MANONMANIAM SUNDARANAR UNIVERSITY

TIRUNELVELI

CHOICE BASED CREDIT SYSTEM

COURSE STRUCTURE FOR B.Com

(With effect from the Academic Year 2017-2018 onwards)

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CHOICE BASED CREDIT SYSTEM

COURSE STRUCTURE FOR B.Com

(With effect from the Academic Year 2017-2018 onwards)

I. B.Com – I Semester

Sem (1)	Pt. I/II/ III/IV/ V (2)	Sub. No. (3)	Subject Status (4)	Subject Title (5)	Contact Hours/ Weeks (6)	L HRS/ Week (7)	T HRS/ Week (8)	P HRS/ Week (9)	C Credits (10)
I	I	1	Language	Tamil/other language	6	6	0	0	4
	II	2	Language	English	6	6	0	0	4
	III	3	Major Core 1	Financial Accounting I	5	5	0	0	4
	III	4	Major Core 2	Business Organisation	5	5	0	0	4
	III	5	Allied I	Business Economics	6	6	0	0	3
	IV	6	Common	Environmental Studies	2	2	0	0	2
	Sub Total				30	30	0	0	21

I. B.Com – II Semester

Sem (1)	Pt. I/II/ III/IV/ V (2)	Sub. No. (3)	Subject Status (4)	Subject Title (5)	Contact Hours/ Weeks (6)	L HRS/ Week (7)	T HRS/ Week (8)	P HRS/ Week (9)	C Credits (10)
II	I	7	Language	Tamil/ other language	6	6	0	0	4
	II	8	Language	English	6	6	0	0	4
	III	9	Major Core 3	Financial Accounting II	5	5	0	0	4
	III	10	Major Core 4	Principles of Management	5	5	0	0	4
	III	11	Allied II	Marketing	4	4	0	0	3
	IV	12	Common	Value Based Education/ Social Harmony	2	2	0	0	2
	IV	13		Field work	2	2	0	0	2
	Sub Total				30	30	0	0	23

I B. COM (I SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -1
FINANCIAL ACCOUNTING I

L	T	P	C
5	0	0	4

Objectives

Total 60 hours

1. To acquire conceptual knowledge of financial accounting.
2. To impart skills for recording various kinds of business transactions.

Unit I **15 hours**

Accounting – Definition – Branches of Accounting – Functions of Accounting – Advantages – Limitations –Book keeping – Difference between Book keeping and Accounting – Users of Accounting information – Accounting Principles – Concepts and Conventions – Accounts and classification – Double entry system of Accounting – Journal – Ledger – Subsidiary Books – Trial balance – Final Accounts

Unit II **10hours**

Bank Reconciliation Statement – Rectification of Errors – Suspense Account

Unit III **15 hours**

Bills of Exchange- Essentials – Accounting Treatment – Renewal of the Bill – Noting Charges – Retiring the Bill – Insolvency – Accommodation Bill

Unit IV **10hours**

Depreciation – Meaning – Causes – Types – Straight Line Method – Written Down Value Method – Annuity Method – Sinking Fund Method – Insurance Policy Method.

Unit V **10hours**

Single Entry system – Meaning – Salient Features – Defects – Statement of Affairs Method – Conversion Method – Difference between Single entry and Double entry System

Text & Reference Books

1. S.P.Jain & K.L.Narang, Advanced Accountancy, Kalyani Publishers, New Delhi.
2. R.L.Gupta and M.Radhaswamy, Advanced Accountancy, Sultan Chand &Sons, New Delhi.
3. M.C.Shukla and T.S.Grewal, Advanced Accountancy, Sultan Chand &Co., New Delhi.
4. Dr.M.A.Arulanandam & K.S.Raman, Advanced Accountancy, Himalaya Publishing House, Mumbai.
5. T.S.Reddy & A. Murthy, Advanced Accountancy, Margham Publications, Chennai.
6. R.S.N.Pillai, Bagavathi & S.Uma, Fundamentals of Advanced Accounting, S.Chand & Company Ltd., New Delhi.

I B. COM (I SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -2
BUSINESS ORGANISATION

L	T	P	C
5	0	0	4

Objectives **Total 60 hours**

1. To understand business and its role in society.
2. To enable the student to undertake business activities.

Unit I **14 hours**

Nature and scope of Business: Concept of Business-human occupations-Profession, Employment and business-Divisions of business-Industry and Commerce-Business system-Objectives of business-Essentials of a successful business- Qualities of a good businessman.

Unit II **12 hours**

Types of Business organizations: Sole proprietorship- Partnership-Joint Stock company-Co-operatives-Nonprofit business organizations under the Societies Act and Trusts-Public sector business units-Public utilities -Unique features of each one and their merits and demerits.

Unit III **10 hours**

Partnership: Kinds of firms-Kinds of partners-Basic legal requirement in registration of partnership firm-Comparison with sole proprietorship-Partnership deed and its contents, Rights and duties of partners-Dissolution-Suitability of partnership.

Unit IV **12 hours**

Company: Kinds of companies-Private company-Public company-Comparison with partnership firm-Multinational Companies- Meaning-Definition- Advantages- Disadvantages-Features- Impact of Multinational Companies in India.

Unit V **12 hours**

Co-Operative Organization: Formation of Co-operative organization under the Societies Registration Act and Tamil Nadu Co-operative Societies Act-Management of Co-operative organizations-Co-operatives versus Companies-Cooperatives versus Partnership-Types of Co-operatives-Co-operative Movement in India.

Text & Reference books

1. Y.K.Bhushan, Business Organization and Management, Sultan Chand & sons, 2012.
2. C.B.Gupta, Business Organization and Management, Mayr Paperbacks, 2011.
3. S.A.Sherlekar, Modern Business Organization and Management, A System Approach, Himalaya Publications, 2010.

I B. COM (I SEMESTER) – UNDER CBCS
PART-III - ALLIED – I
BUSINESS ECONOMICS

L	T	P	C
6	0	0	3

Objectives **Total 45 hours**

1. To identify the role of supply and demand in a market economy
2. To enhance knowledge on recent economic trends

Unit I **9 hours**

Introduction of Economics and Business Economics: Meaning, Nature and Significance of Economics – subject matter of Economics – Meaning, Nature and Significance of business Economics – Role of business economics in decision making – Role and responsibilities of a business economist.

Unit II **9 hours**

Consumption and Demand analysis: Business significance of Consumption and Demand – Demand determinants – Law of demand and demand curves – Types of demand – Concept of elasticity – Methods of measuring price elasticity of demand – Relationship between price elasticity and sales revenue.

Unit III **9 hours**

Production Analysis: Factors of production and their characteristics – Production possibility curves – Concepts of total product, Average product and Marginal product – Fixed and variable factors – Classical and Modern approaches to the law of variable proportions – Law of returns to scale and Economies and diseconomies of scale.

Unit IV **9 hours**

Supply and Cost analysis: Supply – Factors affecting supply – Law of supply – Elasticity of supply and types of elasticity of supply – Cost of production – Concepts of Cost– Sunk cost and future cost, direct cost and indirect cost – Cost curves – Total, Average, Marginal cost curves – Relationship of MC to AC – Fixed and variable cost curves.

Unit V **9 hours**

Price and output decisions in various market forms: Role of Time in determining the value of products – Equilibrium conditions of a firm and Industry under various market forms – Price and output determination in a Perfect Market – Price and output determination in an

Imperfect Market with specific reference to Monopoly, Monopolistic competition and Oligopoly.

Text & Reference Books

1. Chaturvedi. D.D., Gupta. S.L. and Sumitra. A.L., Business Economics-Test and cases, Galgotia publishing company, New Delhi, 2001.
2. Manab Adhkary, Business Economics (2nd Edition), Excel Books, New Delhi, 2002.
3. Samuelson. B.A., Economics, Tale MC Graw Hill, New Delhi, 1976.

I B. COM (II SEMESTER) – UNDER CBCS
PART III – MAJOR CORE-3
FINANCIAL ACCOUNTING II

L	T	P	C
5	0	0	4

Objectives **Total 60 hours**

1. To enhance critical and analytical approach to different types of accounting.
2. To provide real life opportunities to manage business accounts.

Unit I **12 hours**

Consignment – Account Sales – Treatment of Bad Debts – Del- Credere Commission – Over Riding Commission – Difference between Consignment and Sales – Valuation of Unsold Stock – Recurring and Non- recurring expense – Abnormal, Normal Loss – Invoice Price Model.

Unit II **12 hours**

Accounts of Non- Trading Concern – Meaning – Capital and Revenue Expenditure – Capital and Revenue Receipts – Difference between Capital and Revenue items – Income and Expenditure Account – Receipts and Payments Account – Balance Sheet.

Unit III **12 hours**

Joint Venture – Meaning – Difference between Joint Venture and Partnership, Difference between Consignment and Joint Venture – Methods of Maintaining Accounts – Own Book Model (Joint Bank Account) – Separate Book Model – Memorandum Joint Venture Model.

Unit IV **12 hours**

Average Due Date – Account Current.

Unit V **12 hours**

Insurance Claims – Loss of Stock – Loss of Profit – Self Balancing Ledger – Sectional Balancing System.

Text & Reference Books

1. S.P.Jain& K.L.Narang, Advanced Accountancy, Kalyani Publishers, New Delhi.
2. R.L.Gupta and M. Radhaswamy, Advanced Accountancy, Sultan Chand &Sons, New Delhi.
3. M.C.Shukla and T.S.Grewal, Advanced Accountancy, Sultan Chand & Co., New Delhi.

4. Dr.M.A.Arulanandam & K.S.Raman, Advanced Accountancy, Himalaya Publishing House, Mumbai.

5. T.S.Reddy & A.Murthy, Advanced Accountancy, Margham Publications, Chennai.

6. R.S.N.Pillai, Bagavathi & S.Uma, Fundamentals of Advanced Accounting, S.Chand & Company Ltd., New Delhi.

I B. COM (II SEMESTER) – UNDER CBCS
PART III – MAJOR CORE - 4
PRINCIPLES OF MANAGEMENT

L	T	P	C
5	0	0	4

Objectives **Total 60 hours**

1. To familiarise the students with concepts and principles of management.

2. To impart knowledge on the functions of management among the students.

Unit I **12 hours**

Introduction to management- Meaning and definition of management-Functions of management- Managerial skills-Levels of management-Roles of manager-Management as a science or art-contributions to management by F.W.Taylor, Henry Fayol, Elton Mayo and Peter.F.Drucker.

Unit II **12 hours**

Planning and Decision making- Planning-Importance of planning-Process of planning-types of planning methods (Objectives-Policies-Procedures-Strategies and Programmes)-Obstacles to effective planning. Decision making- Types of decisions-Process of decision making-Decision tree.

Unit III **12 hours**

Organising - Organisation-importance-Principles of organizing- Organisational structure-Line and functional-Organisation charts and manuals. Departmentation- Bases-span of management. Delegation- Meaning and definition- Principles of delegation-Centralisation and Decentralisation.

Unit IV **12 hours**

Directing- Directing-Importance and Principles of Directing**.** Motivation-Theories. of motivation-Maslow- Herzberg Theories. Communication-Process-Barriers to effective communication- Leadership-Definition-Styles of Leadership.

Unit V **12 hours**

Co-ordination and control- Co-ordination-Importance-Requirements of effective co-ordination - Control-nature-Basic control process-Control techniques (Traditional and Non-traditional) - Use of computers in Management Information system.

Text & Reference Books

1. Gupta.B., Business Management, Sultan Chand and sons, New Delhi 2011.
2. Prasad.L.M., Principles and Practice of Mangement, Sultan Chand and Sons, New Delhi.
3. Pagar Dinkar , Principles of Management , Sultan Chand and sons, New Delhi 2003.
4. Koontz,O Donell , Weirich, Essentials of Management , Tata MGraw Hill Publishing Company Ltd., New Delhi 1998.
5. Pravin Durai , Principles of Management , Pearson's India Education Services Pvt. Ltd.

I B. COM (II SEMESTER) – UNDER CBCS
PART – III- ALLIED -II
MARKETING

L	T	P	C
4	0	0	3

Objectives **Total 45 hours**

1. To understand the basic marketing concepts.

2. To create skills to develop marketing strategies based on product, price, place and promotion objectives.

Unit I **9 hours**

Marketing – Definition – Objectives – Micro and Macro marketing – Modern marketing concept – Marketing in economics development.

Unit II **9 hours**

. **Functions of marketing** – Marketing mix – Market segmentation – Market targeting and positioning.

Unit III **9 hours**

Product Planning – Development – Product line – Product Mix strategies – Product life cycle –Diversification – Elimination - Pricing Strategies.

Unit IV **9 hours**

Marketing of consumer goods – Channels of distribution – Types of channels – Recent trends in marketing – Online marketing – Tele – Marketing – Service marketing.

Unit V **9 hours**

International marketing – Importance – Objectives – Policies – Import and Export marketing – Prohibited imports and exports – Coping with global competition – Export – Import scene in India.

Text & Reference Books

1. R.S.N Pillai & Bhagavathi, Modern Marketing, Principles & Practices, S. Chand & Co. Ltd., New Delhi.
2. Philip Kotler, Marketing Management Practice, Hall of India Pvt Ltd., New Delhi.
3. William G. Zikmund & Michael d' Amico, Marketing, West Publishing Company.
4. Sundar K, Essentials of Marketing, Vijay Nicole Imprints Private Limited, Chennai.

MANONMANIAM SUNDARANAR UNIVERSITY,

TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES

B.Com Corporate Secretaryship

(Choice Based Credit System)

(With effect from the academic year 2017-2018 onwards)

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES

B.Com Corporate Secretaryship

(Choice Based Credit System)

(With effect from the academic year 2017-2018 onwards)

I. B.Com Corporate Secretaryship – I Semester

Sem (1)	Pt. I/II/ III/IV/ V (2)	Sub. No. (3)	Subject Status (4)	Subject Title (5)	Contact Hours/ Weeks (6)	L HRS/ Week (7)	T HRS/ Week (8)	P HRS/ Week (9)	C Credits (10)
I	I	1	Language	Tamil/other language	6	6	0	0	4
	II	2	Language	English	6	6	0	0	4
	III	3	Major Core 1	Financial Accounting I	5	5	0	0	4
	III	4	Major Core 2	Business Organisation	5	5	0	0	4
	III	5	Allied I	Company Law I	6	6	0	0	3
	IV	6	Common	Environmental Studies	2	2	0	0	2
	Sub Total				30	30	0	0	21

I. B.Com Corporate Secretaryship – II Semester

Sem (1)	Pt. I/II/ III/IV/ V (2)	Sub. No. (3)	Subject Status (4)	Subject Title (5)	Contact Hours/ Weeks (6)	L HRS/ Week (7)	T HRS/ Week (8)	P HRS/ Week (9)	C Credits (10)
II	I	7	Language	Tamil/ other language	6	6	0	0	4
	II	8	Language	English	6	6	0	0	4
	III	9	Major Core 3	Financial Accounting II	5	5	0	0	4
	III	10	Major Core 4	Principles of Management	5	5	0	0	4
	III	11	Allied II	Company Law II	4	4	0	0	3
	IV	12	Common	Value Based Education/ Social Harmony	2	2	0	0	2
	IV	13		Field Work	2	2	0	0	2
	Sub Total				30	30	0	0	23

I B. COM CORPORATE SECRETARYSHIP (I SEMESTER) – UNDER CBCS

PART III – MAJOR CORE -1
FINANCIAL ACCOUNTING I

L	T	P	C
5	0	0	4

Objectives

Total 60 hours

1. To acquire conceptual knowledge of financial accounting.
2. To impart skills for recording various kinds of business transactions.

Unit I **15 hours**

Accounting – Definition – Branches of Accounting – Functions of Accounting – Advantages – Limitations –Book keeping – Difference between Book keeping and Accounting – Users of Accounting information – Accounting Principles – Concepts and Conventions – Accounts and classification – Double entry system of Accounting – Journal – Ledger – Subsidiary Books – Trial balance – Final Accounts

Unit II **10hours**

Bank Reconciliation Statement – Rectification of Errors – Suspense Account

Unit III **15 hours**

Bills of Exchange- Essentials – Accounting Treatment – Renewal of the Bill – Noting Charges – Retiring the Bill – Insolvency – Accommodation Bill

Unit IV **10hours**

Depreciation – Meaning – Causes – Types – Straight Line Method – Written Down Value Method – Annuity Method – Sinking Fund Method – Insurance Policy Method.

Unit V **10hours**

Single Entry system – Meaning – Salient Features – Defects – Statement of Affairs Method – Conversion Method – Difference between Single entry and Double entry System

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4. Dr.M.A.Arulanandam & K.S.Raman, Advanced Accountancy, Himalaya Publishing House, Mumbai.
5. T.S.Reddy & A. Murthy, Advanced Accountancy, Margham Publications, Chennai.
6. R.S.N.Pillai, Bagavathi & S.Uma, Fundamentals of Advanced Accounting, S.Chand & Company Ltd., New Delhi.

I B. COM CORPORATE SECRETARYSHIP (I SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -2
BUSINESS ORGANISATION

L	T	P	C
5	0	0	4

Objectives **Total 60 hours**

1. To understand business and its role in society.
2. To enable the student to undertake business activities.

Unit I **14 hours**

Nature and scope of Business: Concept of Business-human occupations-Profession, Employment and business-Divisions of business-Industry and Commerce-Business system-Objectives of business-Essentials of a successful business- Qualities of a good businessman.

Unit II **12 hours**

Types of Business organizations: Sole proprietorship- Partnership-Joint Stock company-Co-operatives-Nonprofit business organizations under the Societies Act and Trusts-Public sector business units-Public utilities -Unique features of each one and their merits and demerits.

Unit III **10 hours**

Partnership: Kinds of firms-Kinds of partners-Basic legal requirement in registration of partnership firm-Comparison with sole proprietorship-Partnership deed and its contents, Rights and duties of partners-Dissolution-Suitability of partnership.

Unit IV **12 hours**

Company: Kinds of companies-Private company-Public company-Comparison with partnership firm-Multinational Companies- Meaning-Definition- Advantages- Disadvantages-Features- Impact of Multinational Companies in India.

Unit V **12 hours**

Co-Operative Organization: Formation of Co-operative organization under the Societies Registration Act and Tamil Nadu Co-operative Societies Act-Management of Co-operative organizations-Co-operatives versus Companies-Cooperatives versus Partnership-Types of Co-operatives-Co-operative Movement in India.

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2. C.B.Gupta, Business Organization and Management, Mayr Paperbacks, 2011.
3. S.A.Sherlekar, Modern Business Organization and Management, A System Approach, Himalaya Publications, 2010.

I B. COM CORPORATE SECRETARYSHIP (I SEMESTER) – UNDER CBCS
PART-III- ALLIED – I
COMPANY LAW I

L	T	P	C
6	0	0	3

Objectives **Total 45 hours**

1. To know the rules and regulations of the company creations
2. To understand the memorandum of Association and Articles of Association
3. To know the prospectus and membership of the company

Unit I **9 hours**

Meaning and definition of a company, characteristics - company distinguished from partnership - kinds of companies - Private company vs. Public company - conversion.

Unit II **9 hours**

Formation of a company – promotion, incorporation –commencement of business – promoters – legal status of a promoter- functions of promoter – preliminary contract.

Unit III **9 hours**

Memorandum of Association – contents – alteration – articles of association – contents- Doctrine of indoor management – Doctrine of constructive notice.

Unit IV **9 hours**

Prospectus – definition – contents – liability – misstatement in prospectus – remedies for misstatement – statement in lieu of prospectus – listing of securities – underwriting of share.

Unit V **9 hours**

Membership in a company – difference between member and shareholder – who can become a member – Liability of members – rights of members – Duties of members – register and index of members.

***As per the Companies Act 2013**

Text & Reference Books

1. Elements of Merchantile law - N.D. kapoor – Sultan chand & Sons
2. A text book of company law – P.P.S. Gogna – S. Chand & Co. New Delhi
3. Company law – Ashok k. Bogrial , Vikas Publishing House Ltd, New Delhi
4. Tax mann's Company Law & Practice by A.K. Majumdar & Dr. G.K. Kapoor.

5. Company Law & Practice – Part I (Revised) by Dr. V. Balachandran, Publisher - Sultan Chand & Sons

6. Company Law and Secretarial Practice (As per Company ACT 2013) – Dr.P.Srirenganayaki - Charulatha Publications.

I B. COM CORPORATE SECRETARYSHIP (II SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -3
FINANCIAL ACCOUNTING II

L	T	P	C
5	0	0	4

Objectives **Total 60 hours**

1. To enhance critical and analytical approach to different types of accounting.
2. To provide real life opportunities to manage business accounts.

Unit I **12 hours**

Consignment – Account Sales – Treatment of Bad Debts – Del- Credere Commission – Over Riding Commission – Difference between Consignment and Sales – Valuation of Unsold Stock – Recurring and Non- recurring expense – Abnormal, Normal Loss – Invoice Price Model.

Unit II **12 hours**

Accounts of Non- Trading Concern – Meaning – Capital and Revenue Expenditure – Capital and Revenue Receipts – Difference between Capital and Revenue items – Income and Expenditure Account – Receipts and Payments Account – Balance Sheet.

Unit III **12 hours**

Joint Venture – Meaning – Difference between Joint Venture and Partnership, Difference between Consignment and Joint Venture – Methods of Maintaining Accounts – Own Book Model (Joint Bank Account) – Separate Book Model – Memorandum Joint Venture Model.

Unit IV **12 hours**

Average Due Date – Account Current.

Unit V **12 hours**

Insurance Claims – Loss of Stock – Loss of Profit – Self Balancing Ledger – Sectional Balancing System.

Text & Reference Books

1. S.P.Jain& K.L.Narang, Advanced Accountancy, Kalyani Publishers, New Delhi.

2. R.L.Gupta and M. Radhaswamy, Advanced Accountancy, Sultan Chand &Sons, New Delhi.

3. M.C.Shukla and T.S.Grewal, Advanced Accountancy, Sultan Chand & Co., New Delhi.

4. Dr.M.A.Arulanandam & K.S.Raman, Advanced Accountancy, Himalaya Publishing House, Mumbai.

5. T.S.Reddy & A.Murthy, Advanced Accountancy, Margham Publications, Chennai.

6. R.S.N.Pillai, Bagavathi & S.Uma, Fundamentals of Advanced Accounting, S.Chand & Company Ltd., New Delhi.

I B. COM CORPORATE SECRETARYSHIP (II SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -4
PRINCIPLES OF MANAGEMENT

L	T	P	C
5	0	0	4

Objectives **Total 60 hours**

1. To familiarise the students with concepts and principles of management.

2. To impart knowledge on the functions of management among the students.

Unit I **12 hours**

Introduction to management- Meaning and definition of management-Functions of management- Managerial skills-Levels of management-Roles of manager-Management as a science or art-contributions to management by F.W.Taylor, Henry Fayol, Elton Mayo and Peter.F.Drucker.

Unit II **12 hours**

Planning and Decision making- Planning-Importance of planning-Process of planning-types of planning methods (Objectives-Policies-Procedures-Strategies and Programmes)-Obstacles to effective planning. Decision making- Types of decisions-Process of decision making-Decision tree.

Unit III **12 hours**

Organising - Organisation-importance-Principles of organizing- Organisational structure-Line and functional-Organisation charts and manuals. Departmentation- Bases-span of management. Delegation- Meaning and definition- Principles of delegation-Centralisation and Decentralisation.

Unit IV **12 hours**

Directing- Directing-Importance and Principles of Directing**.** Motivation-Theories. of motivation-Maslow- Herzberg Theories. Communication-Process-Barriers to effective communication- Leadership-Definition-Styles of Leadership.

Unit V **12 hours**

Co-ordination and control- Co-ordination-Importance-Requirements of effective co-ordination - Control-nature-Basic control process-Control techniques (Traditional and Non-traditional) - Use of computers in Management Information system.

Text & Reference Books

1. Gupta.B., Business Management, Sultan Chand and sons, New Delhi 2011.
2. Prasad.L.M., Principles and Practice of Mangement, Sultan Chand and Sons, New Delhi.
3. Pagar Dinkar , Principles of Management , Sultan Chand and sons, New Delhi 2003.
4. Koontz,O Donell , Weirich, Essentials of Management , Tata MGraw Hill Publishing Company Ltd., New Delhi 1998.
5. Pravin Durai , Principles of Management , Pearson's India Education Services Pvt. Ltd.

I B. COM CORPORATE SECRETARYSHIP (II SEMESTER) – UNDER CBCS
PART-III - ALLIED-II
COMPANY LAW II

L	T	P	C
4	0	0	3

Objectives **Total 45 hours**

1. To know the share capitals and borrowing powers
2. To understand the regulatory frameworks of companies.

Unit I **9 hours**

Share capital - Types of share capital - Stock and Shares - Types of shares – Application – Allotment – Calls on Shares – Share Certificate – transfer of Shares – forfeiture of Shares – issue of Bonus Shares.

Unit II **9 hours**

Borrowing powers – ultra vires borrowing – methods of borrowing debentures – kinds – creation of charges – fixed and floating charges – registration of changes.

Unit III **9 hours**

Directors – appointment – position – qualification, disqualification – removal – duties of directors – powers – liability of directors – managerial remuneration – board meetings – managing directors – rights and duties.

Unit IV **9 hours**

Dividend – Rules regarding dividend – penalty for default – payment of interest out of capital – Appointment of Auditors – Removal – Remuneration – rights, powers and duties of auditors.

Unit V **9 hours**

Winding up – Modes of winding up – official liquidator – duties and powers of liquidators.

***As per the Companies Act 2013**

Text & Reference Books

1. Elements of Merchantile law – N.D. Kapoor – Sultan Chand & Sons.
2. A Text book of company Law – P.P.S Gogna – S.Chand & Co. New Delhi.
3. Company Law – Ashok Bagrial, Vikas publishing house Ltd, New Delhi.
4. Tax Man's Company Law & Practice – By A.K. Majumdar & Dr. G.K.Kapoor
5. Company Law & Practice – Part I (Revised) by Dr. V. Balachandran, Publisher - Sultan Chand & Sons.
6. Company Law and Secretarial Practice (As per Company ACT 2013) – Dr.P.Srirenganayaki - Charulatha Publications.

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI
CHOICE BASED CREDIT SYSTEM
COURSE STRUCTURE FOR B.A. Economics
(With effect from the Academic Year 2017-2018 onwards)

I SEMESTER

PART	SUBJECT STATUS	SUBJECT	HOURS	L	C
I	Language	Tamil	06	06	04
II	Language	English	06	06	04
III	Core 1	Micro Economics I	06	04	04
	Core 2	Statistical Methods I	06	04	04
	Allied I	Principles of Advertisement I	04	03	03
IV	Common	Environmental Studies	02	02	02
		TOTAL	30		21

II SEMESTER

PART	SUBJECT STATUS	SUBJECT	HOURS	L	C
I	Language	Tamil	06	06	04
II	Language	English	06	06	04
III	Core 3	Micro Economics II	05	04	04
	Core 4	Statistical Methods II	05	04	04
	Allied II	Principles of Advertisement II	04	03	03
IV	Common 2	Value Based Education	02	02	02
		FIELD WORK 1	02	-	02
		TOTAL	30	-	23

III SEMESTER

PART	SUBJECT STATUS	SUBJECT	HOURS	L	C
I	Language	Tamil	06	06	04
II	Language	English	06	06	04
III	Core 5	Mathematical Methods I	06	04	04
	Allied III	Entrepreneurial Development I	04	02	03
IV	Skill Based Core 1	International Economics I	04	04	04
IV	Non Major Elective 1	Economics for Completive Examination I	02	02	02
		FIELD WORK 2	02	-	02
		TOTAL	30		23

IV SEMESTER

PART	SUBJECT STATUS	SUBJECT	HOURS	L	C
I	Language	Tamil	06	06	04
II	Language	English	06	06	04
III	Core 6	Mathematics II	06	06	04
	Allied IV	Entrepreneurial Development II	04	04	03
	Skill Based Core 2	International Economics II	04	04	04
IV	Non Major Elective 2	Economics for Completive Exam II	02	02	02
V	Extension Activities 1	NSS, NCC, YRC,YWF	00	00	01
		FIELD WORK 3	02	00	02
		TOTAL	30	-	24

V SEMESTER

PART	SUBJECT STATUS	SUBJECT	HOURS	L	C
III	Core 7	Macro Economics I	06	04	04
	Core 8	Public Finance I	06	04	04
	Core 9	Money and Banking I	06	04	04
IV	Major elective 1	Indian Economy I	05	03	04
	Major elective 2	Labour Economics	05	03	04
	Skill based common I	Personality Development Effective / Youth Leadership	02	02	02
		TOTAL	30	-	22

VI SEMESTER

PART	SUBJECT STATUS	SUBJECT	HOURS	L	C
III	Core 10	Macro Economics II	05	05	04
	Core 11	Public Finance II	04	04	04
	Core 12	Money and Banking II	04	04	04
	Core 13	Indian Economy II	04	04	04
IV	Major Elective 3	Planning and Growth	05	05	03
	Project	Group	08	-	08
		TOTAL	30	-	28

Hours Total : 180

Credit Total : 141

Core: 13

Allied :04

Skill Based Core: 02

Skill Based Common: 01

Non Major Elective: 02

Major Elective: 03

Field Work : 03

Common : 02

Project : 01

Extension Activity : 01

MICRO ECONOMICS – I

Unit – I Introduction

Definition of Economics – Main Divisions of Economics – Micro Economics – Importance and Limitations – Distinction between Micro and Macro Economics – Economic Laws – Basic Concepts.

Unit – II Consumption

Human wants - Law of Diminishing Marginal Utility – Law of Equi – Marginal Utility – Consumer's Surplus – Law of Demand – Elasticity of demand – types – Factors determining elasticity of demand – Measurement of Elasticity of demand.

Unit – III Indifference curve Analysis

Indifference Curve Analysis – Properties of Indifference Curves – Marginal Rate of Substitution - Consumer's equilibrium in terms of indifference curves – Price Effect – Income effect – Substitution effect – Uses of IC Analysis.

Unit – IV Production :

Meaning of Production – Factors of production – Characteristics – Theories of Population – Capital formation – Functions of Entrepreneurs – Division of Labour – Merits and Demerits – Large and Small scale Production –Merits and Demerits .

Unit – V Production Function

Production Function – Types of Production Functions – Law of Variable proportion – Law of Diminishing Returns – Law of increasing Returns – Law of constant Returns.

Reference:

1. Principles of Economics - K.P.M.Sundaram
2. Micro Economics - M.L.Seth
3. Advanced Economic Theory - M.L.Jhingan

STATISTICAL METHODS–I

Unit – I Introduction:

Definition of statistics and explanations –collection of data – primary and secondary data.

Unit – II Classification and Tabulation:

Meaning and objectives of classification –Tabulation – Rules for constructing diagrams – graphs of time series data and frequency distribution.

Unit – III Averages:

Averages – Qualities of a good average – Measurement of average – Arithmetic Mean, Media, Mode– Relative merits and demerits.

Unit – IV Dispersion:

Measures of Dispersion – Qualities of good measure of dispersion – Types of dispersion –Range, Quartile deviation – Mean deviation – Standard deviation – absolute and relative measures.

Unit – V Skewness and kurtosis:

Skewness – Types – Measures of Skewness – absolute and relative measures – Four types of moments – Kurtosis.

Text Books:

1. S.P.Gupta, Statistical Methods, Sultan Chand & Sons, New Delhi, 2011.
2. R.S.N.Pillai & Mrs.Bagawathi, Statistics, S.Chand & Company, Ramnagar, New Delhi, 2006.

Reference Books:

1. H.C.Sexeva and P.V.Surendran, Statistical inference, S.Chand & Company New Delhi.
2. Raonald J.Wonnacott, Introductory Statistics, John Wiley & Sons, New York.
3. Atty Marry R Spie Gel, Statistics in S.I.Units, McGraw Hill International Book Company, Newyork.
4. G.Undy Yule , Theory of Statistics, Universal Book Stall, New Delhi.
5. R.P.Hooda, Introduction to statistics, Macmilan & company, New Delhi,2002.
6. B.L.Agarwal, Basic Statistics, New Age International New Delhi 2009.
7. D.M.Mithani, Economics Statistics, Oxford & IPH Publishing Company, New Delhi, 2001.
8. C.P.Gupta, Statistical Methods , Vikas Publishers Pvt. Ltd., New Delhi 2005.
9. Girija, M.Sasikala.L, and Girija Bai, Introduction to Statistics, Vrinda publications, New Delhi, 2004.

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Principles of Advertisement- I Allied I

Unit I - Introduction

Meaning- definition - features and importance of advertising - types of advertising.

Unit II - Advertising media - meaning - selection - Factors influencing selection of media - Display advertising.

Unit III - Press advertising

Newspapers, Foreign papers, magazines - magazine circulation.

Unit IV - Outdoor advertising

Features - Forms of outdoor advertising - merits & Demerits -indoor vs outdoor

Unit V - Electronic media

Radio Advertising - Television advertising - Film advertising - Internet - Audio - visual cassettes - screen slides - Electronic signs.

SEM – II

MICRO ECONOMICS – II

Unit – I Cost and Revenue

Cost concepts – Fixed cost and variable cost – Average cost and marginal cost – Shortrun cost curves – Longrun curves.

Revenue concepts – Revenue curves under different market conditions.

Unit – II Market theories

Perfect competition – Features – Price determination – Equilibrium of firm and industry. Monopoly – Types – Features – Price determination – Monopolistic competition – Features – Price determination.

Unit – III Distribution Theory

The Marginal Productivity theory of Distribution – Rent – Ricardian theory of rent – Quasi – rent – Modern theory of rent.

Unit – IV Wages

Wages – Money wage – Real wage – Difference in wage – Theories of wages – Trade union and wages.

Unit – V Interest and Profit

Interest – Net interest – Gross interest – Theories of interest – Liquidity Preference theory – Loanable fund theory – Profit – Net Profit – Gross Profit – Theories of Profit – Risk and uncertainty theories – Dynamic theory of profit.

Reference :

1. Micro Economics - S. Sankaran
2. Principles of Economics - M.L. Seth
3. Advanced Economic theory - M.L. Jhingan

STATISTICAL METHODS - II

UNIT I : Correlation And Regression :

Meaning – Types of Correlation – Karl Pearson's Co-efficient of Correlation – Rank Correlation.

Regression: Meaning – Uses of Regression analysis – difference between correlation and– regression line equations.

UNIT II : Analysis of Time Series :

Secular Trend – Seasonal Variations – Classification of time series- Measurement of trend – Free hand or Graphic Method – Method of least squares.

UNIT III: Index Number :

Uses, Problems in the construction of Index Number – Methods of Constructing index number- Lapser's method – Pastel's method – Fisher's ideal index number – Consumer Price.

UNIT IV: Probability:

Definition – mutually exclusive events – Equally likely events – Simple and Compound events– addition and multiplication theorems (Without proof- Only basic elementary level simple problems)

UNIT V: Association of Attributes:

Meaning – Uses – Consistency of data – Methods of studying association – Yule's co-efficient.

Reference Books:

1. D.G.Rees, Essential Statistics, Chapman and Hall, London, Newyork, 2nd Edition, 1985.
2. Ronald J.Wonnacott , Introductory Statistics, Johnwiley & Sons, New York, 4th Edition, 1985.
3. Murray.R. Spiegel, Statistics, McGraw – Hill International Book Company, New York, 1st Edition, 1981.
4. B.L.Agarwal, Basic Statistics, Wiley Easter Ltd., New Age International Ltd., New Delhi. 2nd Edition, 1988.
5. D.C.Sancheti, Statistics, Sultan Chand & sons, New Delhi, 7th Edition, 2005
6. P.N. Arora, Statistics, S.Chand & company Ltd., Ram Nagar, New Delhi. 1st Edition, 1994.
7. J.Medhi, Statistical Methods, Wiley Eastern Limited New Delhi, 7th Edition, 1992.
8. Shivakumar, Practical Statistics, Sulthan chand & Sans, Daryaganj, New Delhi, First Edition, 1981.
9. M. Manokaran, Statistical Methods, Palani Paramount Publications, Anna Nagar, Palani, 1st Edition, 1992
10. Agarwal D.R. Mathematics and Statistics in economics, Vrinda Publications, (P) Ltd., New Delhi, 1st Edition, 2003.

Principles of Advertisement - II Allied II

Unit I - Advertising budget

Advertising Budget - methods of Budgeting - importance and factors affecting advertising Budget.

Unit II - Advertising copy

Preparation of an effective advertising copy - Qualities of a good advertising copy - classification -elements.

Unit III - Layout : Meaning - preparation of layout - types of layout - components - Printing - Typography - Proof reading & proof correction - Language for advertisement - correction marks

Unit IV - Advertising Appeal - meaning - types - Buying motives - Evaluation of Advertising effectiveness - methods of Advertising effectiveness.

Unit V - Advertising agency

Advertising agency - Types and structure of advertising agency - functions - selection of advertising agency - services of advertising agency.

Reference Books

Advertising planning and Implementation - Sangeetha Sharma

Advertising - Dr. Pazhani & Dr. Jessi

Advertising management - R.K. Chandran

Advertising as career - Subrata Bannerjee

Marketing - Rajan Nair

Principles of Marketing - Rajan Nair & Ranjit Nair

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI
UG COURSES – AFFILIATED COLLEGES

B.A. English

(Choice Based Credit System)

(with effect from the academic year 2017-2018 onwards)

SEMESTER - 1

Sem	Part I/II/ III/IV	Sub. No	Subject Status	SUBJECT TITLE	Hrs/ Week	Credits	Marks				
							Maximum			Passing Minimum	
							Int.	Ext.	Tot	Ext.	Tot.
I	I	1	Language	TAMIL/OTHER LANGUAGE	6	4	25	75	100	30	40
	II	2	Language	ENGLISH	6	4	25	75	100	30	40
	III	3	Core - 1	INDIAN WRITING IN ENGLISH - I	4	4	25	75	100	30	40
	III	4	Core - 2	BRITISH FICTION	4	4	25	75	100	30	40
	III	5	Core - 3	AUSTRALIAN LITERATURE	4	4	25	75	100	30	40
	III	6	Allied - 1	SOCIAL HISTORY OF ENGLAND	4	3	25	75	100	30	40
	IV	7	Common	ENVIRONMENTAL STUDIES	2	2	25	75	100	30	40
	SUB TOTAL				30	25					

MSU/2017-18/UG-Colleges/Part-III (B.A. English) Semester-I/Paper. No. 3 Core-1

Core-I
Indian Writing in English

Objectives:

- To introduce the learners the rich literary tradition in Indian writing in English.
- To acquaint the students the various genres in Indian writing in English

Unit-I

Prose

M.K. Gandhi	: The Gospel of Non-Violence
Jawaharlal Nehru	: Tryst with Destiny
C. Rajagopalachari	: Tree Speaks

Unit-II

Poetry

Rabindranath Tagore	: From *Gitanjali*: The Tame Bird was in a Cage
Nissim Ezekiel	: Night of the Scorpion
A. K. Ramanujan	: Small-Scale Reflections on a Great House
Kamala Das	: The Old Play House

Unit-III

Short-Stories

R. K. Narayan	: Astrologer's Day
Ruskin Bond	: The Woman on Platform No. 8
Prem Chand	: Idgah

Unit-IV

Drama

Vijay Tendulkar	: *Silence! The Court is in Session*

Unit-V

Fiction

Mulk Raj Anand	: *Untouchable*

Text Prescribed:

Unit I, II & III: *Selections from Indian Writing in English for Undergraduates*. Board of Editors. New Century Book House (P) Ltd.

Unit IV: *Silence! The Court is in Session*. Vijay Tendulkar. Oxford.

MSU/2017-18/UG-Colleges/Part-III (B.A. English) Semester-I/Paper. No. 4 Core -2

Core-II
British Fiction

Objectives:

- To familiarize the students with the evolution of the genre of fiction in Britain.
- To enhance vocabulary and usage of English through reading.

Unit-I

Henry Fielding : *Joseph Andrews*

Unit-II

Sir Walter Scott : *Kenilworth*

Unit-III

Charles Dickens : *Oliver Twist*

Unit-IV

Thomas Hardy : *Far from the Madding Crowd*

Unit-V

Doris Lessing : *The Grass is Singing*

MSU/2017-18/UG-Colleges/Part-III (B.A. English) Semester-I/Paper. No. 5 Core - 3

Core-III
Australian Literature

Objectives:

- To introduce the students to the Australian literary texts and approach them from a postcolonial perspective.
- To make him approach selected texts for their literary value and cultural importance.

Unit – I

Prose

Sally Morgan	:	A Black Grandmother
Dick Roughsey	:	Faces of White Pipe Clay
David Malouf	:	*From* Remembering Babylon

Unit –II

Poetry

Dorathy Hewett	:	*From* Testament
Mudrooroo Narogin (Colin Jackson):		They Give Jacky Rights
Silvana Gardner	:	Old Girl
Kevin Gilbert	:	Mister Man

Unit –III

Short-Stories

Tim Winton	:	Neighbours
Barbara Baynton	:	The Chosen Vessel
Henry Lawson	:	The Drover's Wife

Unit –IV

Drama

Jack Davis	:	*Kullark* (*Home*)

Unit –V

Fiction

Kate Grenville	:	*The Secret River*

Texts:

Australian Literature. Ed. Board of Studies. Angel Publishers. Chennai-8

Unit 1, 2, & 3: The Arnold Anthology of Post-Colonial Literatures. Ed. John Thieme. Arnold Publications.

Allied - I
Social History of England

Objectives:

- To familiarize the students with the historical movements and the cultural politics of England.
- To provide the student the social-cultural background on which a literary text is grounded.

Unit-I

Introduction – A brief outline of British History

Chapter I The Renaissance

II The Reformation

Unit-II

Chapter III The Religion of England

IV The Elizabethan Theatre

VI The Civil War and its Social Consequences

Unit-III

Chapter VII Puritanism

VIII Restoration England

XI Coffee-House Life in London

Unit-IV

Chapter XIII The Industrial Revolution

XIV The Methodist Movement

XV Other Humanitarian Movement

Unit-V

Chapter XVI Effects of the French Revolution

XVIII The Victorian Age

XIX Development of Education in Victorian England

Texts Prescribed:

A. G. Xavier. *Introduction to the Social History of England*. Published by S. Viswanathan (Printers and Publishers) Pvt. Ltd.

Reference:

G.M. Trevelyan. *English Social History. A Survey of Six Centuries: Chaucer to Queen Victoria.*

Padmaja Ashok. *The Social History of England*. Padmaja Ashok. Orient Black Swan. 2011.

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI
UG COURSES – AFFILIATED COLLEGES

B.A. English

(Choice Based Credit System)

(with effect from the academic year 2017-2018 onwards)

SEMESTER - II

Sem	Part I/II/ III/IV	Sub. No	Subject Status	SUBJECT TITLE	Hrs/ Week	Credits	Marks				
							Maximum			Passing Minimum	
							Int.	Ext.	Tot	Ext.	Tot.
II	I	7	Language	TAMIL/OTHER LANGUAGE	6	4	25	75	100	30	40
	II	8	Language	ENGLISH	6	4	25	75	100	30	40
	III	9	Core - 4	INDIAN WRITING IN ENGLISH - II	4	4	25	75	100	30	40
	III	10	Core - 5	AMERICAN LITERATURE	4	4	25	75	100	30	40
	III	11	Core - 6	ENGLISH GRAMMAR AND USAGE	4	4	25	75	100	30	40
	III	12	Allied- II	LITERARY FORMS	4	3	25	75	100	30	40
	IV	13	Common	VALUE BASED EDUCATION/SOCIAL HARMONY	2	2	25	75	100	30	40
	SUB TOTAL				30	25					

MSU/2017-18/UG-Colleges/Part-III (B.A. English) Semester-II/Paper. No. 9/Core - 4

Indian Writing in English – II

Unit-I

Prose

Swami Vivekananda	:	Work and its Secret
Khushwant Singh	:	The Portrait of a Lady
Amitav Ghosh	:	A Town by the Sea

Unit-II

Poetry

Jayanta Mahapatra	:	Freedom
K. Sachidananthan	:	Mad
Mohanchand	:	Before I am Born
Gieve Patel	:	Old Man's Death

Unit-III

Short-Stories

K. A. Abbas	:	Bholi
Prajwal Parajuly	:	The Cleft
Mrinal Pandey	:	Girls

Unit-IV

Drama

Asif Currimbhoy	;	*The Refugee*

Unit-V

Fiction

Easterine Kire	:	*When the River Sleeps*

Texts:

Asif Currimbhoy. *The Refugee*. Pub. Writer's Workshop. Calcutta.

Easterine Kire. *When the River Sleeps*. Zuban Publications. NewDelhi.

MSU/2017-18/UG-Colleges/Part-III (B.A. English) Semester-II/Paper. No. 10/Core - 5

American Literature

Objectives:

- To acquaint the students with different literary era, movements and authors relating to American history and literature
- To enhance communicative and creative skills through literature.

Unit – I

Prose

Edgar Allen Poe	-	Philosophy of Composition
Henry David Thoreau	-	A Battle of Ants
Martin Luther King	-	I have a Dream

Unit –II

Poetry

Edgar Allen Poe	-	The Raven
Walt Whitman	-	O! Captain My! Captain
Robert Frost	-	West-running Brook

Unit –III

Short-Story

O'Henry	-	Last Leaf
James Thurber	-	The Night the Ghost got in
Kate Chopin	-	Regret

Unit – IV

Drama

Arthur Miller	-	*All My Sons*

Unit – V

Fiction

Nathaniel Hawthorne	-	*The Scarlet Letter*

Text Prescribed:

A Text Book of American Literature. Ed. Board of Editors. Sarah Publishers. Tiruchi.

All My Sons. Arthur Miller. Oxford University Press.

MSU/2017-18/UG-Colleges/Part-III (B.A. English) Semester-II/Paper. No. 11/Core - 6

English Grammar and Usage

Objectives:

- To enhance the communicative competence by improving the grammatical skills.
- To strengthen the writing skills by augmenting the grammatical skills.
- Enable the students to use English correctly and confidently.

Unit-I

The Word: Uses

- The Nouns – Kinds – Number – Gender – Compound nouns – Forms of the Genitive.
- Articles
- Pronouns
- Adjectives – Kinds – formation with affixes
- Adverbs: Kinds – Formation – Functions – Uses
- Prepositions: Simple and Compound prepositions; those accompanying verbs, adjectives and nouns.
- Conjunctions: Coordinating, Correlatives and Subordinating.

Unit-II

The Verb:

- Transitive, intransitive and Linking – Usage
- Phrasal verbs
- Auxiliaries: Primary and Models
- Concord: Subject-Verb Agreement

Unit-III

The Sentence:

- Kinds of Sentences
- Formation of Negatives
- Yes or No Questions
- Word Questions
- Question Tags

Unit-IV

Tenses: Forms and Uses

- Verb Forms
- Non-Finites: Present and Past Participles - Uses
- Infinitives and Gerunds – Uses

Unit-V

- Active and Passive Voices
- Indirect Speech
- Transformation of Sentences (Pages236-237 & 248-258 only)

Text: *English Grammar and Usage*. Mahaam Publishers, Chennai.

MSU/2017-18/UG-Colleges/Part-III (B.A. English) Semester-II/Paper. No. 12/Allied - 2

Literary Forms

Objectives:

- To introduce the various genres and forms of literature.

Unit-I

Section I – Poetry – Chapter II: Poetical Types
The Lyric
The Ode
The Sonnet
The Elegy

Unit-II

The Idyll
The Ballad
The Satire

Unit-III

Section II – Drama Chapter II: Dramatic Types
Tragedy and Comedy
Tragi-Comedy
Farce and Melodrama
The Masque
The One-Act Play
The Dramatic Monologue

Unit-IV

Section III – Prose
The Essay
The Novel
The Short-Story

Unit-V

Biography
Autobiography

Prescribed Text:

A Background to the Study of English Literature (Revised Edition). B. Prasad, Macmillan.

Reference:

A Companion to Literary Forms, Padmaja Ashok, Orient BlackSwan

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI
CHOICE BASED CREDIT SYSTEM
COURSE STRUCTURE FOR B.A. History
(With effect from the Academic Year 2017-2018 onwards)

I Semester

Part	Subject Status	Subject	Hours	L	C
I	Language	Tamil	06	06	04
II	Language	English	06	06	04
III	Core 1	History of India upto 647 A.D.	04	04	04
III	Core 2	History of Tamil Nadu upto 1336 A.D.	05	04	04
III	Core 3	Principles of Tourism	04	04	04
III	Allied I	Theory of Political Science /Economics / Sociology	03	03	03
IV	Common	Environmental Studies	02	02	02
		Total	30	-	25

II Semester

Part	Subject Status	Subject	Hours	L	C
I	Language	Tamil	06	06	04
II	Language	English	06	06	04
III	Core 4	History of India (647 A.D. – 1526 A.D.)	04	04	04
III	Core 5	History of Tamil Nadu 1336 A.D. – 1800 A.D.	05	04	04
III	Core 6	Tourism Product in India	04	04	04
III	Allied II	Modern Constitutions / Economics / Sociology	03	03	03
IV	Common 2	Value Based Education	02	02	02
		Total	30	-	25

History of India upto 647 A. D.

Unit I: Geographical features of India- Survey of the sources for Ancient India- Prehistoric India – Indus valley civilization – Vedic Civilization – Vedic Literature – Caste System.

Unit II: Condition of North India during 6th century B. C.- Rise of new religions – Buddhism – Jainism – Foreign invasions – Greek and Persian – effects.

Unit III: The Mauryan Empire – Chandra Gupta Maurya – Asoka – Edicts of Asoka – Asoka's Dharma – Mauryan Administration – Causes for the downfall of Mauryan Empire – Kushans – Kanishka – Gandhara Art.

Unit IV: The Gupta Dynasty – Chandra Gupta I – Samudra Gupta – Golden Age of Guptas – Gupta Administration – Causes for the downfall – Fahien's report.

Unit V: Vardhana Empire – HarshaVardhana – Political, Social, Economic and Religious life – HieunTsan's account

Reference Books:

1. Anil Chandra Banerjee, History of India, Maharjee and Co Private Limited, Calcutta, 1974.
2. K. M. Panikar, A Survey of Indian History, Asia Publishing house, Mumbai, 1963.
3. R. C. Majumdar, An advanced History of India Mac millan, St. Martin's Press, Madras, 1970
4. R. Sathianathaiar, A Political and Cultural History of India, Volume I, S. Vishwanathan Private Limited, Chennai, 1980.
5. J. Dharmaraj, History of India VolI(Tamil) Tensy Publications, Sivakasi, 2015.

6. V. D. Mahajan, Ancient History of India, S. Chaud and Co., New Delhi, 1970.

MSU/2017-18/UG-Colleges/Part-III (B.A. History)/Semester-I/Ppr.no.4/ Core-2

History of Tamil Nadu upto 1336 A. D.

Unit I: Geographical features of Tamil Nadu- Sources – Sangam Age – Political, Social and Economic condition – Sangam Literatures – Sangam rulers – Kalabhra interregnum.

Unit II: Age of the Pallavas – origin – MahendraVarma I – NarasimhavarmanI – Contribution of Pallavas to art and Literature.

Unit III: Cholas – Paranthaka I, Rajaraja I, Rajendra I – Chalukya Cholas – Kulottungan III – Chola administration – Social, economic and religious conditions – Contribution to art and architecture.

Unit IV: Pandyas – First Pandyan Empire – Second Pandyan Empire – Contribution of Pandas to art and architecture.

Unit V: Muslim invasion in Tamil Country – Invasion of Malik Kafur – Rise of Madurai Sultanate – Impact of Muslim rule.

Reference Books:

1. N. Subramanian, Original sources for the History of Tamil Nadu, Ennes Publications, Udumalaipettai, 1994
2. K. K. Pillay, Historical Heritage of the Tamils, M. J. P. Publishers, Chennai, 1979.
3. K. A. NilakandaSastri, The Chilas University of Madras, Chennai, 1987
4. T. V. SadhasivaPandarathar, History of Later Cholas (Tamil), Annamalai University, Annamalai Nagar, 1967.
5. J. Dharmaraj, History of Tamil Nadu, upto 1336(Tamil) Tensy publications, Sivakasi, 2013

6. K. Rajayyan, History of Madurai, Madurai University, Madurai, 1974.

MSU/2017-18/UG-Colleges/Part-III (B.A. History)/Semester-I/Ppr.no.5/ Core-3

Principles of Tourism

Unit I: Definition of Tourism – Meaning – Origin – Basic Components of Tourism – Causes for the rapid growth of Tourism – Location – Accommodation - Transport.

Unit II: Types of Tourism – Domestic, Regional, International – Forms of Tourism – Holiday Tourism, Cultural Tourism, Social Tourism, Business Tourism, Religious Tourism, Health Tourism, Pleasure Tourism and Eco Tourism.

Unit III: Travel through the ages – Ancient period – Romans and Greeks – Indians – Medieval period – Modern period.

Unit IV: Industrial revolution and Tourism – Transportation: roadways, railways, airways and waterways – Tourism organizations – Economic and social impact of tourism.

Unit V: Travel formalities and regulations – Passport VISA – Foreign exchange – customs and health formalities – Positive and negative impact of Tourism

Reference Books:

1. A. K. Bhatia, Tourism Development, Principles and Practices, Sterling Publications, New Delhi, 1997.
2. PranNath Seth, An introduction to Travel and Tourism management, Sterling Publishers, New Delhi, 2007.
3. PranNath Seth, Successful Tourism management, Vol I, Sterling Publishers, New Delhi, 2008.
4. Mohamed Zalfikar, Introduction to Tourism and Hotel Industry, Vikas Publishing House, New Delhi, 2008.

5. J. Dharmaraj, Tourism (Tamil) Tensy Publications, Sivakasi, 2016

MSU/2017-18/UG-Colleges/Part-III (B.A. History)/Semester-I/Ppr.no.6/ Allied -1

Theory of Political Science

Unit I: State and its elements – relationship between Government and Society – Organs of Government – Legislative, Executive and Judiciary.

Unit II: Citizenship – meaning – rights of the citizen – Duties of Citizen – Fundamental rights – How rights are safeguarded.

Unit III: Forms of Government – Unitary and Federal - Types of Constitutions – Written and Unwritten Flexible and rigid.

Unit IV: Executives – Parliamentary and Presidential – Legislature – Unicameral – Bicameral – Judiciary – Judicial review – Rule of Law and Administrative Law.

Unit V: Separation of Powers – Pressure groups – Political parties – Single Party, Bi-party and Multi-party systems

Reference Books:

1. V. D. Mahajan, Select Modern Constitutions, S. Chaud and Co, New Delhi, 1975.
2. A. C. Kapur, Select Constitutions, S. Chaud and Co, New Delhi, 1975
3. Hiermer Finer, The Theory and practices of Modern Government, Surjeet Publications, New Delhi, 1977.
4. B. C. Rai, The World Constitutions, Universal Publications, New Delhi, 1971.

History of India (647 A.D. – 1526 A.D.)

Unit I: Sources for Medieval Indian History – Origin and theory of Rajputs – Civilization and Culture – Arab conquests of Sindh - effects.

Unit II: Advents of Muslim invaders – Mohmud of Ghazni – Muhammed of Ghor – First and Second battles of Tarain – Foundation of slave dynasty – Qutb-ud-din Aibak – Iltumish – SulthanRaziya – Balbaw – Administration – Mongolian threats – effects.

Unit III: Khilfi imperialism – AlaudinKhilji – Malik Kafur's conquests – administration and economic reforms – Rise of Thuglaq – Muhammed bin Tuglaq – FerozTuglaq – Sayyids and Lodis – Art and Architecture – Delhi Sultanate administration.

Unit IV: Foundation of Vijayanager Empire – origin – Krishnadevaraya – Administrations – Art and Architecture – Literature – Battle of Talaikotta.

Unit V: Bahmini Kingdom – origin – disintegration of Bahmini Kingdom – MuhammudGawan

Reference Books:

1. Macra Sing, Medieval History of India, Orient Blackswan, New Delhi, 2009.
2. J. L. Mehta, Advanced study in the history of Medieval India, Sterling Publishers, New Delhi, 1980
3. R. C. Majumdar, Delhi Sultanate, Vol. VI, BharatiVidya Bhavan, 1967.
4. Srivastava, The Delhi Sultanate (711 – 1526) ShivalalAgarwala and Company, Agra, 1977.
5. Satis Chandra, History of Medieval India, Orient Blackswan, New Delhi 2009.

History of Tamil Nadu 1336 A.D. – 1800 A.D.

Unit I: Foundation of Vijayanagarempire – invasion of Kumara Kampana – Impact of Vijayanagar rule on Tamil Nadu – Administration – Valangai and Idangaiissuses.

Unit II: The Nayakas of Madurai – ViswanathaNayak – ThirumalaiNayak – Rani Mangammal – Meenakshi – the decline of Nayakdom of Madurai – Poligar System – Administration – Social and Economic condition – Spread of Christianity – Contribution of Nayak to Tamil culture.

Unit III: The Marathas of Tamil Country – Administration – Constitution of Marathas to Tamil Culture – Sethupatis of Ramnad – some aspects of the rule of Sethupatis – Society, Economy, Religion and Culture.

Unit IV: The Nawabs of Carnatic – Tamil Society under Nawabs – - Anglo-Mysore relations – Administration under Nawabs -The Carnatic wars - Society, Economy, Religion and Culture.

Unit V: The Poligar Rebellion – Khan Sahib andPuliThevar – VeerapandiaKattabomman – The South Indian Rebellion of 1800 – 1801 – Causes, Course and result.

Reference Books:

1. R. Kalidos, History and Culture of Tamils, Vijay publishers, Dindigul, 1976
2. K. Rajayyan, History of Tamil Nadu, 1565 – 1982, Madurai Publishing House, Madurai, 1978
3. N. Subramanian, Social and Cultural History of Tamil Nadu (1336 – 1984), Koodal Publications, Madurai, 1976
4. R. SathiyanathaAiyar, Ministry of Nayaks of Madurai, OVP, 1924
5. K. Rajayyan, South Indian Rebellion, Rao and Raghavan Publishers, Mysore, 1971

Tourism Product in India

Unit I: Definition of Tourism Product –Geographical features of India – Unity in Diversity – Climates – rain and monsoons – the seasonal incidence – floods – droughts and famines – causes and effects – Natural tourist resources and man-made resources.

Unit II: State-wise study of important tourist centres in India – hill resorts – beach resorts – waterfalls lakes – historical monuments – archaeological sites – museums – art galleries – libraries – wildlife and bird sanctuaries – national parks – forts and palaces – ports.

Unit III: Popular pilgrim tourist centres in India – Hindu shrines and temples – Buddhist centres – Jain centres – Christian Churches – Muslim mosques – Sikh Gurdwara.

Unit IV: Cultural attractions of India – Centres of learning – forms of dances – festivals – Indian music – music festivals – important fairs and festivals of India.

Unit V: Main adventure centres of tourist interest in India – trekking, river running, rock climbing, camel safari, hang gliding, hunting, fishing and boat race – Registered tourist guide and his role.

Reference Books:

1. Percy Brown, Indian Architecture (Buddhist and Hindu periods), D.B. Taraporevala, Bombay, 19559.
2. Edith Tomory, A history of fine arts in India, orientblackswan, Madras, 1989.
3. K. R. Srinivasan, Temples of South India, National book trust, New Delhi, 1985
4. R. C. Majumdar, Race and Culture of India
5. A. L. Basham, The wonder that was India
6. J. Dharmaraj, Tourism Product in India (Tamil), Tensy Publications, Sivakasim 2004
7. Acharya Ram, Tourism and Cultural heritage of India.

Modern Constitutions

Unit I: Constitution of England – Salient features – sources – conventions – The Queen – Power and Functions of Prime Minister.

Unit II: Parliament – The House of commons – speakers – the house of lords – the process of Law making – Cabinet – Cabinet dictatorship – Judiciary – Committee system.

Unit III: Constitution of USA – Salient features – framing of the constitution – Federalism – President – election, position and process – Vice President - power.

Unit IV: The Congress – The House of representatives – the senate – pre-eminence of Senate – the process of Law making – Committee system – the Judiciary – Judicial review – Political parties – pressure groups.

Unit V: Swiss constitution – Salient Features – The Federal Council – the Federal assembly – Council of states – National council – The Federal Tribunal – direct democracy – Referendum – Initiatives – the call.

Reference Books:

1. V. D. Mahajan, Select Modern Constitutions, S. Chaud and Co, New Delhi, 1975.
2. B. C. Rai, The World Constitutions, PrakashanKondra, Lucknow, 1979
3. M. G. Clarke, Modern Political constitutions, The English Language book Society, Lucknow, 1973.
4. Kanwar Jain, Constitution of United States, A Kiran publications, New Delhi, 1968.
5. J. Dharmaraj, Modern constitutions (Tamil), Tensy publications, Sivakasi, 2014.
6. A.C.Kapur, Select Constitutions, S. Chaud and Co, New Delhi, 1975.

MANONMANIAM SUNDARANAR UNIVERISTY, TIRUNELVELI-12

B.A. History (Vocational) Tourism (CBCS)

(With effect from the Academic Year 2017 – 2018 Onwards)

1. Scheme of the Course

Distribution of marks in Theory between External and Internal Assessment is 75:25; Minimum Pass is 40% for external and overall components

I Semester

Part	Subject Status	Subject	Hours	C
I	Language	Tamil	06	04
II	Language	English	06	04
III	Core 1	History of Tourism - I	05	04
III	Core 2	COMMUNICATION SKILL	05	04
III	Allied I	1. History of India up to 647 A.D. 2. Computer Application - I 3. Indian Archaeology	06	03
IV	Common	Environmental Studies	02	02
		Total	30	21

II Semester

Part	Subject Status	Subject	Hours	C
I	Language	Tamil	06	04
II	Language	English	06	04
III	Core -3	History of Tourism II	05	04
III	Core -4	Tourism Organization	05	04
III	Allied -II	**Optional** 1. History of India from 647 A.D. to 1526 A.D. 2. Computer Application - II 3. Indian Heritage	06	03
IV	Common	Value Based Education /Social Harmony/ சமூக ஒழுக்கங்களும் பண்பாட்டு விழுமியங்களும்	02	02
		Total	30	21

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Semester-I/Ppr.no.3/ Core-1

History of Tourism - I

Unit I

History of Tourism as a new discipline Evolution of Tourism as an academic subject, Tourism and other social sciences.Methodology for History of Tourism. Primary and secondary sources for studying History of tourism, Chronological Division of History of Tourism, Travellers and Travelogues of Ancient and Medieval World.

Unit II

Tourism – basic concepts:Tourism- Definition, types and determinants, Difference between travel and tourism, Concepts of excursion, holiday, sightseeing, tourists and mass tourism, Tourism Products - definition and Characteristics.

Unit – III

Ancient Civilization, Social conditions and Tourism: Egypt, Mesopotamia, India, China, Rome, Greece Middle Ages: Rise and fall of early empires, Byzantine, Christian and Islamic Civilizations. Tourism activity in the ancient and medieval world: Seven Wonders of the WorldTourism. Pilgrimage (Hindu, Buddhist, Jain, Christian and Islamic), Tourism and Spectator Sports (Olympics, chariot races and gladiator fights), Resorts and Spas, Tramping Royal Tourism and Educational tours

Unit – IV Concept of Discovery, Urbanization- Rome and Varanasi, Trade Routes- Silk Route and Spice Route, Sea Voyages- Columbus and Vasco de Gama, Rise of ationalism-Japan and China, Grand Tour: Classical, Romantic Tour to the East

Unit – V

Four major dimensions of tourism. Factors necessary for the development of travel and tourism. Development of spas. Growth of seaside resorts. Tourism today

Suggested Readings

1. A Farouqui“ Early Social Formations”- Manak, Delhi-2001.
2. A.L. Rouse “The Use of History”- 1971
3. Burkhardt and Madlik”Tourist Past, Present and Future”-Butterworth Heinemann, severaleditions
4. Collingwood “The Idea of History”-Oxford, 1073
5. Franck and Brwonstone “The Silk Road, A history.
6. Gilbert Sigeauxz “History of Tourism”.
7. Herbert “Heritage Tourism and Society”.
8. J. Christopher Holloway “The Business of Tourism.
9. Maisels “ËarlyCivilisations of the Old World”- Business Books Communica, 1978
10. Mclntosh, Goldner, Ritchie “Tourism: Principles, Practices, Philosophy”- John Wiley, New York, 1995
11. Nisbet “Social Change and History”- OxfordUniversity Press, 1972
12. Nora Starr. “Viewpoint”- Prentice Hall, 1997
13. Ratnagar “Trading Ecounters”- OxfordUniv. New Press, 2004
14. Roger Housden “Sacred Journeys in a Modern World”- Simon&Schuster, New York, 1979
15. T. Walter Wallbank “Civilisations Past and Present”- Scott Foresman, London, 1978

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Semester-I/Ppr.no.4/ Core-2

COMMUNICATION SKILL

Unit – I:

Importance of Communication in Tourism – types of communication Purpose of communication – communication process – factors of communication in Tourism

Unit – II:

Communication flow in Tourism Organization – Written, oral and non-verbal communication-barriers and breakdowns in communication – effective communication – electronic media in communication

Unit – III:

Communicative English – grammar for spoken English – conversation practice – comprehensive exercise – language functions – applied grammar.

Unit – IV:

Reading – phonetics – identify the correct sentence – identify additional or unnecessary word in text

Unit – V:

Making effective speeches – common pitfalls in spoken English

Books for Reference:

Harold Koontz, Heinz Weihrich & Ramachandra Aryasri.A	:	Principles of Management
Gantside Modern	:	Business Correspondence
Jane Singleton and Wendy Teraokai	:	Business Listening and Speaking

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Semester-I/Ppr.no.5/ Allied -1(A)

HISTORY OF INDIA UPTO 647 A.D.

Unit – I

Physical Features of India – Effects of Geography on History – Unity in Diversity – Source of Ancient Indian History – Indus Valley Civilization – Chief centres of Indus valley Civilization – Destruction of Indus Valley Civilization.

Unit – II

The Vedic Age – Vedic Literature – Vedic Civilization – Caste System: Merits and Demerits of Caste System.

Unit – III

Religious Movement: Causes for the rise of religious movements – Jainism: Principles of Jainism – Contribution of Jainism- Buddhism: Doctrines – Causes for the downfall of Buddhism = Contribution of Buddhism, Foreign Invasions – Persian Invasion – Macedonian Invasion.

Unit – IV

Mauryan Dyanasty: Sources – Origin – Chandra Gupta Maurya – Bindusara – Asoka – Kalingawar – Asoka's Dharma – Contribution to Buddhism - Mauryan Society and Administration.

Kushans: Kanishka – conquest – Contribution to Buddhism – Art & Architecture – Mahayanism.

Unit – V

Gupta Empire: Sources – Chandra Gupta I – Amudra Gupta – Chandra Gupta II – Gupta Age – Administration – Fahien's Account.

Harsha Vardhana: Conquest – Religion, Art and Architecture – Hiuen Tsang's Account.

Books for Reference

1. Mahajan V.D. : History of India
2. Neelakanda Sastri, K.A. : The Age of Nandas and Mauryas
3. Srivastava A.L : History of Medieval India
4. Sharma, L.P. : History of Ancient India

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Semester-I/Ppr.no.5/ Allied -1(B)

Computer Application - I

Unit – I

Introduction to Computer – What is Computer – Generation of Computer – Components of Computer – Input Devices – Primary Memory – Secondary Memory – CPU – Operating System – Introduction to Application Software

Unit – II

MS Word Basics: Creating word document – editing – applying text enhancement – aligning and formatting – adding bullets and numbering, symbols , date and time – replacing and checking text – printing a documents.

Unit – III

Formatting techniques: Formatting pages – section – using page numbers – header and footer – using columns – constructing tables – creating outlines.

Unit – IV

Understanding mail merge – creating a new data source in word – merging documents – creating catalogue and lists – creating envelops and lables.

Unit – V

Designing a form – using footnotes and endnotes – creating a master document – inserting comments – highlights text.

Books for Reference

1. Nellai Kannan, C. : MS Office
2. Gini Computer and Annette Marquis : Microsoft Office 2000
3. Perker Norton : Introduction to Computer

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Semester-I/Ppr.no.5/ Allied -1(C)

Indian Archaeology

Unit – I

History of Archaeology in India – foundation of the Indological studies – Sir William Jones establishment of Asiatic society – James Prinsep – Alexander Cunningham – Robert Bruce Fooote – John Marshal – Martimer Wheeler – Post-independent era.

Unit – II

Pre-history of India – Old Stone Age – Pre-Harappan Culture of Balushistan – the Indus Civilization or Harappan Culture.

Unit – III

Neolithic – Chalcolithic settlements beyond the Indus system – Neolithic cultures of India, Eastern group etc. – Megalithic period of India – Development of Megalithic types in Tamilnadu.

Unit – IV

Ceramics or pottery – Potteries in India in different periods – Memorial stones – Hero stones in Tamilnadu – Palaeography – Epigraphy.

Unit – V

Pre-historic art – rock art – art of historic India – Gandara and Mathura – Chola Bronzes – Museology – aims – National Museum – Universities and Archaeology.

Books for Reference

1. Venkataraman, R. : Indian Archaeology
2. Rajan, K. : Archaeology Principles and Methods
3. Gomathy Nayagam : An Introduction to Archaeology

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Semester-II/Ppr.no.9/ Core -3

History of Tourism - II

Unit – I Major Social Movements: Renaissance, Reformation, French Revolution, Industrial Revolution, Imperialism, National Movements, Socialism in Europe and Russia, social Tourism and Middle class Tourism

Unit – II

1841 – 1914: Rise of International Tourism , World Cruises, Automobile and Coach Tours, Resort Tourism, Role of Infrastructure, Tourism as an Industry 1914 – 1950: Tourist boom between the World Wars, Tourism and Economy and Crises, Social hanges, Transport and Technological Advances, Women and Tourism, Politics and
Tourism, League of Nations, IUOTO, Bermuda Agreement, IATA, Emergence of Tourism Services Organizations and Civil Aviation

Unit – III

1950 – 2000: Tourism Phenomenon: Long Hauls, Thomas Cook and Package Tours Charters, Role of escorts and guides, Social Reforms and Tourism, Tourism in Newly Independent Countries, Tourism and Globalization, Emergence of Tourism Organizations
and Standardization of services.

Unit – IV

Tourism as a Globalized System .Early Forms of Travel and Types of Journey.Precursors of Modern Tourism .The Foundations of Modern Tourism.The Boom in Mass Tourism in the 19th Century. Holidaying Practices in the Interwar Period.The Expansion of Tourism and Globalization.Approaches to Travel and Tourism.Tourism and Five-year Plans in India. Analysis of National Tourism Policy 2002

Unit – V

Accommodations: Early inns, The grand hotels, Motels, Hotels today. The dimensions of tourism: Attraction, Facilities, Transportation, Hospitality. The role of transportation in shaping tourism.

Suggested Readings

- A Farouqui“ Early Social Formations”- Manak, Delhi-2001.
- A.L. Rouse “The Use of History”- 1971
- Burkhardt and Madlik”Tourist Past, Present and Future”-Butterworth Heinemann, several editionsCollingwood “The Idea of History”-Oxford, 1073
- Franck and Brwonstone “The Silk Road, A history.
- Gilbert Sigeauxz “History of Tourism”.
- Herbert “Heritage Tourism and Society”.
- J. Christopher Holloway “The Business of Tourism.
- Maisels “ËarlyCivilisations of the Old World”- Business Books Communica, 1978
- Mclntosh, Goldner, Ritchie “Tourism: Principles, Practices, Philosophy”- John Wiley, New York, 1995
- Nisbet “Social Change and History”- OxfordUniversity Press, 1972
- Nora Starr. “Viewpoint”- Prentice Hall, 1997
- Ratnagar “Trading Ecounters”- OxfordUniv. New Press, 2004
- Roger Housden “Sacred Journeys in a Modern World”- Simon & Schuster, New York, 1979
- T. Walter Wallbank “Civilisations Past and Present”- Scott Foresman, London, 1978

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Semester-II/Ppr.no.10/ Core -4

TOURISM ORGANIZATIONS

Unit – I:

Introduction – factors influencing organization – nature, purpose and kinds of organization – departmentation – committees – informal organization.

Unit – II:

National Tourist Organizations – Travel Agents Association of India (TAAI) – Indian Association of Tour Operators (IATO) – Federation of Hotel and Restaurant Association of India (PHRAI)

Unit – III:

International organizations – classifications – WTO, IATA, UFTAA, ICAO, WTTC & PATA – International consultative organization – specialized agencies – UNESCO.

Unit – IV:

Public organizations in India – Department of Tourism, Government of India – ITDC – State Tourism Organizations – ITDC, etc. Indian Railways – Ministry of Civil Aviation.

Unit – V:

The users – The International Touring Alliance – World Touring and Automobile Organization (WTAO) – The International Automobile Federation (IAF) – Hotel and Restaurant Industry.

Books for Reference:

Prem Nath Dhar	: International Tourism
Prem Nath Dhar	: Development of Tourism Travel Industry
Bhatia. A.K.	: Tourism Development
Publication of IUOTO, GENEVA	: Introduction to Tourism Concepts and Impacts
Dileep. M.I.	: KITTS, TVM

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Semester-II/Ppr.no.11/ Allied -2 (A)

History of India from 647 A.D. to 1526 A.D.

Unit – I

Sources of Medieval India – Rajaputs – origin of Rajaputs – Rajput Civilization and Culture – Causes of the failure of the Rajaputs – Arab Invasion of Sindh – Causes of the Success of the Arabs – Effects of Arab invasion.

Unit – II

Rise of Ghani – Muhammed of Ghazni – Muhammed of Ghore – First and Second Battle of Tarrain – Delhi Sultanate – Slave Dynasty – Qutub-ud-din Aibak – Iitumish – Raziya- Balban – Administrative Reforms.

Unit – III

Khilji Dynasty – Allaudin Khilji – Malikkaafur – Administration – Tughlug Dynasty – Muhammed-bin-Tughlug-Firoz Tughlug.

Unit – IV

Sayyids and Lodies – Ibrahim Lody – Timur's invasion – Kingdom of Vijaya Nagar – Origin – Kfrishna Deva Raya – Administration, Art, architecture and literature.

Unit – V

Bahmini Kingdom – Origin – Alaudin Bahmanshaw I – Muhammed Gawan – Battle of Talikotta – Disintegration of Bahmini Kingdom.

Books for Reference

1. Ishwari Prasad : History of Medieval India
2. Majumdar, R.C. : An Advance History of India
3. Sharma, L.P. : History of Medieval India
4. Srivastava, A.L. : History of Medieval India

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Semester-II/Ppr.no.11/ Allied -2 (B)

Computer Application - II

Unit – I

Excel: Entering and editing cell entries – excel application window – adjusting row and column – height – inserting and deleting rows, columns and cells – borders and colours – printing.

Unit – II

Advance formatting in excel: using auto format – custom format – financial and statistical funtioninf – sorting a database – filtering a data base – using a data from – auditing worksheet.

Unit – III

Creating a chart – moving, sizing and printing chart objects – editing and formatting charts – creating pivot tables.

Unit – IV

Power point slides: creating a power point presemtation – slides – changing the colour scheme- customizing the back ground.

Unit – V

Animation effect: Inserting objects – inserting clip arts – sound and motion clips – inserting chart and tables from MS word – adding animations.

Books for Reference

1. Nellai Kannan, C. : MS Office
2. Gini Computer and Annette Marquis : Microsoft Office 2000
3. Perker Norton : Introduction to Computer

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Semester-II/Ppr.no.11/ Allied -2 (C)

Indian Heritage

Unit – I

Topographic of India: Geographical Features – climate, rivers, wildlife sanctuaries – national parks - birds sanctuaries – Mountains and Hill Resorts – Beach Resorts.

Unit – II

Religious Heritages: Hinduism, Buddhism – Islam, Jainism, Sikhism, Christianity – Religious Centres of Hinduism, Buddhism, Islam, Christianity – Fairs and Festivals – Rites and Rituals – Folk Customs – Folk Culture, Folk Arts, Monuments in India.

Unit – III

Architectural Heritage: Indian Art and Architecture origin, Indus Valley Art, Rig Veda Arts, Buddhist Art, Jain Art, Mauryas Art, Sugas, Kuzhana Art, Gupta Art, Mughal Art, Pallava Art, Chola Art, Indo-European Architecture.

Unit – IV

Cultural Heritage: Dances of India – classical, Bharatham, Kathak, Kathakali, Kuchipidi, Manipuri. Music: Folk - Adventure Toruism. Trekking, Skiing, Safaris

Unit – V

Handicrafts: Textiles, wood craft, stone curving, glassware, pottery, ivory curving, metal work, carpet weaving.

Books for Reference

1. Lavkush Mishra : Cultural Tourism in India
2. Kothandaraman : Indian Art
3. Ratheyan : Fairs and Festivals in India

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES

B.C.A.

(Choice Based Credit System)

(with effect from the academic year 2017-2018 onwards)

Sem. (1)	Pt. I/II/ III/ IV/V (2)	Sub No. (3)	Subject Status (4)	Subject Title (5)	Con-tact Hrs/ Week (6)	L Hrs./ Week (7)	T Hrs./ Week (8)	P Hrs./ Week (9)	C Credits (10)
I	I	1	Language	Tamil / Other Language	6	6	0	0	4
	II	2	Language	English	6	6	0	0	4
	III	3	Core	Programming in C	4	4	0	0	4
	III	4	Major Practical - I	C Programming Lab	4	0	0	4	2
	III	5	Allied - I	Digital Design	4	4	0	0	3
	III	6	Allied Practical - I	Office automation Lab - I	4	0	0	4	2
	IV	7	Common	Environmental Studies	2	2	0	0	2
	Subtotal				**30**				**21**
II	I	8	Language	Tamil/Other Language	6	6	0	0	4
	II	9	Language	English	6	6	0	0	4
	III	10	Core	Object Oriented Programming with C++	4	5	0	0	4
	III	11	Major Practical - II	Object Oriented Programming with C++ Lab	4	0	0	4	2
	III	12	Allied - II	Mathematical Foundation for Computer Science	4	3	0	0	3
	III	13	Allied Practical - II	Office automation Lab - II	4	0	0	4	2
	IV	14	Common	Value Based Education / Social Harmony	2	2	0	0	2
	Subtotal				**30**				**21**
III	III	15	Core	Java Programming	5	5	0	0	4
	III	16	Core	Financial Accounting	5	5	0	0	4
	III	17	Major Practical - III	Java Programming Lab	6	0	0	6	3
	III	18	Allied - III	Data Structures	4	4	0	0	3
	III	19	Allied Practical - III	Data Structures Lab	4	0	0	4	2
	III	20	Skilled Based Core - Theory	Fundamentals of Operating System	4	4	0	0	4
	IV	21	Non-Major Elective	Introduction to IT / Introduction to Computers	2	2	0	0	2
	Subtotal				**30**				**22**

IV	III	22	Core	Visual Basic	5	5	0	0	4
	III	23	Major Practical - IV	Visual basic Lab	6	0	0	6	3
	III	24	Major Elective - I	Micro Processor / E-Commerce / System Programming	5	5	0	0	4
	III	25	Allied - IV	Resource Management Techniques	4	4	0	0	3
	III	26	Allied Practical - IV	TALLY Lab	4	0	0	4	2
	IV	27	Common	Personality Development & Yoga	4	0	0	0	4
	IV	28	Non-Major Elective	Introduction to HTML / MS Word	2	2	0	0	2
	V	29	Extension Activity	NCC,NSS, YRC,YWF	-	0	0	-	1
	Subtotal				**30**				**23**
V	III	30	Core	Software Engineering	5	5	0	0	4
	III	31	Core	Web Technology	5	5	0	0	4
	III	32	Core	RDBMS	5	5	0	0	4
	III	33	Major Practical - V	RDBMS Lab	4	0	0	4	2
	III	34	Major Elective - II	Artificial Intelligence / Design & Analysis of Algorithm / Cyber Security	5	5	0	0	4
	III	35	Project	Mini Project	4	0	0	4	4
	IV	36	Common	Computers for Digital Era	2	2	0	0	2
	Subtotal				**30**				**24**
VI	III	37	Core	Operating Systems	4	4	0	0	4
	III	38	Core	Computer Networks	4	4	0	0	4
	III	39	Core	Computer Graphics	4	4	0	0	4
	III	40	Core	Multimedia	4	4	0	0	4
	III	41	Major Practical – VI	Graphics Lab	4	0	0	4	2
	III	42	Major Elective - III	Web Services / Software Project Management / Mobile Communications	4	4	0	0	4
	III	43	Project	Major Project (Group)	6	0	0	6	7
	Subtotal				**30**				**29**
				Total					**140***

Total Credits =21+21+22+23+24+29 = 140

- *10 Hours of Practical
- **L** - Lecture **T** - Tutorial **P** - Practical

MSU/ 2017-18 / UG-Colleges / Part-III (B.C.A) / Semester – I / Core - 1

Programming in C

Unit I

Overview of C:

Introduction- Importance of C - Sample C Programs - Basic structure of C - Executing C program

Constant, variables and data types:

Introduction- Character set - tokens – keywords and identifiers – constants – variables- data types – declaration of variables – assigning values of variables.

Operators and expressions:

Introduction – arithmetic of operations- relational operator – assignment operator – increment and decrement operator – conditional operator – bitwise operator – special operator – evaluation of expressions – precedence of arithmetic operators – type conversion in expression- operator precedence and associatively- mathematical functions

Unit II

Managing input and output operators:

Introduction: Reading a character- writing a character – formatted input – formatted output

Decision making and branching:

Introduction – decision making with IF statement- simple IF statement – The IF ELSE statement- nesting of IF –ELSE statement –ELSE IF ladders- The switch statement – The?: operators – The GOTO statement

Decision making and looping:

The While statement – The Do statement – The for statement- Jump in loops

Unit III

Arrays:

One dimensional arrays – two dimensional arrays -Initializing two dimensional arrays – multi dimensional arrays

Handling of character strings:

Introduction: declaring and Initializing string variables- Reading string from terminal- writing string to screen – arithmetic operation on characters – putting strings together – comparison of two strings together – string handling functions

Unit IV

User defined functions:

Introduction – need for user- define functions- A multi- function program – The form of C functions- return values and their types – calling a function- category of function – no argument and no return values – argument with no return values -argument with return values – handling of non integer functions – nesting of functions – recursion – function with arrays – the scope and life time of variables in functions.

Unit V

Pointers

Introduction: understanding pointers – accessing the address of variables – declaring and initializing pointers – accessing a variable through its pointer – pointer expressions – pointer increments and scale factor – pointers and character strings – pointers and functions – points on pointer.

TOTAL: 60 HOURS

Text Book:

Programming in ANSI C – By E.Balagurusamy, Tata Mc Graw-Hill Publishing Company

Reference Book:

Programming with ANSI and TURBO C – by Ashok N. Kamthane

MSU/ 2017-18 / UG-Colleges / Part-III (B.C.A) / Semester – I / Major Practical

C Programming Lab – Practical List

1. Find the area of the Triangle
2. To Solve the possible roots of the quadratic equation
3. To arrange a List of numbers in Descending order
4. To Find Ncr Value using Functions
5. To Check given string is palindrome or not
6. To find Transpose of a Matrix
7. To Multiply two matrices
8. To Prepare a Mark list
9. To sort a List of names in alphabetical order

DIGITAL DESIGN

Unit I : Digital System and binary numbers:

Digital systems – binary numbers – number base conversion – Octal and hexa decimal numbers – complements – signed binary numbers – binary codes – binary storage and registers – binary logic

Boolean algebra:

Introduction – basic definition – axiomatic definition of Boolean algebra – basic theorem and properties and of Boolean algebra – Boolean functions.

Unit II : Logic gates:

Canonical and standard forms – other logic operations – digital logic gates and integrated circuits

Gate-Level minimization:

Introduction : The Map method – Four- variable Maps –Five-variable Map – Product –of-sums simplifications- Don't conditions

Unit III : NAND and NOR implementation- other two level implementations – Exclusive OR Functions

Combinational Logic: Introduction – Combinational circuits – Analysis Procedure - Design Procedure – Binary Adder – Subtractor – Decimal Adder - Binary Multiplier - Magnitude Comparator

Unit IV : Decoders - Encoders – Multiplexers

Synchronous Sequential Logic:

Introduction –Sequential Circuits – Storage Element Latches - Storage Element Flip- Flops - Analysis of Clocked Sequential Circuits

Unit V :

Registers and Counters: Registers – Shift Registers – Ripple Counters – Synchronous Counters – Other counters

Memory : Introduction – Random access memory – Memory Decoding – Error Detection and Correction – Read Only Memory.

TOTAL: 45 HOURS

Text Book:

Digital Design Fourth Edition – M, Morris Mano, Michael D Ciletti ,Prentice Hall of India Pvt Ltd.

Reference Books:

1.Digital Principles and Applications Fourth Edition – Albert Paul Malvino, Donald P Leach, Tata Mc Graw Hill Publishing Company Ltd.

2. Digital Principles and Design – Donald d.Givone, Tata McGraw – Hill Publishing Company Limited

Office Automation Lab –I

MS-WORD

1. Creating and saving documents
2. Letter Typing and Editing
3. Design an invitation
4. Design a Calendar
5. Design a Time Table
6. Prepare student Bio-Data
7. Using of Header/Footer/Book mark/Spell Check
8. Design an cover page
9. Mathematical Equations and Symbols
10. Mail Merge

MS-EXCEL

1. Mark sheet Preparation
2. Pay roll Preparation
3. Sales details
4. Graphs and Charts
5. Mathematical/Statistical /Logical Functions
6. Budget Preparation

MSU/ 2017-18 / UG-Colleges / Part-III (B.C.A) / Semester – II / Core - 2

OBJECT ORIENTED PROGRAMMING WITH C++

UNIT I

Principles of Object-oriented Programming: Software Evolution – A look at Procedure-Oriented Programming – Object-Oriented Programming Paradigm – Basic concepts of object-Oriented Programming – Benefits of OOP – Object-Oriented Languages- Applications of OOP

Beginning with C++ : What is C++? – Applications of C++ - A simple C++ Program – More C++ statements – An example with Class- Structure of C++ Program – Reference Variables – Operators in C++ - Scope Resolution Operator – Member De referencing Operators – Memory Management Operators – Manipulators – Type Cast Operators

UNIT II

Functions in C++: Introduction – The Main Function – Function prototyping – Call by Reference – Return by reference – Inline Functions - Default Arguments – const Arguments – Function Overloading – Math Library Functions

Classes and Objects: Introduction - C Structure Revisited – Specifying a Class – Defining Member Function-A C++ Program with Class -Making an outside Function Inline –Nesting of Member Function – Private member functions- Arrays with in a class – Memory allocation for objects – Static Data Members – Static Member Functions, Arrays of objects – Objects as Function arguments – Friendly Functions – Returning Objects - Pointers to Members – Local Classes

UNIT III

Constructors and Destructors : Introduction – Constructors – Parameterized constructors – multiple constructors in a class – Constructors with Default arguments – Dynamic Initialization of Objects- Copy Constructors – Dynamic Constructors – Constructing two dimensional Arrays – Destructors

Operator Overloading and Type Conversion:

Introduction – Defining Operator Overloading – Overloading unary operators – Overloading Binary Operators – Overloading binary operators using Friends – Manipulation of strings using operators – Rules for overloading operators – Type conversions

UNIT IV

Inheritance : Extending Classes : Introduction – Defining Derived Classes – Single inheritance – Making a Private Member Inheritable – Multilevel Inheritance – Multiple Inheritance – Hierarchical Inheritance – Hybrid Inheritance – Virtual Base Classes -Abstract Classes – Constructors in Derived Classes – Member Classes –Nesting of Classes

Unit V

Managing Console I/O Operations: Introduction - C++ Streams – C++ Stream Classes – Unformatted I/O Operations – Formatted Console I/O Operation – Managing output with Manipulators

Working with Files: Introduction – Classes for File Stream Operators – Opening and closing a File – Detecting end-of-file _ File Pointers and their Manipulators – Sequential Input and Output Operations – Error Handling during File Operations – Command –Line Arguments.

TOTAL: 60 HOURS

Text Book:

Object Oriented Programming C++ Third Edition – E Balagurusamy, Tata McGraw-Hill Publishing Company Limited

Reference Book:

1. Complete Reference C++ - Herbert Schildt, Fourth Edition, Tata McGraw-Hill Publishing Company Limited
2. Object Oriented Programming with ANSI and Turbo C++ - Ashok N. Kamthane, Pearson Edition
3. C++ How to Program – Deitel, Fifth Edition Prentice Hall of India
4. Programming with C++ - D.Ravichandran, Second Edition , Tata McGraw-Hill Publishing Company Limited

MSU/ 2017-18 / UG-Colleges / Part-III (B.C.A) / Semester – II / Major Practical - 2

OBJECT ORIENTED PROGRAMMING C++ PRACTICAL LIST

1. Finding the Volume of any three geometric figures using function Overloading
2. Exchange values between two class objects using friend functions
3. Define a class to represent a bank account

   Data Members:

   1. Name of the Depositor
   2. Account Name
   3. Type of Account
   4. Balance amount in the Bank

   Member Functions

   1. To Assign initial values
   2. To withdraw an amount
   3. To Deposit an amount
   4. To display name and balance

   Write a main Program to test the program

4. Find the minimum of two objects using friend function
5. Using Dynamic Constructors , concatenate two strings
6. Overload unary minus operator to change the sign of given vectors (3 elements)
7. Overload Binary + Operator to add two complex numbers
8. Add two vector objects . Use >> and << overloading
9. Process student Mark List using multilevel inheritance
10. Using Hierarchical inheritance process employee details

MSU/ 2017-18 / UG-Colleges / Part-III (B.C.A) / Semester – II / Allied –II

MATHEMATICAL FOUNDATION FOR COMPUTER SCIENCE

UNIT I

Set Theory : Basic Concepts of Set Theory - Inclusion and Equality of Sets – Power Set – Operations on Sets – Cartesian Products – Relations – Equivalence Relations

UNIT II

Functions: Definition – Examples – One and Onto Functions – Bijective Functions – Identify Functions - Composition of Functions – Inverse Functions

Unit III

Mathematical Logic : Statements and Notation – Connectives – Negation, Conjunction, Disjunction – Statement Formulas and Truth Tables – Conditional and Bi conditional – well formed Formulas – Tautology – Equivalence of Formulas – Duality Law – Principle Disjunctive Normal Forms – Principal conjunctive Normal Forms

Unit IV

Graph: Definition – Examples – Sub graphs – Finite and Infinite Graph – Degree of a Vertex – Isolated and Pendent Vertices – Types of Graphs – Examples

Unit V

Paths and Circuits: Walk, Path and Circuits – Connected and Disconnected Graphs – Euler Graphs – Operations on Graphs – Trees – Properties of Trees – Rooted and Binary Trees .

Text Book:

Mathematical Foundations for Computer Science – Part I - D Glory Ratna Mary, Y.S.Irine Viola, Veda Publications

Reference Books:

1. Modern Algebra – Arumugam and Isaac, SciTech Publications
2. Graph Theory - Arumugam and Isaac
3. Discrete Mathematics for Computer Science – Hary Haggard, John Schlipf and Sue Whitesides, Thomson Publications.

TOTAL: 45 HOURS

MSU/ 2017-18 / UG-Colleges / Part-III (B.C.A) / Semester – II / Allied Practical – II

Office Automation Lab – II

MS - ACCESS

1.Mark List creation
2. Salary List Preparation
3.Electricity Bill Generation
4. Report Generation
5. Creation of Mailing Labels

MS - POWER POINT

1. Creating a Presentation from Scratch
2. Creating Presentation using Design Template
3. Creating an animated Presentation with sound effect
4. Creating a presentation about your personality

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES

B.Sc. Botany

(Choice Based Credit System)

(With effect from the academic year 2017-2018 onwards)

Sem	Pt	Sub No	Subject Status	Subject Title	Con Tact Hrs/wk	L Hrs/ wk	P Hrs/ wk	Credits
I	I	1	Language	Tamil/Other Languages	6	6	0	4
	II	2	Language	English	6	6	0	4
	III	3	Core – Paper I	Plant Anatomy & Microtechniques	4	4	0	4
	III	4	Core – Paper II	Algae & Bryophytes	4	4	0	4
	III	5	Major Practical I	Plant Anatomy, Microtechniques, Algae & Bryophytes	2	0	2	2
	III	6	Allied I Paper – 1	Plant Diversity and Medicinal Botany	4	4	0	3
	III	7	Allied Practical-1		2	0	2	2
	IV	8	Common	Environmental Studies	2	2	0	2
				Subtotal	**30**	**26**	**4**	**25**
II	I	9	Language	Tamil/Other Languages	6	6	0	4
	II	10	Language	English	6	6	0	4
	III	11	Core – Paper III	Fungi, Plant Pathology and Lichenology	4	4	0	4
	III	12	Core – Paper IV	Cell Biology & Embryology of Angiosperms	4	4	0	4
	III	13	Major Practical 2	Fungi, Plant Pathology, Lichenology, Cell Biology & Embryology of Angiosperms	2	0	2	2
	III	14	Allied 1 Paper – II	Embryology, Plant anatomy, Physiology and Biotechnology	4	4	0	3
	III	15	Allied Practical-2		2	0	2	2
	IV	16	Common	Social Value Education	2	2	0	2
				Subtotal	**30**	**26**	**4**	**25**
III	I	17	Language	Tamil/Other Languages	6	6	0	4
	II	18	Language	English	6	6	0	4
	III	19	Core – Paper V	Pteridophytes, Gymnosperms &Paleobotany	4	4	0	4
	III	20	Major Practical 3	Pteridophytes, Gymnosperms &Paleobotany	2	0	2	2
	III	21	Allied - II		4	4	0	3
	III	22	Allied Practical II		2	0	2	2

	III	23	Skilled Based Core	Mushroom Cultivation/Preservation of Fruits and Vegetables	4	4	0	4
	IV	24	Non-Major Elective	Gardening and Garden Management/ Herbal Medicine	2	2	0	2
				Subtotal	**30**	**26**	**4**	**25**
IV	I	25	Language	Tamil/Other Languages	6	6	0	4
	II	26	Language	English	6	6	0	4
	III	27	Core – Paper VI	Microbiology & Techniques in Biology	4	4	0	4
	III	28	Major Practical 4	Microbiology & Techniques in Biology	2	0	2	2
	III	29	Allied - II		4	4	0	3
	III	30	Allied Practical II		2	0	2	2
	IV	31	Skilled Based II	Personality Development and Yoga	4	4	0	4
	IV	32	Non-Major Elective	Food and Nutrition/Botany for Competitive Examination	2	2	0	2
	V	33	Extension Activity	NCC/NSS/YRC/YWF	-	-	-	1
				Subtotal	**30**	**26**	**4**	**26**
V	III	34	Core – Paper VII	Morphology and Taxonomy of Angiosperms & Economic Botany	6	6	0	4
	III	35	Core – Paper VIII	Biochemistry & Bioinformatics	6	6	0	4
	III	36	Major Elective-1	Plant Biotechnology & Genetic Engineering/Environmental Biotechnology	5	5	0	4
	III	37	Major Elective - 2	Horticulture and Plant Breeding/Forestry	5	5	0	4
	III	38	Major Practical V, VI	Morphology and Taxonomy of Angiosperms, Economic Botany Biochemistry, Bioinformatics and Electives I & II	6	0	6	4
	IV	39	Skill Based III Common	Computer	2	2	0	2
				Subtotal	30	22	8	22
VI	III	40	Core Paper IX	Plant Physiology	6	6	0	4
	III	41	Core Paper X	Genetics, Evolution and Biostatistics	6	6	0	4
	III	42	Core Paper XI	Plant Ecology & Phytogeography	5	5	0	4
	III	43	Major Practical VII, VIII and IX	Plant Physiology, Genetics, Evolution, Biostatistics, Plant Ecology & Phytogeography	8	0	8	6
	III		Group Project		5			4
Subtotal					30	17	13	22
Grand Total					180	143	37	145

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc.Botany) / Semester – I / Core – I

PLANT ANATOMY AND MICRO TECHNIQUES
(4 hrs/week)

UNIT –I **12Hrs**

Meristems – Characteristics of meristematic tissues – Types, functions and Theories of meristems. Structure and functions of simple and permanent tissues – parenchyma, collenchyma, sclerenchyma, xylem and phloem.

UNIT – II **12Hrs**

Structure of dicot stem and root, structure of monocot stem and root, structure of dicot and monocot leaves.

UNIT – III **12Hrs**

Normal secondary thickening in dicot stem and root, anomalous secondary growth in the stem of *Boerhaavia*and *Dracaena*.

UNIT – IV **12Hrs**

Nodal anatomy: Types of nodes – unilocular, trilocular and multilocular; leaf traces and leaf gaps; epidermal tissue system: stomatal types, hair, trichomes and glands.

UNIT – V **12Hrs**

Microscopy: Principle and working of simple and compound light microscopes and electron microscope (TEM only). Micro techniques – simple staining, double staining and preparation of permanent slides – Maceration

PRACTICALS:

1. To observe and identify the following slides showing
   a. Meristems – shoot apex and root apex
   b. Simple tissues
   c. Xylem elements
2. Primary structure of stem, root and leaves of dicot and monocot plant.
3. Normal secondary thickening in dicot stem and root.
4. Anomalous secondary growth in *Boerhaavia* and *Dracaena*.
5. Maceration technique (Xylem elements only)
6. Demonstration: Preparation of double stained permanent slides.

ALGAE AND BRYOPHYTES
(4 hrs/week)

UNIT –I **12Hrs**

General characters and classification of Algae based on Fritsch (1945), life cycle patterns of Algae, systematic position, distribution, structure, reproduction and life history of *Volvox* and *Caulerpa* .

UNIT – II **12Hrs**

Systematic position, distribution, structure, reproduction and life history of *Chara, Sargassum* and *Gracilaria*.

UNIT – III **12Hrs**

Seaweed cultivation – *Gracilaria*; Methods of extraction and uses of agar-agar and carrageenin; Economic importance of Algae.

UNIT – IV **12Hrs**

Morphology, mass culture and nutritive importance of *Spirulina*; Morphology, mass culture and economic importance of *Nostoc.*

UNIT – V **12Hrs**

General characters and classification of Bryophytes by Rothmaler (1951); systematic position, distribution, structure, reproduction and life history of *Marchantia.*

PRACTICALS

1. Study of morphology of the Algae and Bryophytes prescribed in the syllabus.
2. Make suitable micro preparations of the following:
   a. *Caulerpa*– Rhizomeb. *Sargassum* - Stipe, leaf
   c. *Gracilaria*–Thallus with cystocarpd. *Marchantia* – Thallus.
3. Observe and identify the microslides
   a. *Volvox* - Vegetative colony, colony with daughter colonies and sexorgans.
   b. *Chara* - Sex organs
   c. *Sargassum* - Male and female conceptacles
   d. *Gracilaria* - Thallus with cystocarp.
   e. *Marchantia* – V.S of Gemma cup, V.S of Antheridiophore, V.S of Archegoniophore, V.S of Sporophyte
   f. Algal Slides/ Tablet - *Spirulina, Nostoc*; BGA – fertilizer (packet);.
4. Field trip of minimum one day.

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc.Botany) / Semester – I / Allied – I

Semester I / III

PLANT DIVERSITY AND MEDICINAL BOTANY

4hrs/week

UNIT – I

General characters and economic importance of Algae – Distribution, Structure and Life History of Volvox; General characters and economic importance of Fungi – Distribution, Structure and Life History of Polyporus

UNIT – II

General characters and classification of Lichens; Structure and Reproduction of Usnea. General characters of Bryophytes; Structure, Reproduction and Life History of Funaria.

UNIT – III

General characters of Pteridophytes; Structure, Reproduction and Life History of Lycopodium. General characteristics of Gymnosperms ; Structure, Reproduction and Life History of Pinus.

UNIT – IV

Bentham and Hooker's system of classification; Critical study of the following families: Rutaceae, Asclepiadaceae, Euphorbiaceae and Poaceae.

UNIT – V

Study of the following plants with reference to the morphology of the useful parts and their medicinal importance: *Aloe vera, Piper nigrum, Phyllanthusamarus, Coleus amboinicus*and *Catharanthusroseus,*.

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc.Botany) / Semester – I / Allied Practical – I

Practical's

1. Assign the given plant to its family, giving reasons.
2. Dissect out and draw the floral parts of the plants belong to the families prescribed in the syllabus.
3. Make suitable micropreparations of Lycopodium stem, Pinus needle.
4. Identify and record the medicinal values and morphology of the useful parts of the plants prescribed in the syllabus.
5. Observe and identify the following specimens: Polyporus, Funaria, Lycopodium and Pinus –male and female cone.
6. Identify the slides showing mature anther, ovule, dicot embryo, Volvox, Nostoc, Yeast, Lycopodium - cone L.S and Funaria -capsule L.S.

FUNGI, PLANT PATHOLOGY AND LICHENOLOGY
(4 hrs/week)

UNIT I **12Hrs**

General characters and classification of fungi based on Alexopoulous (1962). occurrence, systematic position, structure, reproduction and life cycle of *Albugo* and *Mucor*.

UNIT II **12Hrs**

Occurrence, systematic position, structure, reproduction and life cycle of *Peziza* and *Puccinia*. Economic importance of fungi: Role of fungi in medicine, industry, agriculture, food and food products.

UNIT III **12Hrs**

Study of the following plant diseases with special reference to the symptoms, etiology, dissemination and control measures: Tikka disease of groundnut, Red rot of sugarcane; Paddy blast.

UNIT IV **12Hrs**

Study of the following plant diseases with special reference to the symptoms, etiology, dissemination and control measures: Citrus canker, Bunchy top disease of Banana and Tobacco Mosaic viral disease.

UNIT V **12Hrs**

Lichens: General account, types and economic importance of Lichens. Structure and reproduction with special reference to *Usnea*.

PRACTICALS

1. Micro preparation and identification of *Peziza*, *Puccinia* and Lichen thallus.
2. Spotters:
   i. Slides - *Albugo*, *Mucor*, *Usnea*- VS of apothecium, Puccinia – Uredosorus andTeleutosorus
   ii. Disease infected leaves showing Albugo and Puccinia; *Usnea* habit
   iii. Observe and identify thefollowing Plant diseases.
      a. Tikka disease of Groundnut
      b. Red Rot of Sugarcane
      c. Paddy Blast
      d. Citrus Canker
      e. Bunchy Top of Banana
      f. Tobacco Mosaic Viral disease
5. Maintain a record note book.

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc.Botany) / Semester – II / Core - 4

CELL BIOLOGY & EMBRYOLOGY OF ANGIOSPERMS
(4 hrs/week)

UNIT I

Cell Biology: Structure ofa Plant cell – prokaryotic and eukaryotic cell, structure and functions of cell wall, plasma membrane, endoplasmic reticulum and ribosome.

UNIT II

Structure and functionsof Mitochondria, Chloroplast, Nucleus, Chromosome.

UNIT III

Non-living inclusions - cystolith, raphides, starch grains.
Cell Division: Mitosis and Meiosis.

UNIT IV

Embryology : Structure of Microsporoangium, microsporogenesis, development of male gametophyte. Types and structure of megasporangium, Megasporogenesis, development of female gametophyte, Types of embryo sac:Monosporic – Polygonum type; Bisporic – Allium type; Tetra sporic - Peperomia type

UNIT V

Double fertilization, types of endosperm – nuclear, cellular and helobial; Ruminate endosperm.Structure and Development of dicot embryo (Capsella) and Polyembryony.

PRACTICALS

Cell Biology

1. Mitosis using Onion roots.
2. Electro micrographs of cell organelles – Chloroplast, Mitochondria and Nucleus.
3. Non-living inclusions – Starch grains, Cystolith and Raphides.

Embryology of Angiosperms

1. Dissect out any one stage of embryo.
2. Identification of slides/specimen/photographs showing the C.S of mature anther, Ovules-orthotropous and anatropous; dicot embryo and Polyembryony
3. Specimen – Ruminate endosperm

Semester II/IV
EMBRYOLOGY, PLANT ANATOMY, PHYSIOLOGY AND BIOTECHNOLOGY
4hrs/week

UNIT – I
Structure and development of microsporangium; Structure, types and development of megasporangium; Development of male and female gametophyte; Double fertilization, Endosperm – types, Structure of dicot embryo.

UNIT – II
Meristem - Structure and classification. Simple tissues, complex tissues; Primary structure of **Dicot** and Monocot stem and root;Structure of leaf; Normal secondary thickening in dicot stem.

UNIT – III
Absorption of water – diffusion, osmosis, imbibition, mechanism of absorption of water; Ascent of sap – (cohesion theory only); Transpiration – Types, Mechanism of stomatal transpiration (Starch – sugar hypothesis); Photosynthesis importance of photosynthesis, Mechanism of Photosynthesis – Light and dark reaction (Calvin cycle).

UNIT – IV
Nostoc - Morphology, Use as Biofertilizerand Mass cultivation; Structure,multiplication (budding and fission) and Mass culture of Yeast.

UNIT – V
Tissue Culture – Scope and importance - totipotency, Nutrient media(M.S medium) Callus and Meristem Culture; Applications of plant tissue culture.

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc.Botany) / Semester – II / Allied Practical –II

PRACTICAL – 2

EMBRYOLOGY, PLANT ANATOMY, PHYSIOLOGY AND BIOTECHNOLOGY

1) Dissect out young embryo from *Tridax* flower bud.

2) Make suitable micro-preparations of dicot and monocot stem, root and leaf.

3) Demonstrate the physiology experimental set up –Potato osmoscope, Ganong's light screen, Bell jar experiment

4)) Identify the Photograph/ Slide/ Specimen/setup - (i) *Nostoc* (ii) (ii) Yeast (iii) Callus culture, (iv) Meristem culture.

6) Maintain a record note book for external and internal evaluation.

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES

B.Sc. Chemistry

(Choice Based Credit System)

(with effect from the academic year 2017-2018 onwards)

Sem	Pt	Sub No	Subject Status	Subject Title	Con Tact Hrs/ wk	L Hrs/ wk	P Hrs/ wk	Credits
I	I	1	Language	Tamil/Other Languages	6	6	0	4
	II	2	Language	English	6	6	0	4
	III	3	Core – Paper I	Inorganic Chemistry - I	4	4	0	4
	III	4	Core – Paper - II	Physical Chemistry - I	4	4	0	4
	III	5	Major Practical - I	Volumetric Analysis - I	2	0	2	2
	III	6	Allied I- Paper – I	Allied Chemistry - I	4	4	0	3
	III	7	Allied Practical-I	Allied Chemistry Practical- I	2	0	2	2
	IV	8	Common	Environmental Studies	2	2	0	2
				Subtotal	**30**	**26**	**4**	**25**
II	I	9	Language	Tamil/Other Languages	6	6	0	4
	II	10	Language	English	6	6	0	4
	III	11	Core –Paper III	Inorganic Chemistry - II	4	4	0	4
	III	12	Core – Paper IV	Organic Chemistry - I	4	4	0	4
	III	13	Major Practical II	Volumetric Analysis - II	2	0	2	2
	III	14	Allied 1 -Paper – II	Allied Chemistry - II	4	4	0	3
	III	15	Allied Practical-II	Allied Chemistry Practical- II	2	0	2	2
	IV	16	Common	Social Value Education	2	2	0	2
				Subtotal	**30**	**26**	**4**	**25**
III	I	17	Language	Tamil/Other Languages	6	6	0	4
	II	18	Language	English	6	6	0	4
	III	19	Core – Paper V	Organic Chemistry - II	4	4	0	4
	III	20	Major Practical - III	Inorganic Qualitative Analysis	2	0	2	2
	III	21	Allied - II	Allied Chemistry - I	4	4	0	3
	III	22	Allied Practical - II	Allied Chemistry Practical- I	2	0	2	2
	III	23	Skilled Based-I Core	Agro Chemistry/Food Chemistry	4	4	0	4
	IV	24	Non-Major Elective -I	Food Chemistry /Water Management	2	2	0	2
				Subtotal	**30**	**26**	**4**	**25**
IV	I	25	Language	Tamil/Other Languages	6	6	0	4
	II	26	Language	English	6	6	0	4
	III	27	Core – Paper VI	Physical Chemistry - II	4	4	0	4
	III	28	Major Practical IV	Organic Analysis	2	0	2	2
	III	29	Allied - II	Allied Chemistry - II	4	4	0	3
	III	30	Allied Practical II	Allied Chemistry Practical- II	2	0	2	2
	IV	31	Skilled Based II Common	Personality Development and Yoga	4	4	0	4

	IV	32	Non-Major Elective - II	Dairy Chemistry / Applied Chemistry	2	2	0	2
	V		Extension Activity	NCC/NSS/YRC/YWF	-	-	-	1
				Subtotal	**30**	**26**	**4**	**26**
V	III	33	Core – Paper VII	Organic Chemistry - III	5	5	0	4
	III	34	Core – Paper VIII	Physical Chemistry - III	5	5	0	4
	III	35	Major Elective-I	Polymer Chemistry / Bio Inorganic Chemistry	5	5	0	4
	III	36	Major Elective - II	Analytical Chemistry / Pharmaceutical Chemistry	5	5	0	4
	III	37	Major Practical V	Inorganic Preparation and Physical Constant Determination	8	0	8	6
	III	38	Major Practical VI	Organic Estimation				
	III	39	Major Practical VII	Physical Chemistry Estimations				
	IV	40	Skill Based III Common	Computer	2	2	0	2
				Subtotal	**30**	**22**	**8**	**24**
VI	III	41	Core Paper IX	Inorganic Chemistry - III	6	6	0	4
	III	42	Core Paper X	Organic Chemistry - IV	6	6	0	4
	III	43	Core Paper XI	Physical Chemistry - IV	5	5	0	4
	III	44	Major Practical VII, VIII and IX	Gravimetric Estimation	8	0	8	6
	III	45	Major Practical VIII	Organic Preparation				
	III	46	Major Practical IX	Physical Chemistry Experiments - II				
	III	47	Group Project	Group Project	5		5	4
				Subtotal	**30**	**17**	**13**	**22**
Grand Total					**180**	**143**	**37**	**147**

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc. Chemistry) / Semester – I / Core-1

INORGANIC CHEMISTRY – I

Objectives

To study the atomic structure from wave mechanical concept

To know the arrangement of elements in the periodic table and the periodic properties.

To understand the different kinds of chemical forces in molecules.

To know the nature of compounds formed by s- and p-block elements.

UNIT I –ATOMIC STRUCTURE

Atom models –Bohr's atom model –orbit and orbital-Dual nature of matter – deBroglie equation (verification not required) - Schrodinger wave equation and its applications (no derivation)- Eigen value and Eigen function-significance of Ψ and Ψ^2 – quantum numbers and their significance-principles governing the occupancy of electrons in various quantum levels, probability distribution of electron around the nucleus – radial probability distribution, Pauli's exclusion principle-Hund's rule, Aufbau principle, Stability of half-filled and fully filled orbitals

UNIT II – PERIODIC PROPERTIES

Long form of periodic table- classification as s, p, d and f block elements -periodicity in properties- variation of atomic and ionic radii, electron affinity, ionisation energy and electronegativity along periods and groups – various scales of electronegativity – Pauling, Mullikan and Allred Rochow's scale of electronegativity – factors affecting the magnitude of electronegativity – applications of electronegativity

UNIT III – CHEMICAL BONDING

Properties of ionic compounds- Lattice energy- definition- Born-Lande equation (derivation not required), factors affecting lattice energy, Born-Haber cycle-enthalpy of formation of ionic compound and stability. Covalent character in ionic compounds-polarization and Fajan's rule .

Valence bond theory – hybridization of atomic orbitals and geometry of molecules – sp, sp^2, sp^3, sp^3d, sp^3d^2 and sp^3d^3 hybridisation with examples. VSEPR theory- shapes of simple inorganic molecules – MO theory- applications of MOT to O_2, F_2, HF and CO- - Paramagnetism of O_2 , comparison of VBT and MOT.

UNIT IV – s-BLOCK ELEMENTS

Occurrence, General characters of s block elements , Position of Hydrogen in the periodic table, Chemistry of Li and Be- their anomalous behaviour and diagonal relationship, Hydrides (classification, general methods of preparation and salient features), hydration energies, solvation and complexation tendencies of alkali and alkaline-earth metals.

UNIT V – p-BLOCK ELEMENTS

Occurence , General characterstics of p block elements, Group study of 13-18 group elements-anamolous behaviour and diagonal relationship. Compounds such as hydrides-, halides, oxides and oxyacids-. Preparation, properties, bonding and structure of diborane, borazine and alkali metal borohydrides. Preparation, properties and technical applications of carbides and fluorocarbons. Silicones and silicates (structures only)-.Interhalogen compounds,

Reference Books

1. B. R. Puri, L. R. Sharma, K. C. Kalia, Principles of Inorganic Chemistry, Shoban Lal Nagin Chand and Co., Delhi, 1996.
2. P. L. Soni, Text Book of Inorganic Chemistry, 20th edition, 2001.
3. R. D Madan, Modern Inorganic Chemistry, S. Chand and company, 13th edition, 2005.
4. J. D. Lee, Concise Inorganic Chemistry, 5th ed., Blackwell Science, London, 1996.
5. F. A. Cotton, G. Wilkinson, C. Murillo and M. Bochman, Advanced Inorganic Chemistry, Wiley India, 6th edition, 2008.

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc. Chemistry) / Semester – I / Core-2

PHYSICAL CHEMISTRY -I

UNIT I –GASEOUS STATE

Concept of ideal and real gases, gas laws postulates of kinetic theory of gases (no derivation) Types of molecular velocities and their inter relations - mean, rms, most probable velocities - Calculation of most probable velocity, average velocity and root mean square velocity Maxwell's distribution of molecular velocities, statement of equation and explanation (no derivation) – graphic representation - effect of temperature on velocity distribution. Collision diameter - collision number - collision freqeuency - mean free path – Degrees of freedom of gaseous molecules - principle of equipartition of energy - heat capacity and molecular basis. Viscosity of gases and effect of temperature and pressure on coefficient of viscosity.

UNIT - II PHOTO CHEMISTRY

Difference between thermal and photochemical reactions, primary and secondary reactions - Laws of photochemistry – Beer Lambert law, Grotthus - Draper law, Stark-Einstein law - Quantum efficiency – experimental determination of quantum yield.

Energy transfer in photochemical reactions – Jablonski diagram - radiative and non radiative transition - internal conversion, intersystem crossing - qualitative description of fluorescence, phosphorescence - chemiluminescence, bioluminescence, thermoluminescence, photosensitization and quenching - photochemical reactions - kinetics of hydrogen-chlorine, reaction and decomposition of HI. Lasers – principle, types and uses.

UNIT - III NUCLEAR CHEMISTRY

Natural radioactivity - detection and measurement of radioactivity – Geiger Nuttal rule - rate of disintegration and half life period - average life period - nuclear stability, n/p ratio, magic number, mass defect and binding energy - liquid drop model - shell model - isotopes, isobars, isotones and isomers. Artificial radioactivity - nuclear fission and nuclear fusion – mechanisms – applications - differences – Stellar energy - nuclear reactors - hazards of radiations - fertile and fissile isotopes. Applications of radioisotopes – C^{14} dating, rock dating, neutron activation analysis and isotope as tracers - study of reaction mechanism.

UNIT - IV SOLID STATE

Difference between crystalline and amorphous solids - isotropy and anisotropy - crystal lattices – Lattice energy –Born equation and its derivatives laws of crystallography - elements

of symmetry of crystals - crystal systems - unit cell - space lattice - Bravais lattices - Miller indices - cubic and hexagonal packing – radius ratio rule – tetrahedral and octahedral voids Bragg's equation, derivation and applications - determination of structure of crystals by X-ray diffraction methods - rotating crystal and powder method, structure of NaCl, KCl and ZnS. Imperfections in a crystal - Schottky defects, Frenkel defects, Nonstoichiometric defects - use of crystallographic data for the determination of Avogadro number and molecular mass

UNIT - V DILUTE SOLUTIONS

Colligative properties of dilute solutions: relative lowering of vapour pressure, elevation of boiling point, depression of freezing point and osmotic pressure,Ebullioscopic constant-Cryoscopic constant- Relation between colligative properties and Molecular mass –Osmosis-osmotic pressure-.laws of osmotic pressure -osmotic pressure and concentration of solute-Experimental methods for determining various colligative properties, degree of dissociation and association of solutes Abnormal molecular mass – Van't Hoff factor.

Reference books:

1. Principles of physical chemistry - Puri, Sharma and Pathania, Millennium Edition, Vishal Publishing Co
2. Text Book of physical chemistry - P.L. Soni - Sultan Chand.
3. Atkins' Physical chemistry, 9th Edition, Oxford University Press.
4. Advanced Physical Chemistry - Gurdeep Raj, Goel Publishing House.
5. Physical Chemistry, G.M.Barrow, Tata McGraw Hill.
6. Source book of Atomic Energy.Samuel Glastone, East west press

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc. Chemistry) / Semester – I / Major Practical –I

INORGANIC QUANTITATIVE ANALYSIS -I (VOLUMETRIC)

Objectives

1. To enable the students to acquire the quantitative skills in volumetric analysis.
2. At the end of the course, the students should be able to plan experimental projects and execute them.

Acidimetry and alkalimetry

1. Estimation of oxalic acid – Std. oxalic acid
2. Estimation of Na_2CO_3 – Std. Na_2CO_3
3. Estimation of hydrochloric acid – Std. oxalic acid

Permanganometry

4. Estimation of sodium oxalate – Std. oxalic acid
5. Estimation of ferrous ammonium sulphate – Std. ferrous ammonium sulphate
6. Estimation of ferrous sulphate – Std. oxalic acid

Internal –50 marks

25 marks - Regularity

25 marks – Average of best four estimations in regular class work

External -50 marks

10 marks – Record (atleast 4 volumetric estimations)*

10 marks – Procedure

30 marks – Result

*Experiments done in the class alone should be recorded

(Students having a bonafide record only should be permitted to appear for the practical examination)

Reference books:

1. G.H.Jeffery, J.Bassett, J.Mendham and R.C.Denny 'Vogel's Text book of Quantitative Chemical Analaysis' 5th Edition ELBS.
2. I.M.Kolthoff and E.A.Sanderson, Quantitative Chemical Analysis, S Chand
3. O.P. Pandey, D.N Bajpai, S. Gini, Practical Chemistry, for I, II & III BSc. Students. S.Chand & Company Ltd reprint 2009.
4. V.K.Ahluwalia, Sunitha Dhingra, Adarsh Gulate College Practical Chemistry, Universities Press (India) Pvt Ltd 2008 (reprint)

ALLIED CHEMISTRY - I

Objective

To learn about atomic structure and bonding.
To learn the principles of reactions of organic compounds.
To study about photochemical reactions.
To learn about the importance of polymers and polymer science.
To study about lubricants and some cosmetics in the modern world.

Unit I – Inorganic chemistry

Atomic structure : electronic configuration - Aufbau principle - Pauli's exclusion principle- Hund's rule. Bonding : electrovalent, covalent, hydrogen bonds-orbital overlap - s-s, s-p. Hybridization and VESPR theory - CH_4, C_2H_4, C_2H_2- $BeCl_2$, BF_3, NH_3, H_2O, PCl_5, IF_5, IF_7.

Unit II - Organic chemistry – Principles of reactions

Heterolytic and homolytic cleavage - nucleophiles and electrophiles-reaction intermediates – preparation and properties of carbonium ions, carbanions and free radicals - type of reactions - substitution, addition, elimination and polymerisation reactions.

Unit III-Physical chemistry - Photochemistry

Definition-comparision between thermal and photochemical reactions-Laws of photochemistry-Beer Lambert's law-Grothus Draper law-Einstein's law-Quantum yield-low and high quantum yield-determination of quantum yield-fluorescence, phosphorescence, thermoluminescence, chemiluminescence and bioluminescence-definition with examples-photosensitisation.

Unit IV-Polymer Chemistry

Definition- Monomers, Oligomers and Polymers - Classification of polymers- natural, synthetic- linear, cross linked and network- plastics, elastomers, fibres- homopolymers and co-polymers

Thermoplastics: polyethylene, polypropylene, polystyrene, polyacrylonitrile, poly vinyl
chloride, nylon and polyester - Thermosetting Plastics : phenol formaldehyde and epoxide resin-Elastomers: natural rubber and synthetic rubber - Buna - N, Buna-S and neoprene.

Unit V-Applied Chemistry

Lubricants-classification-criteria of good lubricating oils-synthetic lubricating oils-poly glycols and poly alkene oxides-greases or semi solid lubricants-examples-solid lubricants-graphite

Prepration and uses of shampoo, nail polish, sun screens, tooth powder, tooth paste, boot polish, moth ball and chalk piece.

Reference Books

1. B. R. Puri, L. R. Sharma and K. C. Kalia, Principles of Inorganic Chemistry
2. P. L. Soni, Text Book of Inorganic Chemistry
3. K. S. Tewari and N. K. Vishnoi, A Text Book of Organic Chemistry.
4. Arun Bahl and B.S. Bahl, Advanced Organic Chemistry, S. Chand and Sons.
5. M.K. Jain and S. C. Sharma, Modern Organic Chemistry
6. K.K.Rohatgi Mukherjee, Fundamentals of photochemistry , Wiley Eastern Ltd.
7. B.R. Puri and L.R. Sharma, Principles of Physical Chemistry, Chand & Co.
8. Malcom P. Stevens, Polymer Chemistry – An Introduction
9. V.R. Gowariker, Polymer Science, Wiley Eastern, 1995.
10. Sawyer.W, Experimental cosmetics, Dover publishers, New york, 2000.

MSU / 2017-18 / UG-Colleges / Part-III (B.Sc. Chemistry) /Semester – I / Allied Practical - I

Inorganic Quantitative Analysis

Objective:

To enable the students to acquire the quantitative skills in volumetric analysis.

Acidimetry and alkalimetry

1. Estimation of oxalic acid – Std. oxalic acid
2. Estimation of Na_2CO_3 – Std. Na_2CO_3
3. Estimation of hydrochloric acid – Std. oxalic acid

Permanganometry

4. Estimation of ferrous ammonium sulphate – Std. ferrous ammonium sulphate
5. Estimation of oxalic acid – Std. oxalic acid
6. Estimation of ferrous sulphate – Std. oxalic acid

Internal –50 marks

25 marks - Regularity

25 marks – Average of best four estimations in regular class work

External -50 marks

10 marks – Record (atleast 4 volumetric estimations)*

10 marks – Procedure

30 marks – Result

*Experiments done in the class alone should be recorded

(Students having a bonafide record only should be permitted to appear for the practical examination)

SEMESTER II – PAPER – III

INORGANIC CHEMISTRY- II

Objectives

To know the basic principles of metallurgy and the chemistry of d- Block elements

To learn the chemistry of f- Block elements

To understand the basic concepts of coordination chemistry and early theory

To learn the basic analytical methods

To study the chemistry of noble gases

UNIT-I NOBLE GASES

Occurrence - isolation of noble gases from the atmosphere - separation of the gases from one another - general physical properties - special properties of helium - isotopes of helium - uses of noble gases - importance of inert gases in theoritical chemistry - chemical properties - xenon chemistry: preparation and properties of fluorides, oxides and oxofluorides of xenon - xenates and perxenates - xenon fluoride complexes - structure and bonding in xenon compounds. Fluorides of Krypton and Radon - hydrates and clathrates of noble gases - uses of clathrate compunds.

UNIT II- CHEMISTRY OF d - BLOCK ELEMENTS

Occurence, General characteristics of d- Block elements – Group study of Titanium, Vanadium,Iron, Coinage and Zinc group metals. Important compounds of transition metals: Ziegler – Natta catalyst. Prussian blue, Sodium nitroprusside, Turnbull's blue, Nickel DMG complex, Wilkinson's Catalyst- $KMnO_4$ and $K_2Cr_2O_7$.

UNIT III- CHEMISTRY OF f- BLOCK ELEMENTS

Occurrence, General characteristics of f-block elements, Synthetic elements, comparative account of lanthanides and actinides – oxidation states, magnetic properties, colour and spectra – separation by ion exchange and solvent extraction methods – lanthanide contraction — preparation, properties and uses of ceric ammonium sulphate, thorium dioxide, thorium nitrate, uranium hexafluoride, uranylacetate.

UNIT IV- METALLURGY

Occurrence of metals- Ores and minerals in lithosphere -Mineral wealth of India- principles of metallurgy-concentration of ores – froth floatation, magnetic separation, calcination,

roasting and smelting. Purification of metals – electrolysis, zone refining, van Arkel deBoer methods. Extraction of the following metals in pure form - Li, Be, Ti, V, Th and U

UNIT V: THEORY OF INORGANIC PRACTICALS

Qualitative Analysis: Applications of solubility product and common ion effect in the precipitation of cations – Interfering acid radicals and their elimination (oxalate, fluoride, borate, phosphate, chromate, arsenite and arsenate).

Titrimetry: Primary standard- Molarity, molality formality, normality, wt% ppm, milli equivalence and millimoles -problems Types of titrimetric reactions – acid-base, redox, Iodometric, Iodimetric, precipitation and complexometric titrations – Indicators.

Gravimetric analysis: Precipitation from homogeneous soloution- precipitants -conditions for precipitation – co-precipitation and post precipitation - washing of precipitates. Minimisation of errors.

Reference Books

1. Puri B.R., Sharma L.R., Kalia K.K., Principls of Inorganic Chemistry, 28th edition, Vallabh Publication, 2004, New Delhi.
2. R.D. Madan, Advanced Inorganic Chemistry, 2nd edition.S. Chand & Company, 2005, New Delhi.
3. Concise coordination chemistry – R. Gopalan, V. Ramalingam, Vikas publishing House, PVT LTD, 2001, New Delhi.
4. J.D.Lee, Concise Inorganic Chemistry, 5th edition, Oxford University Press, New Delhi 2008.
5. G.H. Jeffery, J. Bassett, J. Mendham, R.C. Denny, Vogel's Text book of Quantitative Chemical Analysis, 5th Edn., ELBS, 1989.
6. D.A.Skoog and D.M.West, Fundamentals of Analytical Chemistry, Holler Saunders College publishing, USA.VI Ed., 1998.

MSU / 2017-18 / UG-Colleges / Part-III (B.Sc. Chemistry) /Semester – II / Core - 4

ORGANIC CHEMISTRY - I

UNIT- I CLASSIFICATION AND NOMENCLATURE

Classification of organic compounds - based on the nature of carbon skeleton – functional groups – classification of C and H atoms of organic compounds.(primary, secondary, tertiary)

IUPAC system of nomenclature of common organic compounds (upto C-10) – alkanes, alkenes, alkynes, cycloalkanes, bicycloalkanes with and without bridges and aromatic compounds.

Naming of organic compounds with one functional group - halogen compounds, alcohols , phenol, aldehydes, ketones, carboxylic acids and its derivatives, cyano compounds, amines and nitro compounds (Both aliphatic and aromatic)

Naming of compounds with two functional groups - naming of compounds with more than one carbon chain.

Naming of heterocyclic compounds containing one and two hetero atoms present in five and six membered rings. Structural isomerism – types with examples

UNIT-II FUNDAMENTAL CONCEPTS

Hybridisation and geometry

Electronic effects - inductive effect, resonance effect – resonance structures– conditions for

resonance –stability of resonance structures, hyper conjugation ,electromeric effect. Steric effect – steric overcrowding – steric inhibition– steric relief(with examples).

Dissociation of bonds – homolysis and heterolysis- radicals – carbocations – carbanions – electrophiles and nucleophiles Influence of electronic effets - dipole moment – relative strengths of acids and bases – stability of olefins – stability of radicals, carbocations and carbanions

UNIT-III HYDROCARBONS

Addition to unsymmetrical olefins (Markownikoff's rule and peroxide effect), hydroboration, ozonolysis, dihydroxylation with $KMnO_4$, allylic bromination by NBS (mechanisms not required).

Classification of alkadienes, stability of conjugate dienes- Mechanism of 1, 2 and 1,4-addition- Diels-Alder reaction. Acidity of alkynes and formation of metal acetylides

UNIT -IV HALOGEN DERIVATIVES

Type of reactions - substitution, addition, elimination and polymerisation reactions

S_N1 and S_N2 mechanisms - E_1 and E_2 mechanisms- Hoffmann's and Saytzeffs rule- preparation, properties and uses of chloroform, carbon tetrachloride, vinyl chloride and allyl chloride- preparation and uses of westron, westrosol, freon and chloroprene

UNIT-V ALCOHOLS & ETHERS

Distinction between primary, secondary and tertiary alcohols – nitroglycerol, dynamite- estimation of hydroxyl groups- mechanism of dehydration of alcohols- preparation and properties of allyl alcohol

Preparation and uses of oxirane and dioxan –Estimation of number of methoxy groups-Zeisel's method

Distinction between ethers and alcohols.

Reference Books :

1. K. S. Tewari and N. K. Vishnoi, A Text Book of Organic Chemistry, Vikas Publishing House Pvt Ltd.
2. Arun Bahl and B.S. Bahl, Advanced Organic Chemistry, S. Chand and Sons.
3. M.K. Jain and S. C. Sharma, Modern Organic Chemistry, Visal Publishing Co.
4. N. Tewari, Advanced Organic Reaction Mechanism, Third Edition 2011, Books & Allied (P) Ltd.
5. I. L. Finar, Organic Chemistry Volume I, ELBS, Longmans
6. Organic Chemistry – Bhupinder Mehta and Manju Mehta - PHI Learning Pvt Ltd.

INORGANIC QUANTITATIVE ANALYSIS -II (VOLUMETRIC)

Iodometry

1. Estimation of copper – Std. copper sulphate
2. Estimation of $K_2Cr_2O_7$ – Std. $K_2Cr_2O_7$

Dichrometry

3.Estimation of ferrous iron – Std. ferrous ammonium sulphate

4. Estimation of $K_2Cr_2O_7$ – Std. $K_2Cr_2O_7$

Complexometry

5. Estimation of Zn – Std. $ZnSO_4$
6. Estimation of Pb – Std. $ZnSO_4$
7. Estimation of Mg – Std. $ZnSO_4$

Internal –50 marks

25 marks - Regularity

25 marks – Average of best four estimations in regular class work

External -50 marks

10 marks – Record (atleast 4 volumetric estimations)*

10 marks – Procedure

30 marks – Result

*Experiments done in the class alone should be recorded

(Students having a bonafide record only should be permitted to appear for the practical examination)

Reference books:

1. G.H.Jeffery, J.Bassett, J.Mendham and R.C.Denny 'Vogel's Text book of Quantitative Chemical Analaysis' 5th Edition ELBS.
2. I.M.Kolthoff and E.A.Sanderson, Quantitative Chemical Analysis, S Chand
3. O.P. Pandey, D.N Bajpai, S. Gini, Practical Chemistry, for I, II & III BSc. Students. S.Chand & Company Ltd reprint 2009.
4. V.K.Ahluwalia, Sunitha Dhingra, Adarsh Gulate College Practical Chemistry, Universities Press (India) Pvt Ltd 2008 (reprint)

ALLIED CHEMISTRY - II

Objective

To learn the chemistry of basic aromatic compounds.
To understand the nuclear particles and few nuclear reactions
To know about carbohydrates, amino acids, proteins and nucleic acid.
To study about fuels, fertilizers, cement and glass.
To know about some common diseases and the drugs used.

UNIT 1 ORGANIC CHEMISTRY

Aromatic compounds

General characteristics of aromatic compounds - aromaticity – Huckel's rule with examples- non – benzenoid aromatic compounds (definition and examples only)

Preparation, properties and structure of benzene, naphthalene and anthracene.

UNIT 2 PHYSICAL CHEMISTRY

Nuclear chemistry

Nuclear stability – n/p ratio – packing fraction – mass defect – binding energy - isotopes, isobars, isotones with examples. Separation of isotopes by diffusion method – group displacement law - radioactive series - Nuclear fission, fusion - Application of radio isotopes (radio diagnosis and therapy, C-14 dating).

UNIT 3 BIO CHEMISTRY

Carbohydrates –definition and classification – artificial synthetic sweeteners. Amino acids - classification – amphoteric nature – isoelectric point. Proteins - classification according to composition, solubility and shape - colour reactions - biological action . Nucleic acids – purines, pyrimidines, nucleocides, nucleotides – DNA – structure of DNA – RNA - different types of RNA

UNIT 4 INDUSTRIAL CHEMISTRY

Fuel gases – Water gas, Producer gas, L.P.G, Gobar gas and Natural gas. Fertilizers – N.P.K and mixed fertilizers. Soaps and detergents – an elementary idea of soaps and detergents. Cleansing action of soaps and detergents. Cement and glass: Portland cement-manufacture only. Manufacture of glass- types and uses borosilicates -photochromic and safety glass.

UNIT-5: PHARMACEUTICAL CHEMISTRY

Common diseases – infective diseases – insect borne –air borne – water borne – hereditary diseases. Definition and examples of analgesics, antipyretics, sulpha drugs, antimalarials and, antibiotics. Diabetes – causes – hyper and hypoglycemic drugs. Indian medicinal plants – tulsi, neem, keezhanelli- their importance

Reference Books

1. Puri, Sharma & Kalia, Principles of Inorganic Chemistry, Milestone Publishers and Distributors, 2008.

2. P.L. Soni, Text book of Inorganic Chemistry, Sultan Chand and Sons, 2007.

3. Bahl and Arun Bahl, Organic Chemistry, S. Chand and Sons, New Delhi , 2005.
4. Morrison & Boyd, Organic Chemistry, VIth ed, Prentice Hall of India Pvt. Ltd., New Delhi, 1998.
5. P. L. Soni, Text book of Organic Chemistry, S. Chand and Company Ltd., New Delhi .

6. J. L. Jain, Sunjay Jain and Nitin Jain, Fundamentals of Biochemistry, S. Chand and Company Ltd.,New Delhi, 2005.

7. S. Lakshmi, Pharmaceutical Chemistry, S. Chand and Sons, New Delhi , 1995.

MSU / 2017-18 / UG-Colleges / Part-III (B.Sc. Chemistry) /Semester -II / Allied Practical - II

INORGANIC QUALITATIVE ANALYSIS

Inorganic simple salt containing one acidic radical (interfering radical) and one basic radical

1. Acidic radical

   Interfering acidic radicals:

   Borate, Fluoride, Oxalate and Phosphate.

2. Basic radicals

   Group I : Lead

   Group II : Copper, Cadmium

   Group III : Ferric iron

   Group IV : Cobalt, Nickel

   Group V : Barium

   Group VI : Magnesium, Ammonium.

Internal –50 marks

25 marks - Regularity

25 marks – Average of four experiments in regular class work

External -50 marks

10 marks – Record (atleast 4 experiments)*

10 marks – Procedure

30 marks – Result

*Experiments done in the class alone should be recorded

(Students having a bonafide record only should be permitted to appear for the practical examination)

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES

B.Sc COMPUTER SCIENCE

(Choice Based Credit System)

(with effect from the academic year 2017-2018 onwards)

Sem	Part I/ II/ III/ IV/V	Sub No.	Subject Status	Subject Title	Contact Hrs/ week	Credits
I	I	1	Language	Tamil/Other Language	6	4
	II	2	Language	English	6	4
	III	3	Core	Programming in C	5	4
	III	4	Major Practical - I	Programming in C	4	2
	III	5	**Allied - I** a) For the B.Sc.(CS) Programme	a)Discrete Mathematics	3	3
			b) For other U.G. Programme	b)Introduction to Computers		
	III	6	**Allied Practical – I** a) For the B.Sc.(CS) Programmes	a) Computer Basics	4	2
			b) For other U.G. Programmes	b) M.S. Office		
	IV	7	Common	Environmental Studies	2	2
				Subtotal	**30**	**21**
II	I	8	Language	Tamil/Other Language	6	4
	II	9	Language	English	6	4
	III	10	Core	Programming in C++	5	4
	III	11	Major Practical - II	Programming in C++	4	2
	III	12	**Allied –II** a)For the B.Sc.(CS) Programmes	a)Digital Design	3	3
			b) For other U.G. Programmes	b)Programming in C		
	III	13	**Allied Practical – II** a)For the B.Sc.(CS) Programmes	a) Linux	4	2
			b) For other U.G. Programmes	b) C Programming		
	IV	14	Common	Value Based Education	2	2
				Subtotal	**30**	**21**
III	III	15	Core	Java Programming	5	4
	III	16	Core	Data Structures	5	4
	III	17	Major Practical - III	Java Programming	6	3

	III	18	Allied -III	Scripting Languages	4	3
	III	19	Allied Practical - III	Scripting Languages	4	2
	III	20	Skill Based I Core	Fundamentals of Operating System	4	4
	IV	21	Non-Major Elective	1. Fundamentals of Internet 2. Basic Programming Design	2	2
				Subtotal	**30**	**22**
IV	III	22	Core	Computer Architecture	5	4
	III	23	Major Practical - IV	Data Structure	6	3
	III	24	Major Elective - I	1. Multimedia Applications 2. Embedded System 3. Open Source Technologies	5	4
	III	25	Allied -IV	E-Commerce	4	3
	III	26	Allied Practical - IV	PYTHON	4	2
	IV	27	Skill Based II Common	Personality Development & Yoga	4	4
	IV	28	Non-Major Elective	1. HTML 2. Programming in C	2	2
	V		Extension Activity	NCC, NSS, YRC, YWF	0	1
				Subtotal	**30**	**23**
V	III	29	Core	Software Engineering and Testing	5	4
	III	30	Core	Data communication and Computer Network	5	4
	III	31	Core	Dot NET Technologies	5	4
	III	32	Major Practical - V	Dot NET	4	2
	III	33	Mini Project		4	4
	III	34	Major Elective - II	1. Mobile Computing 2. Cryptography 3. Cloud Computing	5	4
	III	35	Skill Based Common	Computers for Digital Era	2	2
				Subtotal	**30**	**24**
VI	III	36	Core	Operating Systems	4	4
	III	37	Core	Relational Database Management System	4	4
	III	38	Core	Computer Graphics and Visualization	4	4
	III	39	Core	Data Mining	4	4
	III	40	Major Practical -VII	Oracle	4	2
	III	41	Major Project		6	7
	III	42	Major Elective - III	1. Network Security 2. Big Data Analytics 3. Neural Networks	4	4
				Subtotal	**30**	**29**
					Total credits	**140**

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc. Computer Science) / Semester – I / Core-1

Programming in C

L T P C

3 1 0 4

Objective: To obtain knowledge about the structure of the programming language C and to develop the program writing and logical thinking skill.

Unit – I: INTRODUCTION

C Declarations**:-** Character Set – C tokens – Keywords and Identifiers – Identifiers – Constants – Variables – Data types – Declaration of Variables – Declaration of Storage Class – Assigning Values to Variables – Defining Symbolic Constants – Declaring Variable as Constant. Operators and Expressions**:-** Introduction – Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operator – Bitwise Operators – Special Operators – Arithmetic Expressions – Evaluation of Expressions – Precedence of Arithmetic Expressions. Managing Input and Output Operations:- getchar( ) – putchar( ) – scanf( ) – printf( ).

(**14L**)

Unit – II: CONTROL STRUCTURES

Decision Making and Branching:- Decision Making with IF Statement – Simple IF statement – The IF…Else Statement – Nesting of IF…Else Statements – The ELSE IF ladder – The Switch Statement – The ?: Operator – The GOTO statement. Decision Making and Looping:- The WHILE Statement – The DO Statement – The FOR statement. (**10L**)

Unit – III: ARRAYS

One-dimensional arrays – Declaration of One-dimensional arrays – Initialization of One-dimensional arrays - Two-dimensional arrays – Initialization of Two-dimensional arrays – Multi-dimensional arrays. Character Arrays and Strings:- Declaring and Initializing String Variables – Reading Strings from Terminal – Writing Strings to Screen – String Handling Functions. (**10L**)

Unit – IV: FUNCTIONS

User-Defined functions:- Need for User-defined functions – Definition of functions – Return Values and their Types – Function Calls – Function Declaration – Category of functions – No Arguments and No return values – Arguments but No return Values – Arguments with return values – No arguments but a return a value – Recursion – Passing Arrays to functions – Passing Strings to functions – The Scope, Visibility and lifetime of a variables. Structures and Unions:- Defining a Structure – Declaring Structure Variables – Accessing Structure Members – Structure Initialization – Arrays of structures –Unions.

(**14L**)

Unit – V: POINTERS AND FILES

Pointers:- Understanding pointers – Accessing the Address of a Variable – Declaring Pointer Variables – Accessing a variable through its pointer – Pointer Expressions –Pointers as function arguments. File Management in C:- Defining and Opening a file – Closing a File – Input/output Operations on files – Error Handling during I/O Operations. (**12L**)

Text Book :

Programming in ANSI C – 6th Edition by E Balagurusamy – Tata McGraw Hill Publishing Company Limited.

Reference Books:

1. Computer System and Programming in C by Manish Varhney, Naha Singh – CBS Publishers and Distributors Pvt Ltd.
2. Introduction to Computer Science, ITL Education Solutions Limited, Second Edition, Pearson Education
3. Computer Basics and C Programming by V. Rajaraman – PHI Learning Private Limited
4. Programming with C, Third Edition, Byron S Gottfried, Tata McGraw Hill Education Private Limited.

Major Practical – I Programming in C

L T P C

0 0 4 2

Objective: To develop skills in implementing algorithms through the programming Language C and to explore the features of C by applying sample problems.

Each exercise should be completed within two hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. To find all possible roots of a quadratic equation using if statement
2. Program to check vowel or consonant using switch case statement
3. Evaluate Sine series using while loop

   $\text{Sin}(x) = x - x^3/3! + x^5/5! - \ldots x^n/n$
4. Sort a list of numbers in ascending order
5. Search an element in an array
6. Reverse a number
7. Check the given string is palindrome or not
8. Find the binomial coefficient (nC_r) value using recursion
9. Multiply two matrices (check for compatibility)
10. Transpose of a matrix
11. Find the sum of 'n' numbers by making function call
12. Alphabetical sorting (passing array as argument to function)
13. Exchange values using pointers and function
14. Prepare the student details using structure
15. Prepare mark sheet using file

Discrete Mathematics

L T P C
3 0 0 3

Objective: To apply basic concepts for clear understanding of mathematical principles and to solve practical problems.

Unit – I: RELATIONS

Introduction to Relations – Binary relation – Classification of Relations – Composition of Relations – Inverse of Relation – Closure operation on Relations – Matrix representation of Relation - digraphs. (**9L**)

Unit – II: FUNCTIONS

Introduction to Functions – Addition and Multiplication of Functions - Classifications of Functions – Composition of Function – Inverse Function. (**6L**)

Unit – III: MATHEMATICAL LOGIC

Introduction – Statement (Propositions) – Laws of Formal Logic –Basic Set of Logical operators/operations - Propositions and Truth Tables – Algebra Propositions - Tautologies and Contradictions – Logical Equivalence – Logical Implication – Normal Forms. (**10L**)

Unit – IV: MATRIX ALGEBRA

Introduction – Definition of a Matrix - Types of Matrices – Operations on Matrices – Related Matrices – Transpose of a Matrix – Symmetric and Skew-symmetric Matrices – Complex Matrix – Conjugate of a Matrix – Determinant of a Matrix – Typical Square Matrices – Adjoint and Inverse of a Matrix – Singular and Non-singular Matrices – Adjoint of a Square Matrix – Properties of Adjoint of a Matrix – Properties of Inverse of a Matrix. (**10L**)

Unit – V: GRAPH

Introduction – Graph and Basic Terminologies – Types of Graphs – Sub Graph and Isomorphic Graph – Operations on Graphs – Representation of Graph. (**10L**)

Text Book:

DISCRETE MATHEMATICS, Swapan Kumar Chakraborty and Bikash Kanti Sarkar,
OXFORD University Press.

Reference Books:

1. DISCRETE MATHEMATICS, Third Edition, Seymour Lipschutz and Marc Lars Lipson, Tata McGraw Hill Education Private Limited.
2. Discrete Mathematical Structures with Aplications to Computer Science by J.P.Tremblay, R.Manohar TMH edition

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc. Computer Science) / Semester – I / Allied -1

INTRODUCTION TO COMPUTERS

(For the Institutions with B.Sc. (Maths) Programme not opting Physics / Chemistry as Allied Subjects with effect from 2017-18 and onwards for Semesters - I & II and also for Semesters - III & IV of the 2016-17 batch)

Aim

The Allied paper is to gain fundamental knowledge in computer

Objectives

- To know the characteristic, parts and applications of computers
- To know the various devices and familiarize with their functions
- To know the usage of internet

UNIT I:

Computer Basics: Introduction, Characteristics of Computers - Generation of Computers, Classification of Computers: Micro computers, Mini Computers, Mainframe, Super Computer, Careers in IT industry. Data representation in Computer: Types of number system, Conversion between Number bases. Coding Schemes: ASCII, EBCDIC, and Unicode.

UNIT II:

Computer Memory and Storage: Introduction, memory hierarchy, Random Access memory (RAM), Read only memory (ROM), RAM, ROM and CPU interaction. Types of Secondary storage devices, Magnetic tape, magnetic disk, types of magnetic disk, optical disk, type of optical disks, USB drives.

UNIT III:

Multimedia Essentials: Introduction, Definition, Building blocks of Multimedia, multimedia system, multimedia applications, Virtual reality, Multimedia and the internet.

UNIT IV:

Operating system: Introduction, definition, Evolution of Operating System, Types of Operating System, Functions of Operating system.

Computer software: definition, categories of Software, Software Piracy.

UNIT V:

The Internet: Introduction, Evolution of Internet – Basic Internet terms – Getting connected to Internet – Internet Applications – Data over Internet.

Emerging trends in IT: Introduction, E-Commerce – Electronic Data Interchange – Mobile Communication – Bluetooth – Global Positioning System – Infrared Communication – Smart Card – Imminent Technologies.

Text Book

Introduction to Computers and Information Technology, Dr. D.Glory Ratna Mary, Mrs. S. Selvanayahi, Dr. V. Joseph Peter, Jupiter Publications

Reference Book

1. Introduction to Computer Science, Second Edition, ITL Education Solutions Ltd, Pearson Education
2. Introduction to Computers, Peter Norton, 7th Edition, Tata McGraw Hill Education
3. Fundamentals of Computers, V.Rajaram, 5th Edition, PHI

Computer Basics

L	T	P	C
0	0	4	2

Objective: To develop skills in implementing algorithms through the programming Language C and to explore the features of C by applying sample problems.

Each exercise should be completed within two hours.
It is compulsory to complete all the exercises given in the list in the stipulated time.

(Any open source Office or MS Office)

1. Usage of Numbering, Bullets, Indents and Headers in a Word Document
2. Prepare a Calendar in a Word Document
3. Design a wedding invitation in Word Document
4. Usage of Spell Check, Find and Replace
5. Picture Insertion and Alignment
6. Prepare a semester wise mark statement for a computer class of 20 students using any spreadsheet' worksheet. Total, average and rank the student marks. Give proper headings. Make the column headings bold and italic.
7. Consider the sample employee worksheet and calculate their salary.
8. Use any spreadsheet to use mathematical, statistical and logical functions
9. Use any spreadsheet to plot a chart for marks obtained by the students (out of 5) vs. frequency (total number of students in class is 50).
10. Create a database for a Telephone Directory. Create a table named phone book with relevant fields. Enter a minimum of 10 records.
11. Create a student database and create validation rules for fields like age, date of birth, pincode etc.
12. Enter data to the student database using a form.
13. Create a query and add criteria to the query.
14. Create a tabular auto report.
15. Customize a report in report design.

Reference Books:

1. Microsoft Office 2016 Step By Step, Lambert, Joan , Frye, Curtis D., Phi Learning
2. *Microsoft Access 2016* Step By Step, By Lambert, Joan Phi Learning
3. *Microsoft Excel 2016* Step By Step, Curtis Frye, Phi Learning
4. Browse the Internet for Open Source Office Software

M.S Office –List of Practicals

(For the Institutions with B.Sc. (Maths) Programme not opting Physics / Chemistry as Allied Subjects with effect from 2017-18 and onwards for Semesters - I & II and also for Semesters - III & IV of the 2016-17 batch)

Objective: To develop skills in office automation by applying sample problems.

1. Text editing with different styles (Wedding or Invitation Card)
2. Table creation and editing (Calendar or Timetable)
3. Cut, Paste, find and replace usage
4. Mathematical symbols, suffix and super fix, equation creation and editing
5. Worksheet for Payroll
6. Worksheet for EB billing
7. Use any spreadsheet to plot a chart for marks obtained by the students (out of 5) vs. frequency (total number of students in class is 50).
8. Database Creation for library books
9. Database Creation for employee‘s details
10. Presentation for a seminar with dynamic provisions

Object Oriented Programming in C++

L T P C
3 1 0 4

Objective: To gain the basic knowledge of object oriented programming concepts and to understand the detail idea of C++ streams, Inheritance, Overloading of operators, functions, constructors, File Handling and templates concepts of C++ programming.

Unit – I: Principles of Object Oriented Programming

Basic Concepts of Object Oriented Programming. **Classes and Objects:** Introduction – Specifying a Class – Defining Member Functions – Making an Outside Function Inline – Nesting of Member Functions - Private Member Functions – Static Data Members – Static Member Functions – Arrays of Objects – Objects as function arguments – Friendly Functions – Returning Objects . (**12L**)

Unit – II: Constructors and Destructors

Introduction – Constructors – Parameterized Constructors – Multiple Constructors in a class – Constructors with Default Arguments – Dynamic Initialization of Objects – Copy Constructors – Dynamic Constructors – const objects - Destructors. (**12L**)

Unit – III: Operator Overloading, Type Conversions and Inheritance

Defining Operator Overloading – Overloading Unary Operators – Overloading Binary Operators – Overloading Binary Operators using Friends – Rules for Overloading Operators – Type Conversions. **Inheritance (Extending Classes):** Introduction – Defining Derived Class – Single Inheritance - Making a Private Member Inheritable – Multilevel Inheritance – Multiple Inheritance – Hierarchical Inheritance – Hybrid Inheritance – Virtual Base Classes - Abstract Classes. (**14L**)

Unit – IV: Pointers, Virtual Functions and Polymorphism

Pointers - Pointers to Objects – this Pointer – Pointers to Derived Classes – Virtual Functions - Pure Virtual Functions. **Managing Console I/O Operations:** Introduction – C++ Streams – C++ Stream Classes – Unformatted I/O operations – Managing Output with Manipulators. (**12L**)

Unit – V: Files and Templates

Working with Files: Introduction – Classes for File Stream Operations – Opening and Closing a file – Detecting end-of-file – File Modes – Sequential Input and Output Operations. **Templates:** Introduction - Class Templates – Function Templates. (**10L**)

Text Book:

Object Oriented Programming with C++, Sixth Edition by E. Balagurusamy, Tata McGraw Hill Publishing Company Limited.

Reference Book:

1. Programming with ANSI C++, Bhushan Trivedi, 2010, Oxford University Press
2. The Complete Reference C++, Fourth/ Fifth Edition Herbert Schildt, Tata McGraw Hill Publishing Company Limited.
3. Programming With C++ Third Edition by D. Ravichandran, Tata McGraw Hill Education, 2011.
4. Programming in C++ Second Edition by Ashok N. Kamthane, Pearson Education

Programming in C++

L T P C

0 0 4 2

Objective: To gain knowledge about the object oriented programming concepts and C++ streams, Inheritance, Overloading of operators, functions, constructors, File Handling and templates concepts of C++ programming by implementing sample programs.

Each exercise should be completed within three hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

1) Program with a Class and Member Functions.
2) Program to Overload Function.(minimum three geometric figures)
3) Program to implement Parameterized Constructor.
4) Program to implement Friend Function (minimum two classes)
5) Program to Overload Unary Minus Operator.
6) Program to Overload Binary Plus Operator.
7) Program to implement Multiple Inheritance for Family Details.
8) Program to implement Multilevel Inheritance for Bank Customer Details.
9) Program to implement Hierarchical Inheritance for Students Details.
10) Program to implement Virtual Function.

Digital Design

L T P C

3 0 0 3

Objective: To understand the concept of digital systems, to operate on various number systems and simplify Boolean functions and to distinguish logical and combinational circuits.

Unit – I: Number Systems, Codes and Digital Logic

Binary Number System – Binary to Decimal Conversion – Decimal to Binary Conversion – Octal Numbers – Hexadecimal Numbers – The ASCII Code – The Excess-3 Code – The Gray Code. **Digital Logic:** The Basic gates NOT, OR , AND – Universal Logic Gates NOR,NAND – AND-OR Invert Gates.

(**10L**)

Unit – II: Combinational Logic Circuits

Boolean Laws and Theorems – Sum of Products Method – Truth Table to Karnaugh Map – Pairs, Quads and Octets – Karnaugh Simplifications – Don't Care Conditions – Product of Sums Method – Product of Sums Simplification. (**10L**)

Unit – III: Data Processing and Arithmetic circuits

Multiplexers – De-multiplexers – 1-of- 16- Decoders –BCD-to-Decimal Decoders – Seven-Segment decoders – Encoders – Exclusive-OR gates. **Arithmetic Circuits:** Binary Addition – Binary Subtraction – Unsigned Binary Numbers – Sign-Magnitude Numbers – 2's Complement Representation – 2's Complement Arithmetic. (**10L**)

Unit – IV: Flip-Flops

RS Flip Flops – Edge Triggered RS Flip Flops - Edge Triggered D Flip Flops - Edge Triggered JK Flip Flops – JK Master Slave Flip Flops. (**8L**)

Unit – V: Registers

Types of Registers – Serial in serial out – serial in parallel out – parallel in serial out – parallel in parallel out– Universal Shift Register. (**7L**)

Text Book:

Digital Principles and Applications, by Albert Paul Malvino & Donald P.Leach, Seventh Edition, Tata McGraw Hill Education Private Limited

Reference Book:

1. Fundamentals of Digital Circuits, A.Anand Kumar, Second Edition, PHI Learning Private Limited
2. Digital design, M.Morris Mano, Third Edition, Pearson Education

Programming in C

(For the Institutions with B.Sc. (Maths) Programme not opting Physics / Chemistry as Allied Subjects with effect from 2017-18 and onwards for Semesters - I & II and also for Semesters - III & IV of the 2016-17 batch)

Objective: To obtain knowledge about the structure of the programming language C and to develop the program writing and logical thinking skill.

Unit – I: INTRODUCTION

C Declarations**:-** Character Set – C tokens – Keywords and Identifiers – Identifiers – Constants – Variables – Data types – Declaration of Variables – Declaration of Storage Class – Assigning Values to Variables – Defining Symbolic Constants – Declaring Variable as Constant. Operators and Expressions**:-** Introduction – Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operator – Bitwise Operators – Special Operators – Arithmetic Expressions – Evaluation of Expressions – Precedence of Arithmetic Expressions. Managing Input and Output Operations:- getchar( ) – putchar( ) – scanf( ) – printf( ).

Unit – II: CONTROL STRUCTURES

Decision Making and Branching:- Decision Making with IF Statement – Simple IF statement – The IF…Else Statement – Nesting of IF…Else Statements – The ELSE IF ladder – The Switch Statement – The ?: Operator – The GOTO statement. Decision Making and Looping:- The WHILE Statement – The DO Statement – The FOR statement.

Unit – III: ARRAYS

One-dimensional arrays – Declaration of One-dimensional arrays – Initialization of One-dimensional arrays - Two-dimensional arrays – Initialization of Two-dimensional arrays – Multi-dimensional arrays. Character Arrays and Strings:- Declaring and Initializing String Variables – Reading Strings from Terminal – Writing Strings to Screen – String Handling Functions.

Unit – IV: FUNCTIONS

User-Defined functions:- Need for User-defined functions – Definition of functions – Return Values and their Types – Function Calls – Function Declaration – Category of functions – No Arguments and No return values – Arguments but No return Values – Arguments with return values – No arguments but a return a value – Recursion – Passing Arrays to functions – Passing Strings to functions – The Scope, Visibility and lifetime of a variables. Structures and Unions:- Defining a Structure – Declaring Structure Variables – Accessing Structure Members – Structure Initialization – Arrays of structures –Unions.

Unit – V: POINTERS AND FILES

Pointers:- Understanding pointers – Accessing the Address of a Variable – Declaring Pointer Variables – Accessing a variable through its pointer – Pointer Expressions –Pointers as function arguments. File Management in C:- Defining and Opening a file – Closing a File – Input/output Operations on files – Error Handling during I/O Operations.

Text Book:

Programming in ANSI C – 7th Edition by E Balagurusamy – Tata McGraw Hill Publishing Company Limited.

Reference Books:

1. Computer System and Programming in C by Manish Varhney, Naha Singh – CBS Publishers and Distributors Pvt Ltd.
2. Introduction to Computer Science, ITL Education Solutions Limited, Second Edition, Pearson Education
3. Computer Basics and C Programming by V. Rajaraman – PHI Learning Private Limited
4. Programming with C, Third Edition, Byron S Gottfried, Tata McGraw Hill Education Private Limited.

LINUX

L T P C

0 0 4 2

Objective: To understand and make effective use of Linux utilities and Shell scripting language to solve problems.

Each exercise should be completed within three hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Use any text editor in linux(say vi) to enter a C program to find the largest of three numbers, compile using gcc and display the output.
2. Use any text editor in linux(say vi) to enter a C program to find the factorial of a given number, compile using gcc and display the output.
3. Linux commands
    a. ls, mkdir, rmdir, cd, pwd, find, du(Directory oriented)
    b. cat, cp, rm, mv, wc (File oriented)
    c. ps, kill, batch, grep(Process oriented)
    d. write, mail, wall (Communication oriented
4. Linux commands
    a. date, who, who am i, man, cal, echo, bc(General purpose)
    b. Pipe, Filter
5. Write a shell script to display date in the mm/dd/yy format, time, username and current directory.
6. Write a shell script to find the sum of digits of a given number.
7. Write a program to generate Fibonacci series.
8. Write a program to check whether given string is palindrome or not
9. Write a shell script to find factorial of a given integer.
10. Write a shell script to generate mark sheet of a student. Take 3 subjects, calculate and display total marks, percentage and Class obtained by the student.

Reference Books:

1. Linux: A practical approach, B. Mohamed Ibrahim, Firewall Media
2. Comdex Linux and Open Office course kit revised and upgraded, Gupta, Wiley India.
3. A practical guide to Linux command, editors, and shell programming 2/e; Mark G Sobell, Prentice Hall.
4. Linux Lab - Open source Technology : Ambavade - Dreamtech

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc. Computer Science) / Semester – II / Allied Practical –II

C Programming - List of Practicals

(For the Institutions with B.Sc. (Maths) Programme not opting Physics / Chemistry as Allied Subjects with effect from 2017-18 and onwards for Semesters - I & II and also for Semesters - III & IV of the 2016-17 batch)

1. Write a program to convert the temperature from Fahrenheit to Celsius.
2. Write a program to test whether the given year is leap year or not.
3. Write a program to read two integers m and n and print the prime numbers in between them.
4. Write a program to evaluate the series ex=1+ x/1!+x^2/2!+…
5. Write a program to arrange the given set of numbers in ascending order.
6. Write a program to read two matrices and to find the sum and product of the matrices.
7. Write a program to check whether a given string is Palindrome or not.
8. Write a program to find Factorial value, Fibonacci, GCD value-Recursion.

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES

B.Sc.Electronics

(Choice Based Credit System)

(with effect from the academic year 2017-2018 onwards)

Sem (1)	**Part I/II/ III/ IV/V** (2)	**Sub No** (3)	**Subject status** (4)	**Subject Title** (5)	**Con--tact Hrs/ week** (6)	**L Hrs/ Week** (7)	**T Hrs/ week** (8)	**P Hrs/ week** (9)	**C Credits** (10)
I	I	1	Language	Tamil/Other Language	6	6	0	0	4
	II	2	Language	English	6	6	0	0	4
	III	3	Core	Basic Electronic Devices	5	3	2	0	4
	III	4	Major Practical - I	Basic Electronic Devices Lab	4	0	0	4	2
	III	5	Allied - I	Basic Electronics	3	3	0	0	3
	III	6	Allied Practical - I	Basic Electronics Lab	4	0	0	4	2
	IV	7	Common	Environmental studies	2	2	0	0	2
				Subtotal	**30**	**20**	**2**	**8**	**21**
II									
	I	8	Language	Tamil/Other Language	6	6	0	0	4
	II	9	Language	English	6	6	0	0	4
	III	10	Core	Digital Electronics	5	3	2	0	4
	III	11	Major Practical-II	Digital Electronics Lab	4	0	0	4	2
	III	12	Allied-II	Introduction to Digital Electronics	3	3	0	0	3
	III	13	Allied Practical-II	Digital Electronic Circuits Lab	4	0	0	4	2
	IV	14	Common	Value Based Education	2	2	0	0	2
				Subtotal	**30**	**20**	**2**	**8**	**21**

BASIC ELECTRONIC DEVICES

LTPC
3204

Objective: To learn about the various Electronic devices

UNIT I

Types of resistor – color code –Construction of various types of resistors (carbon composition.carbon film, wire-wound etc.) – power ratings- Capacitors (ceramic, mica polystrene,electrolytic etc.) – fixed and variable capacitors – Inductors,types.

(12L)

UNIT II

Atomic structure Bohr atom model – energy levels -energy bands –important energy band in solids- classification of solids and energy bands – forbidden Energy gap – intrinsic and extrinsic semiconductors P type and N type semiconductors– majority and minority carriers

(13L)

UNIT III

PN junction- Biasing a PN junction – forward and reverse biasing – PN junction diode: Characteristics -static and dynamic resistance - Diode Rectifiers: Half wave and Full wave rectifier – Bridge rectifier – clippers and clampers - Zener diode –Characteristics-voltage regulation using zener diode.

(12L)

UNIT IV

Bipolar transistor – UJT – Common Base, Common Emitter & Common Collector configurations and their characteristics – load line – operating point – cut off and saturation regions – transistor biasing methods -Transistor as switch,Amplifier– SCR.

(11L)

UNIT V

FET Constructional features-working Principle, features and characteristics – JFET and MOSFET and their characteristics – enhancement and depletion type – LED, LDR and photodiode.

(12L)

(Total:60L)

TEXT BOOK:

1. V.K.Mehta, “Principles of Electronics”, S.Chand & Co
2. B.L.Theraja, “Basic solid state Electronics”, S.Chand & Co

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc. Electronics) / Semester – I / Core Practical -1

BASIC ELECTRONIC DEVICES LAB

LTPC

0042

1. Characteristics of PN Junction diode

2. Characteristics of Zener diode

3. Transistor Characteristics – Common base

4. Transistor Characteristics – Common emitter

5. Transistor Characteristics – Common collector

6. Measurement of stability factor of self biasing method

7. Measurement of stability factor of fixed biasing method

8. FET Characteristics

9. Photoconductivity of LDR

10. Characteristics of Photo diode

11. Characteristics of SCR

12. Characteristics of Photo transistor.

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc. Electronics) / Semester – I / Allied - I
Allied Electronics for other Major Students

BASIC ELECTRONICS

LTPC
3003

UNIT I

Semiconductor Basics: Introduction to semiconductor materials, intrinsic & extrinsic semiconductors. P type semiconductor,N type semiconductor p-n junction diode

UNIT II

Diode Circuits: clipper circuits, clamping circuits. Half wave rectifier, Center tapped and bridge full wave rectifiers, DC power supply: Block diagram of a power supply, Zener diode as voltage regulator.

UNIT III

The BJT: Basic transistor action, Transistor configurations: Common Base (CB), Common Emitter (CE) and Common Collector (CC) configuration, UJT: construction, working

UNIT IV

Feedback Amplifiers: Concept of feedback, negative and positive feedback, Positive feedback: Barkhausen criteria for oscillations, Study of Hartley,Colpitts oscillator and Crystal oscillator.

UNIT V

Junction Field Effect Transistor (JFET): Construction of JFET, Metal Oxide Field Effect Transistor (MOSFET): Basic Construction of MOSFET and working, enhancement and depletion modes.

TEXT BOOK:

Basic and Applied Electronics-T.K Bandyopadhyay, Books and Allied Pvt Ltd (2002)

BOOKS FOR REFERENCE:

1. V.K.Mehta, “Principles of Electronics”, S.Chand & Co
2. B.L.Theraja, “Basic solid state Electronics”, S.Chand &Co
3. R. L. Boylestad, L. Nashelsky, Electronic Devices and Circuit Theory, Pearson Education (2006).
4. N Bhargava, D C Kulshreshtha and S C Gupta, Basic Electronics and linear circuits, Tata McGraw-Hill (2007)
5. J. Millman and C. Halkias, Integrated Electronics, Tata McGraw Hill (2001).
6. David A. Bell, Electronic Devices & Circuits, Oxford University Press, Fifth edition
7. Mottershed, Electronic Devices, PHI Publication, 1st Edition.

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc. Electronics) / Semester – I / Allied Practical - I

Allied Practical for other major students

BASIC ELECTRONICS LAB

LTPC

004

1. Characteristics of PN diode

2. Characteristics of Zener diode

3. Transistor Characteristics – Common base

4. Transistor Characteristics – Common emitter

5. Transistor Characteristics – Common collector

6. Measurement of stability factor of self biasing method

7. Measurement of stability factor of fixed biasing method

8. FET Characteristics

9. Photoconductivity of LDR

10. Characteristics of Photo diode

11. Characteristics of SCR

12. Characteristics of Photo transistor

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc. Electronics) / Semester – II / Core - 2

DIGITAL ELECTRONICS

LTPC
3204

UNIT I

Number System and Codes: Decimal, Binary, Octal and Hexadecimal number systems, base conversions. Representation of signed and unsigned numbers, BCD code. Binary, octal and hexadecimal-,BCD-Excess3,graycode-Alphanumeric codes.

UNIT II

Digital Logic families: Fan-in, Fan out, Noise Margin, Power Dissipation, Figure of merit, Speed power product, comparison of TTL and CMOS families.

Truth Tables of OR, AND, NOT, NOR, NAND, EXOR, , Universal Gates, Basic postulates and fundamental theorems of Boolean algebra. Demorgan's Theorem. Karnaugh Maps: Two variable K-Map

UNIT III

Arithmetic Circuits: Binary Addition. Half and Full Adder. Half and Full Subtractor, Binary Adder/Subtractor. Multiplexers, De-multiplexers, Decoders, Encoders. Parity checker – parity generators – code converters - Magnitude Comparator.

UNIT IV

Latches, Flip-flops - SR, JK, D, T, and Master-Slave -Edge triggering – Level Triggering Asynchronous Ripple or serial counter – Asynchronous Up/Down counter - Synchronous counters – Synchronous Up/Down counters – Programmable counters – Modulo–n counter, Registers – shift registers - Universal shift registers – Shift register counters – Ring counter – Shift counters - Sequence generators.

UNIT V

Memory Devices Classification of memories – ROM - ROM organization - PROM – EPROM – EEPROM – EAPROM, RAM – RAM organization – Static RAM Cell- Programmable Logic Devices – Programmable Logic Array (PLA) - Programmable Array Logic (PAL) – Field Programmable Gate Arrays (FPGA) .

BOOKS FOR REFERENCE:

1. Digital Principles & Applications – Albert Paul Malvino & Leach
2. Digital Fundamentals – Thomas L. Floyd – Prentice Hall
3. Digital Electronics-an introduction to Theory and Practice - William H.Gothmann Prentice Hall
4. Digital Practice using Integrated Circuits – R. P. Jain and Anand
5. Fundamentals of Digital Circuits, Anand Kumar, 2nd Edn, 2009, PHI Learning Pvt. Ltd.
6. Digital Circuits and systems, Venugopal, 2011, Tata McGraw Hill.
7. Digital Systems: Principles & Applications, R.J.Tocci, N.S.Widmer, 2001, PHI Learning.
8. Digital Principles, R. L. Tokheim, Schaum's Outline Series, Tata McGraw- Hill (1994)

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc. Electronics) / Semester – II / Core Practical - 2

DIGITAL ELECTRONICS LAB

LTPC

0042

1. Study of AND, OR, NOT, NAND, NOR and XOR gates using IC

2. Designing of all the logic gates using NAND gate IC

3. Designing of all the logic gates using NOR gate IC

4. Verification of Demorgan's theorems

5. Construction of gates using discrete components

6. Code conversion

7. Half adder and Full adder

8. Half subtractor and Full subtractor

9. Multiplexer and De-Multiplexer

10. Encoder and Decoder

11. Study of Flip flops

12. Shift register

13. Ripple counter

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc. Electronics) / Semester – II / Allied - 2

Allied Electronics for other Major Students

INTRODUCTION TO DIGITAL ELECTRONICS

LTPC
3003

UNIT I

Number System and Codes: Decimal, Binary, Octal and Hexadecimal number systems, base conversions. BCD code. Binary, octal and hexadecimal arithmetic.

UNIT II

Digital Logic families, Truth Tables of OR, AND, NOT, NOR, NAND, EXOR,gates , Universal Gates, Basic postulates and fundamental theorems of Boolean algebra. Demorgan's Theorem.

UNIT III

Arithmetic Circuits: Binary Addition. Half and Full Adder. Half and Full Subtractor, Multiplexers, De-multiplexers, Decoders, Encoders. Parity checker– code converters

UNIT IV

Latches and Flip flops , S-R Flip flop, J-K Flip flop, T and D type Flip flops,

Counters (synchronous and asynchronous, ring and modulo- n counter Registers – shift registers. **UNIT V**

Memory Devices Classification of memories – ROM PROM – EPROM – EEPROM – EAPROM, RAM – Static RAM Cell- Bipolar RAM cell – MOSFET RAM cell – Dynamic RAM cell Programmable Logic Devices – Programmable Logic Array (PLA) - Programmable Array Logic (PAL) – Field Programmable Gate Arrays (FPGA)

BOOKS FOR REFERENCE:

1. Digital Principles & Applications – Albert Paul Malvino & Leach
2. Digital Fundamentals – Thomas L. Floyd – Prentice Hall
3. Digital Electronics-an introduction to Theory and Practice - William H.Gothmann Prentice Hall
4. Digital Practice using Integrated Circuits – R. P. Jain and Anand
5. Fundamentals of Digital Circuits, Anand Kumar, 2nd Edn, 2009, PHI Learning Pvt. Ltd.
6. Digital Circuits and systems, Venugopal, 2011, Tata McGraw Hill.
7. Digital Systems: Principles & Applications, R.J.Tocci, N.S.Widmer, 2001, PHI Learning.
8. Digital Principles, R. L. Tokheim, Schaum's Outline Series, Tata McGraw- Hill, (1994)

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc. Electronics) / Semester – II / Allied Practical - 2

Allied Practical for other Major Students

DIGITAL ELECTRONIC CIRCUITS LAB

LTPC

0042

1. Study of AND, OR, NOT, NAND, NOR and XOR gates using IC

2. Designing of all the logic gates using NAND gate IC

3. Designing of all the logic gates using NOR gate IC

4. Verification of Demorgan's theorems

5. Construction of gates using discrete components

6. Code conversion

7. Half adder and Full adder

8. Half subtractor and Full subtractor

9. Multiplexer and De-Multiplexer

10. Encoder and Decoder

11. Study of Flip flops

12. Shift register

13. Ripple counter

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES

B.Sc. Mathematics

(Choice Based Credit System)

(with effect from the academic year 2017-2018 onwards)

Sem	Part	Sub. No	Subject Status	Subject title	Hrs / Week	Cre-dits	Marks				
							Maximum			Passing minimum	
							Int.	Ext.	Tot.	Ext.	Tot.
I	I	1	Language	Tamil/Other Languages	6	4	25	75	100	30	40
	II	2	Language	English	6	4	25	75	100	30	40
	III	3	Core -1	Calculus	5	4	25	75	100	30	40
		4	Core-2	Classical Algebra	5	4	25	75	100	30	40
		5	Allied-I	Statistics-I OR Physics/ Chemistry/ Computer Science With Practicals	6 6	3 4	25 25	75 75	100 100	30 30	40 40
	IV	6	Common	Environmental Studies	2	2	25	75	100	30	40
II	I	7	Language	Tamil/Other Languages	6	4	25	75	100	30	40
	II	8	Language	English	6	4	25	75	100	30	40
	III	9	Core-3	Analytical Geometry of Three Dimensions	5	4	25	75	100	30	40
		10	Core-4	Differential Equations	5	4	25	75	100	30	40
		11	Allied-I	Statistics -II OR Physics/ Chemistry/ Computer Science With Practicals	6 6	3 4	25 25	75 75	100 100	30 30	40 40
	IV	12	Common	Value Based Education/	2	2	25	75	100	30	40

				Social Harmony							
III	I	13	Language	Tamil/Other Languages	6	4	25	75	100	30	40
	II	14	Language	English	6	4	25	75	100	30	40
	III	15	Core-5	Real Analysis-I	6	4	25	75	100	30	40
		16	Allied-II	Statistics-I OR Physics /Chemistry With Practicals	6 6	3 4	25 25	75 75	100 100	30 30	40 40
		17	Skilled Based core	Vector Calculus	4	4	25	75	100	30	40
	IV	18	Non-major Elective	Any one of the following 1.1) Mathematics for Competitive Examinations I 1.2) Fundementals of Statistics I	2	2	25	75	100	30	40
IV	I	19	Language	Tamil/Other Languages	6	4	25	75	100	30	40
	II	20	Language	English	6	4	25	75	100	30	40
	III	21	Core-6	Abstract Algebra I	5	4	25	75	100	30	40
		22	Allied-II	Statistics II OR Physics/ Chemistry with Practicals	6 6	3 4	25 25	75 75	100 100	30 30	40 40
	IV	23	Non-major Elective	Any one of the following 2.1) Mathematics for Competitive Examinations II 2.2) Fundementals of Statistics II	2	2	25	75	100	30	40
		24	Common	Personality Development and Yoga	4	4	25	75	100	30	40
	V		Extension Activities	NCC/NSS/YRC/YWF	-	1	-	-	-	-	-

V	III	25	Core-7	Abstract Algebra II	5	4	25	75	100	30	40
		26	Core-8	Real Analysis II	6	4	25	75	100	30	40
		27	Core-9	Mechanics	5	4	25	75	100	30	40
		28	Major Elective -I	Any one of the following 1.1. Astronomy -I 1.2.Discrete Mathematics 1.3.Programming in C	4	4	25	75	100	30	40
		29	Major Elective-II	Any one of the following 2.1.Operations Research - I 2.2.Combinatorial Mathematics 2.3.Numerical Methods	4	4	25	75	100	30	40
	III	30	Skilled Based Major	Trigonometry , Fourier series and Laplace transforms	4	4	25	75	100	30	40
	IV	31	Skilled Based Common	Computers for Digital Era	2	2	25	75	100	30	40
VI	III	32	Core-11	Complex Analysis	5	4	25	75	100	30	40
		33	Core-12	Number Theory	4	4	25	75	100	30	40
		34	Core-13	Graph Theory	5	4	25	75	100	30	40
		35	Major Elective-III	Any one of the following 3.1 Astronomy II 3.2Fuzzy Mathematics 3.3 Mathematical Modeling	4	4	25	75	100	30	40
		36	Major Elective-IV	Any one of the following 4.1 Operations Research II 4.2 Coding Theory 4.3 LaTex	4	4	25	75	100	30	40
		37	Major Project	Group Project	8	8	25	75	100	30	40

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc. Mathematics) / Semester – I / Core-1

CALCULUS (75 Hours)

Unit I : Curvature,Radius of Curvature and Centre of curvature in Cartesian and polar Co-ordinates

Unit II Pedal Equation-Involute and evolute-Asymptotes

Unit III Singular Points(Node,cusp,conjugate points)-Tracing of curves (cartesian only)

Unit IV Double and Triple Integrals - Changing the order of integration - Jacobians and change of variables

Unit V Beta and Gamma functions – Application of Beta and Gamma Functions in evaluation of Double and Triple Integrals, Improper Integrals.

Text Book:

Narayanan S and T.K. Manickavasagam Pillai - Calculus Volume I (2004), Volume II (2004), S. Viswanathan Printer Pvt.Ltd.

Books for Reference :

- Kandasamy P and K. Thilagavathi - Mathematics for B.Sc., Volume II – 2004, S. Chand & Co., New Delhi.
- Apostaol T.M. - Calculus, Vol. I (4th edition) John Wiley and Sons, Inc., Newyork 1991.
- Apostaol T.M. - Calculus, Vol. II (2nd edition) John Wiley and Sons, Inc., New York 1969)
- Stewart, J - Single Variable Calculus (4th edition) Brooks / Cole, Cengage Learning 2010.

CLASSICAL ALGEBRA (75 Hours)

Unit I Theory of Equations – Formation of equations – Relation between roots and coefficients – symmetric function of the roots.

Unit II Sum of the powers of the roots of an equation – Newton's theorem, Reciprocal Equations.

Unit III Transformation of equations, Descarte's rule of signs – Rolle's theorem

Unit IV Multiple roots, Sturm's Theorem, solving appropriate solution of equations using Newton's and Horner's method.

Unit V Biquadratic equations – solution by Ferrari's method – cubic equations – solutions by Cardon's method.

Text Book:

Manickavasagam Pillai .T.K and S. Narayanan - Algebra – Viswanathan Publishers and Printers Pvt. Ltd., - 2004.

Books for Reference :

- Kandasamy P and K. Thilagavathi - Mathematics for B.Sc., - 2004, Volume I and Volume IV, S. Chand & Co., New Delhi.
- Arumugam .S, Thangapandi Issac – Classical Algebra, New Gamma Publishing House, Palayamkottai.
- Burnside, W.S. and A.W. Panton - The Theory of Equations, Dublin University Press, 1954.
- MacDuffee, C.C. - Theory of Equations, John Wiley & Sons Inc., 1954.

SEMESTER – I/III

Statistics

(For Mathematics Students)

Paper – I (90 Hours)

Unit I Moments, Skewness and Kurtosis - Curve fitting - method of least squares – Fitting lines – Parabolic, Exponential and Logarithmic curves.

Unit II Correlation and Regression – Scatter Diagram – Karl Pearson's coefficient of correlation – Properties – Lines of Regression – Coefficient of Regression and properties – Rank Correlation.

Unit III Association of Attributes – Consistency of data – criteria for independence – Yule's coefficient of Association.

Unit IV Random variable – Distribution function – properties of Distribution function – Mathematical Expectation – Addition theorem of Expectation – Multiplication theorem of Expectation – Moment generating function – cumulants – characteristic function – Properties of characteristic function.

Unit V Discrete and continuous Probability Distributions - Binomial and Poisson Distribution and their moments, Generating function, characteristic function, properties and simple applications. Normal Distribution – Standard normal distribution and their properties – simple problems.

Text Book:

Gupta .S.C and V.K. Kapoor – Fundamentals of Mathematical Statistics – (2002) Sultan Chand & Sons, New Delhi.

Books for Reference :

- Vittal, V.R. – Mathematical Statistics (2004) Maragatham Publications
- D.C. Sancheti & Kapoor – Statistics
- M.L. Khanna – Statistics
- S. Arumugam & others – Statistics

SEMESTER – I/III

Allied Mathematics

(For Science Students)

Paper – I

Algebra and Differential Equations (90 Hours)

Unit I Theory of Equations – Formation of Equations – Relation between roots and coefficients – Reciprocal equations.

Unit II Transformation of Equations – Approximate solutions to equations – Newton's method and Horner's method.

Unit III Matrices – Characteristic equation of a matrix – Eigen values and Eigen vectors – Cayley Hamilton theorem and simple problems.

Unit IV Differential equation of first order but of higher degree – Equations solvable for p, *x*, y – Partial differential equations – formations – solutions – Standard form $P_p + Q_q = R$.

Unit V Laplace transformation – Inverse Laplace transform.

Text book:

- Dr. S. Arumugam & others – Allied Mathematics – I

ANALYTICAL GEOMETRY OF THREE DIMENSIONS: (75 Hours)

Unit I Analytical Geometry of 3D Co-ordinate system, direction cosines, direction ratios

Unit II Equation of plane in different forms - angle between planes-Length of perpendicular-angle bisection.

Unit III - Equation of a line in different forms - image of a point – image of a line-The plane and the straight line-angle between plane and line-Coplanar lines-Shortest distance between two lines

Unit IV Sphere – Tangent plane – circle of intersections – Tangency of Spheres – coaxial system of spheres - Radical Planes – Orthogonal Spheres.

Unit V Equation of a cone-cone with vertex at the orgin –Tangent plane and normal-Quadratic cone with the vertex at orgin – Right circular cone – Cylinder – Right circular cylinder-enveloping cylinder

Text Book:

T.K.Manicavachagom Pillay and T.Natarajan-A text book of Analytical Geometry - Part-II Three Dimensions-S.Viswanathan(Printers&Publishers)Pvt Ltd(2012)

Books for Reference :

- Duraipandian .P. Laxmi Duraipandian and D.Muhilan - Analytical Geometry of Three Dimension - Emerald Publishers.
- Kandasamy .P. and K. Thilagavathi – Mathematics for B.Sc., Vol. IV – 2004 S.Chand and Co. New Delhi.
- Loney .S.L. - The Elements of Coordinate Geometry - Mcmillan and Company London.
- B. Stephen John - Analytical Geometry of 3D and vector differentiation : IDEAL publication.

DIFFERENTIAL EQUATIONS : (75 Hours)

Unit I First order higher degree equations – solvable for x,y,p and Clairaut's form – Simultaneous differential equations of the form $f_1(D)x + g_1(D)y = h_1(t)$, $f_2(D)\,x + g_2(D)y = h_2(t)$

Unit II **(Ordinary differential equation)**
Second order linear differential equations with constant coefficients – Find the P.I for functions of the form $e^{ax}\,f(x)$ and $x^n f(x)$

Unit III Linear equations of second order with variable coefficients – Homogeneous equations – Equation reducible to homogeneous equation.

Unit IV **(Partial differential equations)**
Formation of equations by elimination of arbitrary constants and functions – Definition of general, particular and complete solutions – solving standard forms $f(p,q) = 0$, $f(x, p, q) = 0$, $f(y, p, q) = 0$, $f(z, p, q) = 0$, $f(x, p) = f(y, q)$, $z = px + qy + f(p,q)$ – Lagrange's differential equations $P_p + Q_q = R$

Unit V Application of differential equations – Growth and Decay – chemical reaction - Newton's law of cooling – Brochistocrone problem – simple electric circuits.

Text Book:

Narayanan .S and T.K. Manickavachagam Pillai – Differential equations and its applications, 2003 - S. Viswanathan Printers.

Books for Reference :

- Kandasamy .P and K. Thilagavathi - Mathematics for B.Sc., Vol. III – 2004 – S.Chand and Co., New Delhi.
- Braun .M. - Differential Equations and their applications (III edition) Springer – Verlag, New York 1983)
- Boyce .W.E and R.C. Diprima – Elementary differential equations and Boundary value Problems (VII editions) - John Wiley and Sons, Inc, New York 2001.
- Sankaranarayan and Manguldoss – Differential Equations.

SEMESTER – II / IV

Statistics

(For Mathematics Students)

Paper – II (90 Hours)

Unit I Characteristics of index numbers – Laspeyer's and Paasche's – Fisher's and Bowley's Marshall and Edgeworth's index numbers – Tests – Unit test, Commodity Reversal test, Time Reversal test, circular test.

Unit II Testing of Hypothesis – Null hypothesis and Alternate hypothesis – Type I and Type II errors - Critical Region, Level of significance – Test of significance for large samples – Testing a single proportion – Difference of proportions. Testing a single mean and Difference of means.

Unit III Tests based on t-distribution – single mean and Difference of means – Tests based on F-distribution – Variance Ratio test – Tests based on Chi-square Distribution – Independence – Goodness of fit.

Unit IV Analysis of varience – one way and two way classified data – Basis of experimental design – Randomized Block Design – Latin square – simple problems.

Unit V Statistical Quality control – Definition – Advantages, Process control – Control chart, Mean chart, Range chart, P-chart, Product Control – Sampling Inspection Plans.

Text Book:

- Gupta .S.C & V.K. Kapoor – Fundamentals of Mathematical Statistics – (2002) Sultan Chand & Sons, New Delhi.

Books for Reference :

- Vittal .P.R – Mathematical Statistic (2004) – Maragatham Publications
- DC Sancheti & Kapoor – Statistics
- M.L. Khanna – Statistics
- S. Arumugam & others – Statistics

SEMESTER – II/IV

Allied Mathematics

(For Science Students)

Paper – II

Vector Calculus & Fourier Series (90 Hours)

Unit I Vector differentiation – Gradient – Divergence and curl

Unit II Evaluation of double and triple integrals

Unit III Vector integration – Line, surface and volume integrals

Unit IV Green's, Stokes and Divergence theorems (without proof) – simple problems.

Unit V Fourier series – Even and odd functions – Half range Fourier series.

Text Books:

- Dr. S. Arumugam & others – Vector Calculus
- T.K. Manicavachagom Pillai – Calculus (Vol II)

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES

B.Sc. PHYSICS

(Choice Based Credit System)

(with effect from the academic year 2017-2018 onwards)

	Sub. No:	Subject status	Subject Title	Contact Hrs/week	L Hrs/ week	T Hrs /week	P Hrs/ week	Credits
Part I	1	Language	Tamil/Other Languages	6	6	0	0	4
Part II	2	Language	English	6	6	0	0	4
Part III	3	Core-1	Mechanics and relativity	4	4	0	0	4
	4	Core-2	Properties of matter and acoustics	4	4	0	0	4
	5.	Major .Practical-I	Practical-I	2	0	0	2	2
	6	Allied Paper-1	Allied Physics Paper-1	4	4	0	0	4
	7	Allied.Practical-1	AlliedPractical-1	2	0	0	2	2
Part IV	8	Common	Environmental Studies	2	2	0	0	2
			Total	**30**				**26**
Part I	9	Language	Tamil/Other Languages	6	6	0	0	4
Part II	10	Language	English	6	6	0	0	4
Part III	11	Core-3	Thermal physics and statistical mechanics	4	4	0	0	4
	12	Core-4	Optics	4	4	0	0	4
	13	Major .Practical-II	Practical-II	2	0	0	2	2
	14	Allied Paper-2	Allied Physics Paper-2	4	4	0	0	4
	15	Allied.Practical-2	Practical-2	2	0	0	2	2
Part IV	16	Common	Value Based education	2	2	0	0	2
			Total	**30**				**26**

MSU/ 2017-18 / UG-Colleges / Part-III (B.Sc.Physics) / Semester – I / Core - 1

MECHANICS AND RELATIVITY

UNIT-I: **VECTORS**

Vector analysis - components of a vector - gradient of a scalar point function-divergence and curl of vector point function- angular momentum as a vector-product of two vectors - work as a scalar product of two vectors - line, surface and volume integrals - Gauss divergence, Stoke's and Green's theorems

UNIT-II: **CONSERVATION LAWS**

Laws of conservation of energy, linear momentum and angular momentum - work energy theorem - work done by gravitational force - work done by spring force - potential energy - conservative and non conservative forces - potential energy curve - centre of mass - Two body problem and reduced mass - central field motion - motion of planets in elliptical orbits - proof of Kepler's second and third laws - Rocket motion - systems of varying mass - multistage rocket.

UNIT-III: **DYNAMICS OF RIGID BODIES**

Translational and rotational motion - Angular momentum and angular impulse - moment of inertia and radius of gyration - moment of inertia of a thin circular ring, solid sphere, solid cylinder. - parallel axis and perpendicular axis theorem - Compound pendulum - theory - equivalent simple pendulum - reversibility of centres of oscillation and suspension - determination of g and k -Newton's second law for rotation – torque,work, rotational kinetic energy and expression for power during rotation - Kinetic energy of rolling - Acceleration of a uniform body, rolling down an inclined plane. Precessional motion - Gyrostat .

UNIT-IV: **HYDROSTATICS AND HYDRODYNAMICS**

Pressure and thrust - Thrust on a plane surface immersed in a liquid - centre of pressure - centre of pressure on a rectangular lamina, a triangular lamina. Laws of floation - determination of meta centric height of a ship - steady and streamline flow - equation of continuity - energy of a fluid - Bernoulli's theorem – proof - pitot's tube and venturimeter.

UNIT-V: **RELATIVITY**

Introduction - Reference frames-inertial frames - the ether hypothesis - Michelson morley experiment - Postulates of special theory of relativity - Lorentz transformation equations - Lorentz Fitzgerald contraction - time dilation - relativistic addition of velocities - velocity addition theorem - simultaneity - relativistic mass - relativistic momentum - mass energy equivalence. Relation between total energy, rest mass energy and momentum. Accelerated frames and gravity - general theory of relativity (basics) - gravity waves.

Books for study

1. Mechanics - D.S. Mathur - S Chand & Co

2. Mechanics and mathematical physics - R.Murugeshan -S Chand & Co. Pvt. Ltd., New Delhi.

Books for Reference

1. Fundamentals of Physics, 6th Edition, by D Halliday, R Resnick and J Walker. Wiley NY 2001.

2. Mechanics - Berkely physics course: Charles Kittel-Tata Mc Graw Hill Publication

3. Mathematical physics - Satya Prakakash- S Chand & Co. Pvt. Ltd.,

4. Mechanics - Narayanamoorthy

MSU/ 2017-18 / UG-Colleges / Part-III (B.Sc.Physics) / Semester – I / Core - 2

PROPERTIES OF MATTER AND ACOUSTICS

UNIT-I: **ELASTICITY**

Hooke's law - Stress-strain diagram - Elastic moduli-Relation between elastic constants - Poisson's Ratio-Expression for Poisson's ratio in terms of elastic constants - experimental determination of poisson's ratio of rubber - Twisting couple on a cylinder -Work done in twisting a wire - Torsional pendulum- Determination of Rigidity modulus and moment of inertia - **q, *n*** and **σ** by Searles method -I - section griders

UNIT-II: **BENDING OF BEAMS**

Bending of beams - Expression for bending moment - Cantilever - Expression for cantilever depression and oscillations - theory and experiments. Uniform bending and Non-uniform bending - theory and experiments .

UNIT-III: **FLUIDS**

Surface Tension - Synclastic and anticlastic surfaces - Excess of pressure - application to spherical and cylindrical drops and bubbles - variation of surface tension with temperature - Jaegar's method. Capillary rise - Experimental determination of surface tension by capillary rise - angle of contact of mercury-Quincke's method. Viscosity - Rate flow of liquid in a capillary tube - Poiseuille's formula - Determination of coefficient of viscosity by capillary flow - Variations of viscosity of a liquid with temperature- lubricants.

UNIT-IV: **SOUND**

Sound - Simple harmonic motion - free, damped, forced vibrations and resonance -Helmholtz resonator-laws of transverse vibration of strings - Sonometer-Determination of AC frequency using sonometer - Determination of frequency using Melde's apparatus. Decibels - Intensity levels - musical notes - musical scale.

UNIT-V: **ULTRASONICS**

Ultrasonics - production - piezoelectric method-magnetostriction method- detection - properties – applications. Acoustics - Intensity level and loudness

Acoustics of buildings: Reverberation - reverberation time - derivation of Sabine's formula - determination of absorption coefficient - optimum reverberation time-factors affecting acoustics of buildings-sources of noises and its control-sound level meter.

Books for study

1. Properties of matter - Murugeshan R, S Chand & Co. Pvt. Ltd., New Delhi

2. Text book of sound - Brij Lal & Subramaniam, N Vikas Publishing House, New Delhi, 1982

Books for Reference

1. Elements of Properties of Matter - Mathur D S, Shyamlal Charitable Trust, New Delhi, 1993

2. Fundamentals of General Properties of Matter - Gulati H R, R Chand & Co. New Delhi, 1982

3. Waves & Oscillations - Subrahmanyam N & Brij Lal, Vikas Publishing House Pvt. Ltd., New Delhi, 1994

4. A Textbook of Sound - Khanna D R & Bedi R S, Atma Ram & Sons, New Delhi 1985

5. Fundamentals of Physics, - D Halliday, R Resnick and J Walker, Wiley NY 2001. 6th Edition

6. The Feynman Lectures on Physics, , - R P Feynman, RB Leighton and M Sands, Narosa, New Delhi, 1998. Vols. I, II and III

PRACTICAL-1

(8 experiments compulsory)

1. Youngs modulus - non uniform bending - pin and microscope
2. Youngs modulus - uniform bending - optic lever and telescope
3. Youngs modulus - cantilever – depression
4. Torsional pendulum -Rigidity modulus and moment of inertia (with & without masses)
6. Co-efficient of viscosity-Stoke's method
6. Surface tension – Capillary rise.
7. Sonometer – Verification of laws
8. Sonometer- determination of AC frequency
9. Compound pendulum - **g** and **I**
10. Melde's string – determination of frequency- transverse and longitudinal modes

MSU/ 2017-18 / UG-Colleges / Part-III (B.Sc.Physics) / Semester – I / Allied - I

ALLIED PHYSICS – I

Unit I : Elasticity and bending moment

Hooke's law – Elastic moduli – Relation between elastic constants – Work done in stretching a wire – Expression for bending moment - uniform bending- Experiment to determine Young's modulus using pin and microscope-Twisting couple of a wire – Expression for couple per unit twist – Work done in twisting – Experimental determination of rigidity modulus of a wire using Torsion pendulum with theory

Unit II: Surface tension and Viscosity

Surface tension – Definition – Examples – Molecular interpretation – Expression for excess of pressure inside a synclastic and anticlastic surface-Application to spherical and cylindrical drops and bubbles

Viscosity: Coefficient of viscosity – Rate of flow of liquid in a capillary tube (Poisueuille's formula) – Analogy between liquid flow and current flow – Stokes' formula for highly viscous liquids (Dimension method) – Experimental determination of viscosity of highly viscous liquid (stokes' method)

Unit III: Sound

Simple harmonic motion – Free, damped ,forced vibrations and resonance – Composition of two SHMs along a straight line and in perpendicular direction – Melde's string experiment – Determination of frequency of tuning fork(both longitudinal and transverse mode)

Unit IV : Thermal physics : Mean free path- Expression for mean free path (Zero order approximation) – Transport phenomena – Expression for viscosity and thermal conductivity – Conduction in solids – coefficient of thermal conductivity – Lee's disc method to determine thermal conductivity of a bad conductor – Wiedmann – Franz's law – Convection : Newton's

law of cooling – Experimental verification – Radiation : Black body radiation – Distribution of energy in black body spectrum – Important features.

Unit V: Optics

Interference: Condition for interference-Air wedge-determination of thickness of a thin wire by air wedge

Diffraction: Fresnel & Fraunhofer diffraction-Plane diffraction grating- theory and experiment to determine wavelength (normal incidence)

Polarization: Double refraction- half wave and quarter wave plate – Production and detection of plane, elliptically and circularly polarized light.

Books for study

1. Optics – Brijlal & Subramanian

2. Properties of matter – R.Murugesan

3. Heat & Thermodynamics – D.S.Mathur

Reference Books

1.Heat and thermodynamics - Brijlal & Subramanian, S Chand & Co., New Delhi

2.Fundamentals of Optics by Jenkins A Francis and White E Harvey, McGRaw Hill Inc., New Delhi, 1976.

3. Elements of Properties of Matter by Mathur D S, Shyamlal Charitable Trust, New Delhi, 1993

MSU/ 2017-18 / UG-Colleges / Part-III (B.Sc.Physics) / Semester – I / Allied Practical - I

PRACTICAL-1

(8 experiments compulsory)

1. Youngs modulus - non uniform bending - pin and microscope
2. Youngs modulus - uniform bending - optic lever and telescope
3. Torsional pendulum -Rigidity modulus
4. Co-efficient of viscosity-Stoke's method
5. Co-efficient of viscosity-variable pressure head
6. Thermal conductivity of a bad conductor - Lee's disc method.
7. Spectrometer –dispersive power
8. Spectrometer - grating - -normal incidence method.
9. Air wedge - thickness of a wire
10. Melde's string-frequency of tuning fork

MSU/ 2017-18 / UG-Colleges / Part-III (B.Sc.Physics) / Semester – II / Core - 3

THERMAL PHYSICS AND STATISTICAL MECHANICS

UNIT-I: **LOW TEMPERATURE PHYSICS**

Joule - Kelvin effect - liquefaction of hydrogen - liquefaction of helium-Kammerling - Onne's method - Helium I and II - Lambda point - production of low temperatures - adiabatic demagnetization - practical applications of low temperature - refrigerators and air-conditioning machines - super fluidity - application of super fluidity.

UNIT II: **KINETIC THEORY OF GASES**

Kinetic theory of gases-Expression for pressure-gas laws-Maxwell's law of distribution of molecular velocities - Transport phenomena - Diffusion , viscosity and thermal conductivity of gases - Vander walls equation of state - Determination of Vander walls constant - Relation between Vander Wall's constant and critical constants.

UNIT-III: **THERMODYNAMICS I**

Zeroth law, I and II law of thermodynamics - isothermal process-adiabatic process-gas equation during adiabatic process - work done during adiabatic and isothermal process - Carnot's theorem - significance - thermodynamic scale of temperature - perfect gas scale of temperature - Carnot's engine - Otto engine and Diesel engine - working and efficiency.

UNIT-IV: **THERMODYNAMICS II**

First latent heat equation (Clausius - Clapeyron equation) - effect of pressure on melting point and boiling point - second latent-heat equation - III law of thermodynamics - concept of entropy - temperature entropy diagram - entropy of perfect gas - Maxwell's thermo dynamical relations - derivation - applications - Clausius - Clapeyron equation and specific heat relation

UNIT-V: **STATISTICAL MECHANICS**

Concept of probability - stirlings formula - microstate - macrostate -thermodynamic probability - phase space - Maxwell-Boltzmann, Bose - Einstein and Fermi-Dirac Statistics distribution law - fermi energy level - bosons and fermions – comparison.

Books for Study

1. Heat and thermodynamics - Brijlal and Subramaniyam, S Chand & Co.

2.Thermal Physics - R Murugeshan and Kiruthiga Sivaprasad, S Chand & Co., New Delhi.

Books for Reference

1. Heat and thermodynamics - D S Mathur, S Chand & Co., New Delhi

2. Elements of Statistical mechanics - Gupta and Kumar, Pragati Prakashan, Meerut

3. Statistical mechanics - Sathya Prakash and J P Agarwal, Kedar Nath & Ram Nath & Co., Meerut

4. Introduction to Solid State Physics - C Kittel, Prentice Hall of India

5. Thermal Physics – S C Garg, R M Bansal and C K Ghosh, Tata McGraw-Hill

6.. Heat and thermodynamics - J B Rajam, S Chand & Co., New Delhi

MSU/ 2017-18 / UG-Colleges / Part-III (B.Sc.Physics) / Semester – II / Core - 4

OPTICS

UNIT-I: **GEOMETRICAL OPTICS**

Introduction - chromatic and spherical aberration in lenses and their removal - Dispersion of light - Refraction through a thin prism - Dispersive power of a prism - deviation without dispersion - dispersion without deviation - constant deviation spectroscope. Eyepieces - Huygen , Ramsden and Gauss eyepieces - Aplanatic points - oil immersion objective - prism binocular.

UNIT-II: **INTERFERENCE**

Analytical treatment of interference - theory of interference fringes - interference in thin films due to reflected light - Air wedge - experiment to find thickness of a wire - Testing the plainness of surfaces – newton's rings-theory and experiment- Michaelson's interferometer and applications.

UNIT-III: **DIFFRACTION (**Fresnel and Fraunhofer)

Diffraction by single slit and determination of intensity distribution by phasor method - Diffraction by circular aperture - plane transmission grating- diffraction at normal and oblique incidence - Limit of resolution and resolving power-Rayleigh Criterion for resolution - Resolving power of a plane diffraction grating and prism - Fresnel wavefront and theory of half period zones - zone plate-comparison with convex lens - comparison between Fresnel and fraunhofer diffraction

UNIT-IV: **POLARIZATION AND FIBRE OPTICS**

Double refraction - Nicol Prism as polarizer and analyser - production and detection of plane, elliptically and circularly polarized light - Quarter and half wave plates - optical activity- Fresnel's theory of optical activity - Dichroism.

Optical fibre and principles of fibre optics - acceptance angle - numerical aperture expression - step index optical fibre- single mode and multimode step index optical fibres- characteristics.

UNIT-V: **LASER AND ITS APPLICATIONS**

Principle of laser - spontaneous emission - stimulated emission - threshold condition (Schaw low and townes equations) - rate equation - optical excitation-three and four level lasers. Types of lasers - semicondutor diode lasers - dye laser-nitrogen and carbon - di- oxide lasers - Holography - simple applications.

Books for Study

1. Optics by Subramaniam N & Brij Lal, S Chand & Co. Pvt. Ltd., New Delhi, 1990

2. Laser and nonlinear optics by B.B.Laud 2nd edition Wiley Eastern Ltd., 1991

3.Optic fibre and fibre optic communication systems-Subir kumar sankar-. S Chand & Co. Pvt. Ltd., New Delhi,

Books for Reference

1. Fundamentals of Optics by Jenkins A Francis and White E Harvey, McGRaw Hill Inc., New Delhi, 1976.

2. Optical Physics by Lipson. S G, Lipson H and Tannhauser D S, Cambridge University Press (1995)

3. Fundamentals of Optics by Raj M G, Anmol Publications Pvt. Ltd., (1996), New Delhi

4. Fundamentals of Physics, 6th Edition, by D Halliday, R Resnick and J Walker. Wiley NY 2001.

5.Optics and Spectroscopy by Murugeshan, S Chand & Co. Pvt. Ltd., New Delhi

MSU/ 2017-18 / UG-Colleges / Part-III (B.Sc.Physics) / Semester – II / Major Practical - II

PRACTICAL-1I

(8 experiments compulsory)

1. Specific heat capacity of liquid - Newtons law of cooling
2. Thermal conductivity of a bad conductor - Lee's disc method.
3. Callender and Barnes continous flow calorimeter- specific heat capacity of liquid
4. Spectrometer – dispersive power of prism
5. Spectrometer – refractive index of liquid
6. Spectrometer - grating - **N** and **λ** -normal incidence
7. Spectrometer - grating – **oblique** incidence - dispersive power
8. Air wedge - thickness of a wire and thickness of enamel coating.
9. Newtons rings-refractive index
10. Thermal conductivity -Searle,s apparatus

MSU/ 2017-18 / UG-Colleges / Part-III (B.Sc.Physics) / Semester – II / Allied - II

ALLIED PHYSICS - II

Unit I: Electricity

Current and current density – Expression for current density – Ohm's law – Resistors in series and in parallel – I-V characteristic of a resistor – Color coding – Conversion of a galvanometer into an ammeter and voltmeter – Kirchoff's laws – Application of Kirchoff's laws in Wheatstone network – sensitiveness of bridge.

Unit II: Electromagnetism

Magnetism: Definition of magnetic induction B, Magnetic field intensity H , Intensity of magnetization M – Relation connecting M, B and H – Magnetic permeability μ and magnetic susceptibility K – Relation between μ and K – Properties of Dia, Para and Ferro magnetic materials. Electromagnetism: Faraday's law of electromagnetic induction – Lenz's law – Expression for induced current and charge – Self inductance – Self inductance of a long solenoid – Determination of self inductance by Rayleigh's method –Mutual inductance – Coefficient of coupling – Determination of mutual inductance using BG.

Unit III: Electronics

Junction diodes-forward and reverse bias-diode charecteristics- Zener diode – VI characteristic of a Zener diode – Transistors-Charecteristics of a transistor(common emitter mode only). Digital Electronics: Decimal and binary numbers – binary to decimal and decimal to binary-Binary addition – Binary subtraction by 1's and 2's complement method – Basic logic gates OR, AND, NOT (Symbol, Boolean equation, truth table, circuit and working) – NAND, NOR, EX-OR(Symbol, Boolean equation , truth table only) – De Morgan's theorem.

Unit IV: Nuclear physics

Introduction – Classification of nuclei – General properties of nucleus – Nuclear size, Nuclear mass, Nuclear density, Nuclear charge, Nuclear spin & Nuclear magnetic dipole moments – Mass defect – Binding energy - Binding energy curve – Nuclear forces – Properties –

Fundamental laws of radioactivity – Soddy Fajan's displacement law – Law of radioactive disintegration – Half life period – The mean life.

Unit V: Mechanics and Relativity

Projectiles – Time of flight – Range on the horizontal plane – Greatest height attained by the projectile – Path of the projectile– Range on an inclined plane – Relativity: Frames of references – Postulates of special theory of relativity – Galilean & Lorentz transformation equations – Length contraction – Time dilation.

Books for study

1. Electricity and Magnetism – R.Murugesan

2. Modern physics – R. Murugesan

3. Principle of Electronics – V.K.Mehta

4. Digital principles and applications - Albert Paul Malvino & Donald P.Leach

5. Mechanics – D.S.Mathur

Reference Books

1.Modern Physics- Seghal Chopra & Seghal, Sultan chand 1998 Electricity and Magneti - **K**.K.Tiwari (S.Chand &Co.)

2.Electronic fundamentals and applications-John D.Ryder –Prentice Hall

3. Electronic principles-Malvino

4. Electricity and Magnetism – Vasudeva

MSU/ 2017-18 / UG-Colleges / Part-III (B.Sc.Physics) / Semester – II / Allied Practical - II

PRACTICAL-1I

(8 experiments compulsory)

1.Potentiometre-calibration of volt meter(low range)

2. Potentiometre-calibration of ammeter

3.Series resonance circuit

4.Parallel resonance circuit

5.Basic logic gates using descrete components –AND,OR,NOT

6. Zener diode Diode charecteristics

7.Transistor charecteristics(CE mode)

8. Absolute determination of mutual inductance -BG

9.Owen's bridge- Absolute determination of self inductance

10.Tangent galvanometer-Horizontal earth's magnetic induction

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES

B.Sc. Zoology

(Choice Based Credit System)

(with effect from the academic year 2017-2018 onwards)

Sem.	Pt.I/ II/III IV/V	Subject Status	Subject title	Course /paper	Contact Hrs./ Week	Credits
I	I	Language	Tamil/Other Language	1	6	4
	II	Language	English	1	6	4
	III	Core	Animal Diversity-I Invertebrata	1	4	4
	III	Core	Animal Diversity-II Chordata	1	4	4
	III	Major Practical-I	Animal Diversity-I Invertebrata & Animal Diversity-II Chordata	1	2	2
	III	Allied-I	Cell Biology, Genetics and Bio-Technology/Industrial Fish and Fisheries-Biology of Fish	1	4	3
	III	Allied Practical-I	Cell Biology, Genetics and Bio-Technology/Industrial Fish and Fisheries-Biology of Fish	1	2	2
	IV	Common	Environmental Studies	1	2	2
			Sub total	**8**	**30**	**25**
II	I	Language	Tamil/Other Language	1	6	4
	II	Language	English	1	6	4
	III	Core	Developmental Zoology	1	4	4
	III	Core	Ecology & Toxicology	1	4	4
	III	Major Practical-II	Developmental Zoology & Ecology & Toxicology	1	2	2
	III	Allied-II	Developmental Zoology, Ecology, Animal Physiology & Evolution/Industrial Fish and Fisheries-capture Fisheries	1	4	3
	III	Allied Practical-II	Developmental Zoology, Ecology, Animal Physiology & Evolution/Industrial Fish and Fisheries-capture Fisheries	1	2	2
	IV	Common	Value based education/Social harmony	1	2	2
			Sub total	**8**	**30**	**25**
III	I	Language	Tamil/Other Language	1	6	4
	II	Language	English	1	6	4
	III	Core	Cell and Molecular Biology	1	4	4
	III	Major Practical-III	Cell and Molecular Biology	1	2	2
	III	Allied-III	Cell Biology, Genetics and Bio-Technology	1	4	3
	III	Allied Practical-III	Cell Biology, Genetics and Bio-Technology	1	2	2
	IV	Skilled based-core	(Any one) 1.Home aquarium 2. Nutrition and Dietetics	1	4	4
	IV	Non-Major Elective	(Any one) 1.Bee Keeping 2. Clinical Biology	1	2	2
			Sub total	**8**	**30**	**25**

IV	I	Language	Tamil/Other Language	1	6	4
	II	Language	English	1	6	4
	III	Core	Genetics	1	4	4
	III	Major Practical-IV	Genetics	1	2	2
	III	Allied-IV	Developmental Zoology, Ecology, Animal Physiology and Evolution	1	4	3
	III	Allied Practical-IV	Developmental Zoology, Ecology, Animal Physiology and Evolution	1	2	2
	III	Skilled based	PD/Yoga	1	4	4
	IV	Non-Major Elective	(Any one) 1. Public Health and Hygiene 2. Community and Social preventive Medicine.	1	2	2
	V	Extension Activity	NCC/NSS/YRC/YW			1
			Sub total	**8**	**30**	**26**
V	III	Core	Animal Physiology	1	5	4
	III	Core	Animal Biotechnology	1	5	4
	III	Elective	(Any one) 1. Sericulture 2. Economic Entomology 3. Dairy farming	1	5	4
	III	Elective	(Any one) 1. Apiculture 2. Food and Food Processing Technology 3. Poultry Science	1	5	4
	III	Major Practical-V	Animal physiology and Biochemistry	1	3	2
	III	Major Practical-VI	Animal Biotechnology	1	3	2
	III	Major Practical-VII	Corresponding Electives	1	2	2
	IV	Skill based common	Computer	1	2	2
			Sub total	**8**	**30**	**24**
VI	III	Core	Evolution	1	6	4
	III	Core	Immunology and Microbiology	1	6	4
	III	Core	Biostatistics,Computer applications & Bioinformatics	1	5	4
	III	Major Practical-VIII	Evolution, Immunology and Microbiology	1	3	2
	III	Major Practical-IX	Biostatistics,Computer applications & Bioinformatics	1	3	2
	III	Major Practical-X	Corresponding Electives	1	2	2
	III	Project Group		1	5	4
			Sub total	**7**	**30**	**22**

Total number of hours: 180 Total number of Credits: 147

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc. Zoology) / Semester – I / Core-1

ANIMAL DIVERSITY - I - INVERTEBRATA

4 Hrs. /Week **4x15=60Hrs/Semester** **12Hrs/Unit** **4 Credits**

OBJECTIVE:

To elucidate the importance of taxonomy, to know the methods of nomenclature, to realize the differences between Protozoa and Metazoa and to study the structure, functional organization, adaptations and the economic importance of lower and higher Invertebrates.

UNIT I

Introduction to Principles of taxonomy – Binominal nomenclature.

Protozoa: General Characters and classification up to classes with the examples.

Type study:- *paramecium:* morphology – nutrition – Osmoregulation – Excretion – Reproduction(binary fission and conjugation)

General structure, life cycle, Pathogeny and Control Measures of the following: (a) *Entamoeba histolytica (b) plasmodium*

Porifera: General Characters and classification up to classes with the names of the examples.

Type study:- *Leucosolenia* – External morphology – Body wall – Reproduction. **General topic:** Canal system in sponges.

UNIT II

Coelenterata: General characters and classification up to classes with the names of the examples.

Type study:- Obelia – External Characters (structure of the colony) – life history.

General Topics: Corals, Coral reefs and their significance.

Platyhelminthus: General characters and classification up to classes with the names of the examples.

General topic: (i) External morphology and life cycle of fasciola hepatica.

(ii) Parasitic adaptations of platyhelminthes.

UNIT III

Aschelminthes (Nematoda): External morphology, life cycle, pathogeny, Parasitic adaptations and control measures of the following:

(a) Ascaris lumbricoides (Round worm)
(b) Dracunculus medinensis (Guinea worm)
(c) Wuchereria bancrofti (Filarial worm)

Annelida: General characters and classification up to classes with the names of the examples.

External characters

General topics: (i) Metamerism in Annelida.

(ii) Biological significance of Earthworm.

UNIT IV

Arthropoda: General Characters and classification up to class with the names of the examples.

Type study: Penaeus: External characters–Appendages–compound eye -Reproductive system and Life cycle.

General topics: (i) social life in insects – Honey Bees

(ii) Beneficial insects – Honey bee, Lac insects and silk moth

(iii) External Characters, economic importance and control measures of the pests of agricultural crops (Coconut – Paddy)

(a) Oryctes rhinoceros (b) Leptocorisa acuta

UNIT V

Mollusca: General characters and classification up to classes with the names of the examples.

Type study: Pila globosa: External characters – shell – mantle cavity – Anatomy of Digestive system and reproductive system.

General topics: (i) Pearl culture and Pearl Industry in India.

(ii) Cephalopods as advanced Molluscs.

Echinodermata: General characters and classification up to classes with the names of the example.

Type study : Star fish: External Characters – Water vascular system.

General topic:- Larval forms of Echinodermata and their Phylogenetic significance.

REFERENCE BOOKS: Animal Diversity – I : Invertebrata

1. Arora, M.P.Non – Chordates ,Himalaya Publishing House, Ramdoot, Dr.Bhalero Marg (Kelewadi) Gurgan, Mumbai-400004.
2. Barrington, E.J.W.,Invertebrate structure and function.Boston – Houghton. Miffin and ELBS, London.
3. Bhamrah,H.S.et.al. A text book of Invertebrates. Alilnol Publications Private Limited,4374/4B.Ansari Road, Dayaganj,New Delhi – 110002.
4. Brusca, Invertebrates, ANE Books, Avantika,Niwas,19 Doraiswamy Road, T.Nagar,Chennai-600 017.
5. Ekambaranatha Iyer,M.: A Manual of Zoology Part I. Invertebrata, S. Viswanathan (printers and Publishers)Pvt.Ltd,Chennai.
6. Jan,A. Pechenik, Biology of the Invertebrates, Tata McGraw-Hill Publishing Company Limited,No.444/1 Sri Ekambara Naicker Industrial state,Alalpakkam, Porur,Chennai-600 016.
7. Jordan,E.L.and P.S. Verma. Invertebrate Zoology (14th Edition).S. Chand and Company Limited,7361 Ram Nagar,Qutab Road,New Delhi-110055.
8. Kotpal R.L. Modern Text Book of Zoology, INVERTEBRATES (9th Edition). Rastogi Publications, Gangotri, Shivaji Road, Meerut-250 002.
9. Mahanta Rita and I.K. Bhattacharyya. Invertebrate Zoology. Kalyani Publishers, B1/1299, Rajaendar Nagpur, Ludhiana-141008.
10. Parker and Haswell. A text Book of Zoology, Invertebrates Volume I. AITBS Publishers and Distributors,J5/6 Krishna Nagar, Delhi-110051
11. Verma, A. Invertebrates: Protozoa to Echinodermata. Naros Publishing House Private Limited.35-36 Greams Road, Thousand Lights, Chennai - 600006.

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc. Zoology) / Semester – I / Core - 2

ANIMAL DIVERSITY –II: CHORDATA

4 Hrs/week **4x15=60 Hrs/Semester** **12 Hrs/Unit** **4 Credits**

OBJECTIVE: To exemplify the intermediary position of Prochordates between invertebrates and vertebrates, and to study the structure, functional organization, adaptations and the economic importance of lower and higher chordates

UNIT I: **Introduction to chordata**: General characters(Diagnostic characters and additional characters)and Classification up to classes with the name of the examples.

Prochordata: General characters and classification up to orders with the name of the examples.

Type study: Amphioxus-External features-Digestive and Excretory system

External features and biological significance of the following

(a) Ascidian (b) Balanoglossuss

Agnatha: Petromyzon- External morphology; Ammocoetes Larva

UNIT II: Pisces: General characters and classification up to sub-classes with the names of the examples

Type study: scoliodon (shark) -External characters- Placoid scales-Digestive system-Respiratory system-Receptor Organs- Urinogenital system.

General topics: (i) Accessory respiratory organs in fishes (ii) Migration of fishes

(iii) Parental care in fishes

UNIT III: Amphibia: General characters and classification up to orders with the name of the example.

External features and biological significance of the following Examples:

(a) Rhachophorus (b) Ambystoma (c) Axolotl Larva.

General topic: Parental care in Amphibia

Reptilia: General characters and classification up to orders with the name of the examples

External features and Biological significance of the following Examples:

(a) Chelone mydas (b) Chamaeleon (c) Draco (d) Cobra

General Topics: (i) Identification of poisonous and non-poisonous snakes of South India (ii) Poison apparatus- Biting mechanism- venom- First aid for snake bite-Antivenom.

UNIT IV: Aves:- General characters and classification up to subclasses with the names of the examples.

Type study: Columba livia (Pigeon)-External characters-Flight muscles-Digestive system-Respiratory system-Urinogenital system

General topics: (i) Migration of Birds (ii) Flight adaptations in Birds

UNIT V: Mammalia: General characters and classification up to subclasses with the names of the examples.

Type study: Rabbit –External morphology – Digestive system – Respiratory system- Heart-Structure of Brain- Reproductive system.

General topics:(i) Egg laying mammals (ii) Adaptations of aquatic mammals

(iii) Dentition in mammals

REFERENCE BOOKS: Animal Diversity II - Chordata

1.Alexander, R.M. The Chordates Cambridge University Press.

2.Bhamrah, H.S. et al. A text book of chordates.Anmol publication Limited, 4374/4B Ansari Road,Daryaganj, New Delhi 110002.

3.Ekambaranatha Ayyar,M. and T.N.Ananthakrishnan. A Manual of Zoology Vol.II(chordate).S.Viswanathan (Printers and Publishers)Pvt.Ltd.,Chennai.

4.Jordan E.L. and P.S Verma.Chordata Zoology (11th Edition).S.Chand and Company Limited, 7361 Ram Nager,Qutab Road,New Delhi-110 055.

5.Kardong, K. Vertebrates:Comparative Anatomy,Function,Evolution.Tata Mc Graw Hill publishing Company Limited,444/1.Sri Ekambara Naicker Industial estate,Alapakkam,Porur,Chennai-600 116.

6.Kotpal.R.L.Modem Text Book of Zoology-vertebrates.Rastogi Publications, Gangotri,Shivaji Road,Meerut-250 002.

7.Kulshrestha,S.K.Comparative Anatomy of Vertebrates,Anmol Publishers a.Private limited,4374/14B,Ansari Road,Daryaganj.New Delhi-110 002.

8.Mahanta Rita and I,K.Bhattacharyya.Vertebrate Zoology,Kalyani publishers,B-1/1299,Rajinder Nagar,Ludhiana-141008.

9.Nigam,H.C.Biology of Chrodates.Vishal Publishing Company,Books Market,Old Railway Road,Jalandhar-144008.

10.Pough,R.H., C.M.Janis and J.B. Heiser. Vertebrate life.Pearson Education (Singapore) Pvt.Limited;Indian Branch-482 FIE Patpaganj,Delhi-110092.

11.Prasad, S.N.and Kashyap Vasantika,P.Text Book of Vertebrate Zoology,New Age International publishers,4835/24 Ansari Road,Daryaganj,New Delhi-110002.

12.Young,J.L.Life of Vertebrates.Oxford at the clarendon press,London.

Paper 1.1. Animal diversity I- Invertebrata

1. **Dissection and mountings:**

   Cockroach- Nervous system, Digestive System, Trachea, Salivary apparatus.

2. **Museum specimens, slides , models and charts:**

   Paramecium entire, Obelia colony, Ascaris male and female, Earthworm, Honey Bee, Leptocorisa, Nauplius, larva, Sepia, Pinctada, Star fish.

Paper 1.2. Animal Diversity II – Chordata

1 **Dissection and Mountings :**

- Shark – Placoid Scales.
- Frog – Arterial system (Demonstration only) – model / chart / CD – students have to draw the diagram and write detailed account of the arterial system in the observation note book.
- Frog – Brain (demonstration only) – model / chart / CD – students have to draw the diagram of dorsal and ventral view and write detailed account of the brain in the observation note book.

2. **Museum Specimens, slides, models and charts**

Amphioxus, Balanoglossus, Ascidian, Petromyzon,Narcine,Hippocampus,Rhacophorus, Ambystoma, Chameleon, Cobra, Kingfisher, Bat.

Course – 1.1 Cell Biology, Genetics and Biotechnology

4 Hrs/Week **4x15=60 Hrs/Semester** **12 Hrs/Unit** **Credits – 4**

OBJECTIVE:

To elucidate the structure and functions of the cell organelles; to exemplify the concept of genetics, the principles of inheritance and the role of genes in determining characters; to understand the application of the innovative technology to manipulate living organisms or parts of organisms to make products useful to human.

CELL BIOLOGY

UNIT I Ultra structure and functions of (a) Plasma membrane (b) Mitochondria (c) Nucleus. Chromosomes – Structure, types and functions; Giant Chromosomes (Polytene and Lampbrush Chromosomes)

UNIT II DNA: Structure (Watson and Crick Model), Replication.

RNA: Different types – r RNA – mRNA – tRNA; Protein synthesis.

Cancer cells and carcinogenesis – Definition, Types, Causes, Properties, Diagnosis and Treatment.

GENETICS

UNIT III Simple Mendelian traits in man; Multiple alleles – ABO blood groups in man – problems.

Rh-factor in human – Erythroblastosis foetalis. Multiple gene inheritance.

UNIT IV Sex determination in man; Sex linked inheritance in man – Haemophilia, Colour blindness and Hypertrichosis.

Non disjunction and Syndromes in man – Klinefelter's syndrome, Turner's syndrome and Down's syndrome.

Inborn errors of metabolism in man – Phenylketonuria, Alkaptanuria and Albinism

BIOTECHNOLOGY

UNIT V Definition, scope and importance of Biotechnology, Basic concepts of genetic engineering.

Restriction and modification system – Cloning vectors – (Plasmids, pBR 322, Lambda phage)

Introduction of cloned genes into host cells – Transgenesis – Transgenic animals and its application.

INDUSTRIAL FISH AND FISHERIES

Paper – I: BIOLOGY OF FISH

OBJECTIVE:

To help the students taking Industrial Fish and Fisheries as a subject to have a through knowledge of the various aspects of the Biology of Fish

UNIT I

Introduction: Fish Biology – Definition and basic concepts of biosystematics. Importance of classification – Theories of biological classification. Variations in structure, Form, Skin, Coloration, Scales, Mouth, Jaws, Teeth, Fins, Spines and other structures used in taxonomic studies. Induced breeding techniques – Hatching methods – Seed and Brood transport.

UNIT II

Study of external morphology and internal organization of a typical elasmobranch and teleost. Alimentary Canal and Associated Structures – Gills – Swim Bladder – Accessory Respiratory organs – Lateral line system – Sound and Light producing organs. Morphological and anatomical characters of Prawn, Crab, Lobster, Bivalve, Gastropod and Cephalopod (one example each)

UNIT III

Natural food of fishes – Feeding habits in various groups of fresh water and marine fishes, Prawns, Crabs, Lobsters and Cephalopods. Qualitative and Quantitative estimation of food consumption based on experimental studies and stomach content analysis – Seasonal changes in food availability and food preference – Food and Feeding in relation to age – Food selectively – Feeding intensity. Nutrition of fishes and utilization of food, Feeding strategies and energies. Artificial feeding – Nutritional requirement.

UNIT IV

Growth of fish – Absolute, Relative, Isometric and Allometric growth. The Cube Law – Methods for determination of growth – Length frequency analysis – Analysis of growth checks on hard parts like Scales, Otolith and Vertebrae – Estimation of growth by direct methods – Marking and tagging of fish for growth studies – Aging of fish and shell-fish based on length data and growth checks – Length weight relationships, Ponderal index, Relative condition factor and Gonado – Stomach index.

UNIT V

Types of reproduction, Sex differences – Sexual maturity, Classification of maturity stages, Size at first maturity. Estimation of fecundity – Ova diameter frequency – Fecundity in relation to length, Weight, Age and food supply. Spawning habits – Factors affecting Spawning, Spawning seasons and frequency. Embryonic and early development – Types of egg and Larvae – Metamorphosis of larva – Larval life and feeding habits. Reproductive behaviour and parental care – Social behaviour – Aggregation and Shoaling. Migrations – Anadromous and Catadromous.

PRACTICALS

1. Methods for Collection, Handling, Identification and Preservation of fish for taxonomic purposes.
2. Study of external morphology of fish. Specific identification of important fresh water and marine fishes, prawns, crabs, Bivalves and Cephalopods of India.
3. Identification of scales of fishes – Placoid, Cycloid and Ctenoid scales.
4. Study of food and feeding habits of fishes – Plankton feeder, Herbivore feeder, Carnivore feeder, Omnivore feeder, Detritus feeder. Study of Structural Adaptations for Diet.
5. Qualitative and Quantitative methods for Stomach content analysis.
6. Estimation of Oxygen, Carbon dioxide, Salinity content in water samples.
7. Plankton analysis in the water samples – any two.
8. Identification of Anadromous and Catadromous fishes.

REFERENCES

1. The Biology of Fishes, Kyle, H. M., T.F.H. Publication, Hong kong 366 P.
2. The Life of Fishes, Marshell,N.B.1965,Weidenfeld & Nicolson, London 402 P.
3. The Marine and Freshwater Fishes of Ceylon,Munro I.S.R,1982.Soni Reprints Agency, New Delhi 351 P.
4. Inland Fishes of India and Adjacent Countries., Vol I & Vol II,Talwar, P.K. and A.G.Jhingran,1991,Oxford & IBH Publishing Co Pvt Ltd.,New Delhi 1958 P.
5. Fisheries Ecology, Pitcher, T.J. & P.J.E. Hart,1992,Room Helm,London 414 P.
6. Introduction to the Practice of Fisheries Science.Royce,W.F.1984,Academic Press 438 P.
7. Fisheries Science its methods and application,1993,Rounsfell,G.A. and W.H.Everheart, John William & Sons New York,444

ALLIED PRACTICALS FOR 1.1.

2 Hrs/week **2x15=30 Hrs/Semester** **Credits 2**

CELL BIOLOGY, GENETICS AND BIOTECHNOLOGY

Mounting of Giant Chromosome in Chironomous larva

Analysis of any two planktons (marine/fresh water)

Study of the following through Charts, Slides and Figures:

Mitochondria, Interphase Nucleus, DNA, tRNA, ABO Blood group.

Colour Blindness, Haemophilia, Klinefelter's syndrome, Down's syndrome.

pBR 322, Lanmbda Phage, Recombinant DNA.

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc. Zoology) / Semester – II / Core - 3

DEVELOPMENTAL ZOOLOGY

(4 Hrs /Week) 4x15=60 Hrs/Semester 12Hrs/Unit Credits 4

OBJECTIVE: To understand the sequential changes from cellular grade of organization to organ grade of organization in the development of multicellular organisms.

UNIT I

Definition and Scope of Developmental Zoology – Gametogenesis – Spermatogenesis – Oogenesis – Vitellogenesis – Structure of Sperm and Egg in Chick. Fertilization: Pre and Post fertilization events – significance; Parthenogenesis.

UNIT II

Cleavage in chick – Fate map of Chick – Gastrulation in Chick – Chick Embryo 48, 72 Hrs. Manipulations of reproduction in Human: Infertility (male and female) – IUI - Invitro fertilization –Artificial insemination - Test tube babies – Amniocentosis.

UNIT III

Organogenesis : Development of brain and heart in chick.

Organizer : Primary and secondary organizers.

Morphogentic fields and gradient hypothesis.

UNIT IV

Hormonal control of Amphibian metamorphosis.

Extra-embryonic membranes in chick – Development, Types and Physiology.

Placenta in Mammals – Types and Physiology.

UNIT V

Nuclear Transplantation in Acetabularia - Regeneration – Types – Regeneration in Amphibians – Regeneration in Planaria. Birth control : Contraceptive devices: Surgical method – Hormonal methods – Physical barriers – IUCD.

REFERENCE BOOKS: Developmental Zoology

1. Arora, M.P. Embryology. Himalayan Publishing House, Ramdoot, Dr. Bhalero Marg (Kelewadi) Girgaon, Mumbai – 400004.
2. Arumugam, N.Developmental Biology. Saras Publications, 114/35G, A.R.P camp Road, Nagercoil.
3. Balinsky, B.J.Introduction to Embryology, W.B.Saunders, Philadelphia,USA.
4. Berry,A.K. An Introduction to Embryology,EMKAY Publications,Post Box No.9410, B – 19 East Krishna Nagar,Swami Payanand Marg,Delhi – 110 051.
5. Beryl, N.J. Developmental Biology,Tata McGraw Hill Publishing Company Limited, 444/1 Sri Ekambara Naicker Industrial Estate, Alapakkam, Porur, Chennai -600 116.
6. Developmental Biology: R.M.Twyman.Bios scientific publishers, Ltd. New Delhi (2001).
7. Diwan, A.P. Mammalian Embryology, Anmol Publications Private Limited,4374/4B Ansari Road , Daryaganj, New Delhi-110 002.
8. Diwan,A.P.Avian Embryology, Anmol Publications Private Limited,4374/4B Ansari Road , Daryaganj, New Delhi-110 002.
9. Gilbert,Developmental Biology,ANE Books India, Avantika Niwas, 19,Doraiswamy Road,T.nager,Chennai-600 017.
10. Goel,S.C.Principles of Animal Developmental Biology,Himalaya Publishing House,Ramdoot,Dr.Bhalerao Marg (Kelewadi)Girgaon,Mumbai – 400 004.
11. Jain,P.C. Elements of Developmental Biology (Chordate Embryology).vishal Publishing Company,Books Market,Old Railway Road,Jalandhar – 144 008.
12. Jangir, O.P.Developmental Biology – A Manual.Agrobios (India),Behind Nasrani Cinema,Chopasani Road,Jodhpur – 342 002.
13. Nelson, E.Comparative Embryology of Vertebrates.Tata McGraw Hill Publishing Company Limited,No. 444/1 Sri Ekambara Naicker Industrial Estate, Alapakkam,Porur, Chennai – 600 116.
14. Ramesh Mathur and Meenakshi Metha. Embryology.Anmol Publications Private Limited,4374/4B,ansari road,Daryaganj,New Delhi – 110 002.
15. Rao, K.V. Developmental Biology. A Modern Synthesis.Oxford & IBH Publishing company Private Limited, S-155 Panchshila Park, New Delhi 110017.
16. Sastry.K.V. and Vineeta Shukal, Developmental Biology Rastogi Publications Gangotri, Shivaji Road, Meerut-250 002.
17. Slack,Essential Developmental biology. ANE Books India. Avantika Niwas, 19,Doraiswamy Road,T.Nager,Chennai-600 017.
18. Subramomam, T.Developmental Biology. Narosa Publishing House Private Limited, 35 – 36 Grams Road, Thousand Lights, Chennai – 600 006.
19. Verma.P.S. and V.K. Agarwal. Chordate Embryology (10th Edition).S. Chand & Company Ltd.7361 Ram Nagar,Qutab Road,New Delhi – 110055.

ECOLOGY & TOXICOLOGY

(4 Hrs. / Week) **4x15=60Hrs/Semester** **12 Hrs/Unit** **Credits 4**

OBJECTIVE:

To study the interaction and interdependence among environmental factors and living organisms – To enumerate the ill-effects and the health hazards of toxic agents released to the environment – To discern the evolutionary significance of animals, theories origin of species and significance.

UNIT I

i. **Abiotic factors :** Biological Effect of temperature and light.
ii. **Biotic factors:** Producer, Consumers and Decomposers.
iii. **Ecosystem:** Pond,Forest

UNIT II

i. Food chain, Food web, Trophic levels, Energy flow, Ecological Pyramids
ii. Animal Relationships: Mutualism, Commensalism, Antagonism (Antibiosis, Parasitism, Predation and Competition)

UNIT III

Population Ecology: Definition – Density – Natality – Mortality – Age – Distribution – Age pyramids –Population growth – Population fluctuations – Regulation of Population density - Animal Dispersion.

Community Ecology: Definition - Community stratification-Periodicity – Community interdependence – Ecotone - Edge effect- Ecological niche- Concept of community –Ecological Succession.

Adaptation:

- Desert Adaptation
- Cave Adaptation

UNIT IV

Wild life Conservation: Definition- Endangered Species – Causes for Depletion, Necessity for conservation – Methods of conservation – Sanctuaries – National Parks.

Remote sensing: Its application in agriculture, Fisheries, Forest management and Flood Management.

Urbanization: Reasons for urbanization, Urban problems, Methods to control urban growth.

UNIT V

Introduction to Toxicology, Definition, Outline classification of Toxicant.

Toxic agents and mode of action of Pesticides, metals, solvents, carcinogens, poisons

Environmental toxicology and public health.

REFERENCE BOOKS: ECOLOGY

1. Agarwal, A.K. Ecology and Environmental Biology. Student Edition, Agrobios (India) Behind Nasrani Conema, Chopasani Road, Jodhpur -342 002.
2. Arora, M.P. Ecology. Himalaya Publishing House, Ramdoot, Dr.Bhalerao Marg, Girgaon, Mumbai- 400 004.
3. Clarke, G.L. Elements of Ecology, John Wiley & sons Inc. New York.
4. Junega, Kavita. Ecology. Anmol Publications Private Limited, 4371/4B Ansari Road, Daryagani, New Delhi – 110002.
5. Kotpal, R.L and N.P. Bali. Concepts of Ecology Vishal Publishing Company,Books Market, Old railway road, Jalandhar – 144 008.
6. Madhab, C.Dash. Fundamentals of Ecology. Tata McGraw Hill Publishing Company Limited,No.444/1.Sri Ekambara Naicker Industrial Estate, Alapakkam, Porur, Chennai – 600 116.
7. Odum , E.P. Fundamentals of Ecology. International Student Edition, W.B. Saunders Company, Philadelphia, USA.
8. Purohit, S.S. A Text book of Environmental Science, Student Edition, Agrobios (India), Behind Nasrani Cinema, Chopasani Road, Jodhpur – 342 002.
9. Singh, H.R. and Neeraj Kumar. Ecology and Environmental Science, Vishal Publishing Company, Books Market, Old Railway Road,Jalandhar – 140 008.
10. Singh, S.P.Animal Ecology,6th Edition, Rastogi Publications, Gangotri, Shivaji Road, Meerut – 250 002.
11. Verma, P.S. and Agawal 1986, Environmental Biology, S. Chand & Co Ltd.,

TOXICOLOGY:

1. Omkar. Concepts of Toxicology, Vishal Publishing Company, Books market, Old Railway Road,Jalandhur-144 008
2. Sharma, P.D.Toxicology .Rastogi Publications, Shivaji Road,Meerut-250 002.
3. Subramanian, M.A.Toxicology, Principles and Methods.MJP Publishers, Tamil Nadu Book House,47 Nallathambi Street,Triplicane,Chennai-600005.
4. Shukla, J.P. and S.P.Trivedi, Fundamentals of Toxicology, New Central Book Agency(P)Limited, 8/1 Chintamoni Das Lane,Kolkata-700 009.

SEMESTER II- 2HRS / WEEK **2X15=30 HRS / SEMESTER**

PAPER 2.1. DEVELOPMENTAL ZOOLOGY

I. Mounting and observation of live sperms of a vertebrate
II. Mounting and observation of egg of a frog.
III. Temporary mounting and observation of chick embryo – 24,48,72,96 Hrs.
IV. Museum specimens, slides, models and charts

Sperm of a vertebrate, chick embryo – 24,48,72,96 Hrs.

Condom, Mala – D, Placenta in mammals, Discoidal, Cotyledonary, Zonary placenta, Diffuse placenta.

PAPER 2.2 ECOLOGY AND TOXICOLOGY

Ecology

I. Plankton mounting-any two fresh water/marine
II. Museum specimens, slides, models and charts
Secchi disc, Mutualism (Hermit crab and sea anemone),commensalism (Echeneis and shark), Parasitism (Sacculina on crab),Cyclomolphosis (Daphnia)
Predation (Snake and Rat)
Effect of light Protective Colouration(Leaf insect)
Effect of light Colour changes (chamaeleon)
Pond Ecosystem (Chart)
Food Chain – Forest Ecosystem
Food Web – Grass land.

III Compulsory Study Tour

- A one day study tour is compulsory to visit an ecologically important place such as sea shore, sanctuary, forest area etc., to observe and study the animals in their natural habitat.
- The students should write an illustrated , study tour report and the same is to be submitted for evaluation at the time of practical examination (5 marks).

DEVELOPMENTAL ZOOLOGY, ECOLOGY, ANIMAL PHYSIOCOLY AND EVOLUTION

4 Hrs/Week 4x15=60 hrs/Semester 15 Hrs/Unit Credits-4

OBJECTIVES:

To understand the sequential changes from cellular grade of organization to organ grade of organization in the development of multicellular organisms. To study the interaction and the interdependence among environmental factors and living organisms; To understand the functional significance of various organs and organ systems of animals. To discern the evolutionary significance of the animals, origin of species, effects of mutation.

UNIT I

Early development in Man: Structure of sperm and ovum; Fertilization – Cleavage, Morula, Blastocyst, Implantation and gastrulation – Fate map. Placenta in mammals – types and functions. Test tube babies – Twins – Amniocentosis.

Nuclear Transplantation in Acetabularia.

UNIT II

Abiotic factors: Biological effects of Temperature and Light; Biotic factors: Symbiosis, Commensalism, Mutualism, Parasitism, Prey-predator

Relationship; Adaptations: Desert adaptations.

Community: Ecosystem – Structure and dynamics of a pond.

UNIT III

Nutrition: Food constituents – Carbohydrates, Proteins and Fats.

Digestion: Role of enzymes in carbohydrate, protein and fat digestion.

Absorption: Absorption of digested food.

Metabolism: Carbohydrate metabolism: Glycogenesis, Glycogenolysis, Glycolysis. Respiration: Transport and exchange of oxygen and carbon dioxide. Haemoglobin.

UNIT IV

Excretion: Structure of Nephron – Urine formation – Dialysis Nervous Co-ordination: Structure and types of neurons – Nerve impulse, conduction of nerve impulse through neuron and synapse.

Reproduction: Structure of human testis and ovary, Graafian follicle, Menstrual cycle and its hormonal control.

UNIT V

Theories of Evolution: Darwinism, Mutation theory of De Vries.

Adaptive radiation in birds.

Mimicry and Colouration.

INDUSTRIAL FISH AND FISHERIES

PAPER - 2 CAPTURE FISHERIES

OBJECTIVE:

To highlight the recent trends and types of capture fisheries to students studying industrial fish and fisheries

UNIT I

Capture Fisheries – Inland Capture Fisheries – Scope and importance of Capture Fisheries in India and World. Present yield and Estimates of Potential. Inland capture fishery resources of Indian Fisheries of major and minor carps. Cat fishes and other groups. Problems and management.

UNIT II

Cold water fishery resources – Fisheries of trout, Mahaseer and other Cold water Species. Lacustrine fisheries – Species, Catch, Fishing gears, Potential and Problems of Development and management. Estuarine fisheries. Fisheries of Brackish water lakes and back waters – Problems and Management.

UNIT III

Salient features of cultivable species of fishes and shell fishes.Marine fishery resources of India – Fisheries of Sardine, Lesser Sardine, Anchovies, Other Clupeoids, Mackerel, Ribbon fishes, Tunnies, Carangids and Cephalopods.

UNIT IV

Mid water and Demersal fisheries – Fisheries of Elasmobranches, Bombay duck, Cat fishes, Silver Bellies, Sciaenids, Pomfrets,Thread fins,Thread fin breams and Perches,Flat fishes,Prawns lobsters,Crabs,Mussels Oysters and Clams,Culture of edible Oyster.

UNIT V

Biological aspect of fishery managements,Principles of Conservation,Development and Management Concept and practice.Population dynamics – Concept of recruitment and yield,problems of over fishing,MSY,MEY and OSY

PRACTICALS

1. Identification of commercial fresh water and marine prawns.
2. Visit to a Prawn farm.
3. Visit to a fish processing industry.
4. Visit to a Landing centers.
5. Raceway culture system.
6. Field visit to observe fishing and to collect field data regarding species composition,Craft, Gear and Field problems regarding riverine, esturine,reservoir and cold water fisheries.
7. Study of fishery development programmes.
8. Study of fishery management problem – Laws,Acts and Field problems.

REFERENCE BOOKS

1. Fish and Fisheries of India Jhingran V.G. 1982 Hindustan Publishing Corporation India Delhi Rev.Ed.
2. Prawns and Prawn fisheries of India Kurian C.V and V.C Sebastian 1982.Hindustan Publishing corporation (India) Delhi Rev.Ed.
3. Marine Fisheries.Bal D.V and K.V Rao 1990.Narendra Publishing House Delhi Rev.Ed.
4. Cold water fisheriesof India.Jhingran V.G and K.L Sehgal 1979.Barrackpore Inland fisheries soceity of India.
5. Fisheries Development in India.Srivastava U.K and Dharma Reddy 1983.Concept publishing co.,New Delhi.
6. Introduction to the practice of fishery science,Royce 1984 Academic press,London.
7. Fishery Science its methods and Applications,Rounsefell,G.A and W.H Everhart 1953 John.Wiley,New York.

2 Hrs/Week **2x15=30 Hrs/Semester** **Credits 2**

DEVELOPMENTAL ZOOLOGY, ECOLOGY, ANIMAL PHYSIOLOGY AND EVOLUTION.

1. Mounting and observation of live sperms of a vertebrate.
2. Estimation of dissolved oxygen in two water sample and discuss the result
3. Qualitative test for glucose, protein and lipid.
4. Effect of temperature on the opercular movement of fish; Calculation of Q_{10}.
5. Museum specimens, slides, models and charts:

   Developmental Zoology: Human sperm, Human ovum, Cleavage, Diffuse Placenta,Zonary Placenta,Discoidal placenta,Cotyledonary Placenta (any two)

   Ecology: Echeneis and Shark, Hermit crab and Sea anemone, Sacculina, Secchi disc.

   Animal Physiology: Intestinal villi, Nephron, Heart of mammal.

   Evolution: Ancon sheep.

   Allied Practical Examination I for course subjects 1.1 and 2.1 at the end of the Second Semester.

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI
UG COURSES – AFFILIATED COLLEGES

B.Com

(Choice Based Credit System)

(with effect from the academic year 2017-2018 onwards)

Sem. (1)	Pt. I/II/ III/ IV/V (2)	Sub. No. (3)	Subject Status (4)	Subject Title (5)	Contact Hrs/ Weeks (6)	C Credits (7)
III	III	13	Core 5	Advanced Financial Accounting I	6	4
	III	14	Core 6	Business Statistics	5	4
	III	15	Core 7	Banking	5	4
	III	16	Core 8	Human Resource Management	5	4
	III	17	Allied III	Company Organisation	3	3
	IV	18	Non Major Elective 1 (Any one)	1.Introduction to Accountancy 2.Consumer Awareness	2	2
	III	19	Skill Based I - Core	Business Communication	4	4
	IV	20	Common	Yoga	2	2
				Sub total	**30***	**25***

***Excluding the hours and credit for Yoga.**

IV	III	21	Core 9	Advanced Financial Accounting - II	6	4
	III	22	Core 10	Business Mathematics	5	4
	III	23	Core 11	Capital Market	5	4
	III	24	Core 12	Import & Export Procedures	5	4
	III	25	Allied IV	Computer Applications in Business	3	3
	IV	26	Non Major Elective II (Any one)	1. Financial Accounting 2. Human Rights	2	2
	III	27	Skill Based II - Core	Entrepreneurship Development	4	4
	V	28	Extension Activity	NCC/ NSS/ YRC/ YWF	-	1
	IV	29	Common	Computer for Digital Era	2	2
				Sub total	**30***	**26***

***Excluding the hours and credit for Computer for Digital Era.**

Sem. (1)	Pt. I/II/ III/ IV/V (2)	Sub No. (3)	Subject Status (4)	Subject Title (5)	Contact Hrs/ Week (6)	C Credits (7)
V	III	30	Core -13	Corporate Accounting I	5	4
	III	31	Core -14	Cost Accounting	4	4
	III	32	Core -15	Business Law	5	4
	III	33	Core -16	Research Methodology	4	4
	III	34	Major Elective I (Any one)	1. Income Tax Law & Practice I 2. Application of Tally in Accounting 3. Logistic Management	4	4
	IV	35	Skill Based – III Common	Personality Development / Effective Communication / Youth Leadership	2	2
	III	36		Mini Project	6	3
				Sub total	**30**	**25**

Sem. (1)	Pt. I/II/ III/ IV/V (2)	Sub. No. (3)	Subject Status (4)	Subject Title (5)	Contact Hrs/ Week (6)	C Credits (7)
VI	III	37	Core -17	Corporate Accounting II	5	4
	III	38	Core -18	Management Accounting	4	4
	III	39	Core -19	Industrial Law	5	4
	III	40	Core -20	Auditing	4	4
	III	41	Major Elective II (Any one)	1. Income Tax Law & Practice II 2. Retail Management 3. Values & Ethics for Business	4	4
	III	42		Major Project	8	4
				Sub total	**30**	**24**

- **For problem papers 40% marks for theory and 60% marks for problems.**
- **Proportion of marks between internal evaluation and external evaluation for subjects - 25:75.**
- **Internal – 20 marks for theory and 5 marks for assignment.**
- **Total Credits – 144 (excluding the credit for yoga and computer for digital era)**

II B. COM (III SEMESTER) – UNDER CBCS
PART III – MAJOR CORE - 5
ADVANCED FINANCIAL ACCOUNTING I

L	T	P	C
6	0	0	4

Objectives

1. To know the system of Accounting followed in Branches and Departments of business organization.
2. To know the pattern of recording transactions in Hire Purchase and Installment Purchase systems.
3. To understand the accounting treatment to be followed at the time of Insolvency of an individual and while taking a lease of a property.

Unit I: Branch Accounting – Debtor's system – Invoice price Method (excluding stock and Debtor's system) – Departmental Accounts – Departmental Trading, Profit and Loss Accounts – Departmental Transfers . **(22 hours)**

Unit II: Contract Account – Completed contracts and incomplete contracts – Farm Accounting. **(15 hours)**

Unit III: Hire purchase and Installment system – Calculation of Cash price and interest – Default and Repossession – Difference between Hire purchase and Installment system. **(21 hours)**

Unit IV: Royalty Account – Meaning – Minimum rent – Short working – Type of recoupment - strike and lock out. **(14 hours)**

Unit V: Insolvency accounts – Insolvency of an individual – Statement of Affairs – Deficiency Account **(18 hours)**

(90 hours)

Text Books

1. S.P.Jain & K.L.Narang, Advanced Accountancy, Kalyani Publishers, New Delhi.
2. T.S. Reddy & A. Murthy, Advanced Accountancy, Margham Publication, Chennai.

Reference Books

1. Dr.M.A. Arulanandam & K.S.Raman, Advanced Accountancy, Himalaya Publishing House, Mumbai.
2. M. Shukla and T.S. Grewal, Advanced Accountancy, S.Chand & Co., New Delhi.
3. R.S.N. Pillai, Bagavathi & S. Uma, Fundamentals of Advanced Accounting, S. Chand & Company Ltd., New Delhi.

II B. COM (III SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -6
BUSINESS STATISTICS

L	T	P	C
5	0	0	4

Objectives

1. To provide the basic knowledge of statistical techniques as are applicable to business.
2. To enable the students to apply statistical techniques for quantification of data in business.

Unit I: **Introduction**- Definition of statistics – Importance – Application – Limitations - Statistical survey – Planning and design of survey – Collection of Data – Sources - Primary and secondary data – Techniques – Census method and sampling method–Methods of sampling. Classification and tabulation of data –Diagrammatic and graphic presentation of data. **(6 hours)**

Unit II: **Measures of Central Tendency** – Mean – Median – Mode – Geometric Mean - Harmonic Mean. **(25 hours)**

Unit III: Measures of Dispersion-Range – Quartile Deviation – Mean Deviation - Standard Deviation – Co-efficient of Variation. Skewness - methods of studying Skewness - Karl Pearson's Co-efficient of Skewness – Bowley's co-efficient of Skewness. **(14 hours)**

Unit IV: Correlation – meaning – types-scatter diagram – Karl Pearson's Co-efficient of Correlation- Rank correlation – Concurrent deviation method. Regression analysis – uses-Regression line – Regression equations – least square method - deviations taken from actual mean and assumed mean method. **(10 hours)**

Unit V: Index numbers – meaning – types – its problems – Methods of constructing index numbers – unweighted and weighted indices – Index number tests – Consumer price index numbers. Analysis of time series – Meaning – Importance – Components of time series – Secular trend, seasonal, cyclical and irregular variations – Measurement of trend - Graphic method-Semi average method – Moving average method – Method of least square.

(20 hours)
(75 hours)

Text Books

1. Dr. M. Manoharan, Statistical Methods, Palani Paramount Publications, Palani.
2. R.S.N. Pillai & Bhagavathi, Statistics-Theory and Practice, S.S. Chand & Co.

Reference Books

1. Dr. S.P. Gupta, Statistical Method, Sultan Chand & Sons, New Delhi.
2. M. Wilson, Business Statistics, Himalaya Publishing House, Mumbai.

II B. COM (III SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -7
BANKING

L	T	P	C
5	0	0	4

Objectives

1. To create an idea of modern banking
2. To familiarise the students with the banking activities

Unit I: Banker and Customer- Relationship between banker and customer – General & Special relationship – Rights of the banker – Negotiable instruments – Promissory note, Bill of exchange & Cheque (Meaning & Features) – Proper Drawing of the cheque – Crossing (Definition & Types) – Endorsement (Definition & Kinds) – Material alternation. **(20 hours)**

Unit II: Banking System- Indigenous Bankers – Commercial Banks – Co-Operative Banks – Land development Banks – Industrial Development Banks - NABARD- EXIM Banks – Foreign Exchange Banks. **(10 hours)**

Unit III: Traditional Banking- Receiving Deposits – General Precautions – Kinds of deposits – Fixed – Current – Saving – Recurring & Others. Lending Loans & Advances – Principles of sound lending – forms of advances – loan , cash credit , over draft & purchasing and discounting of bills. Mode of charging security – lien , pledge , mortgage , assignment & hypothecation. **(20hours)**

Unit IV: Modernised Banking- Core banking – Home banking – Retail banking – Internet banking – Online banking and Offline banking – Mobile banking –Electronic Funds Transfer – ATM and Debit Card – Smart Card – Credit Card – E-Cash – Swift – RTGS. **(10 hours)**

Unit V: Reserve Bank of India- Functions of Reserve Bank of India – Methods of Credit Control. **(15 hours)**

(75 hours)

Text Books

1. K.C.Sherlekar, Banking Theory Law and Practice, Himalaya Publishing House.
2. E.Gordon and K.Natarajan, Banking Theory Law and Practice, Himalaya Publishing House.

Reference Books

1. S.N.Lal, Banking Theory Law and Practice.
2. M.C.Tannen , Banking Theory Law and Practice. Lexix Nexix Vutterworth, Nagpoor.
3. S.S.Gulshan and Gulshan K.Kapoor, Banking Theory Law and Practice.
4. S. Guruswamy, Banking Theory Law and Practice –3rd Edition, Vijay Nicole Imprints Private Limited, Chennai.

II B. COM (III SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -8
HUMAN RESOURCE MANAGEMENT

L	T	P	C
5	0	0	4

Objectives

1. To study about the importance of human resource.
2. To study the techniques of performance appraisal of employees.
3. To know the methods to redress the grievances of employees.

Unit I: Introduction- Concept – objectives – characteristics – functions – principles. **(8 hours)**

Unit II: Man power planning – definition – need – process job analysis – job description – specification – job evaluation – recruitment and selection process. **(15 hours)**

Unit III: Employee's training – needs – importance – principles – training methods – promotion types – demotion – labour turnover - performance appraisal methods. **(22 hours)**

Unit IV: Industrial relations – significance – causes of poor industrial relations – suggestions – labour disputes and settlement. **(18 hours)**

Unit V: Workers participation in management – collective bargaining and industrial relations – employee's grievances. **(12 hours)**

(75 hours)

Text Books

1. J. Jaya Sankar, Human Resource Management, Margham Publications, Chennai.
2. G.D. Maheshwari, Human Resource Management, Sultan Chand Publications.
3. T.S.Reddy & A.Murthy, Human Resource Management, Margham Publications, Chennai.

Reference Books

1. Wreather and Davis, Human Resource Management. Pearson Education.
2. TN Chhabra, Human Resource Management, Dhanpat Rai & Co., Delhi.
3. Biswajeet Patttanayak, Human Resource Management, PHI Learning.
4. Khurana Ashok, Human Resource Management, V.K. Publications.
5. Sankalp Gaurav, Human Resource Management, Sahitya Bhawan Publications.

II B. COM (III SEMESTER) – UNDER CBCS
PART III – ALLIED III
COMPANY ORGANISATION

L	T	P	C
3	0	0	3

Objectives

1. To provide a fundamental exposure to students on the basic concepts of a company.
2. To enable the students to learn about the functioning of a company.

Unit I: Formation of Companies – Promotion – Incorporation – Capital Subscription – Commencement. **(5 hours)**

Unit II: Company Management – Share Holders – Directors – Managing Directors – Manager – Their appointments – Duties - Rights & Liabilities. **(7 hours)**

Unit III: Essentials of valid Meeting – Notice – Quorum –Agenda - Chairman – Powers & Duties - Motion – Sense of the Meeting (Voting & Poll) - Proxy - Resolution – Adjournment of Meeting - Minutes. **(13 hours)**

Unit IV: Kinds of Meeting – Meeting of Share holders – Statutory Meeting – Statutory Report – Annual General Meeting – Extra-Ordinary General Meeting - Class Meeting. **(15 hours)**

Unit V: Meeting of Directors – Meeting of Debenture holders – Meeting of Creditors **(5 hours)**
***As per the Companies Act 2013** **(45 hours)**

Text Books

1. N.D.Kapoor, Company Law & Secretarial Practice, Sulthan Chand & Sons, New Delhi.
2. M.C.Kuchhal, Secretarial Practice, Vikas Publishing House, Calcutta.

Reference Books

1. Prashanta K.Ghosh, Company Secretarial Practice, Sulthan Chand& Sons, NewDelhi.
2. V.K.Acharya & P.B.Govakar, Company Law & Secretarial Practice, Himalaya Publishing House, Bombay.

II B. COM (III SEMESTER) – UNDER CBCS
PART IV – NON- MAJOR ELECTIVE -1 (ANY ONE) (ONE COURSE) - 1
INTRODUCTION TO ACCOUNTANCY

L	T	P	C
2	0	0	2

Objectives

1. To enable the students to prepare and provide accounting information to the interested parties.
2. To enhance their knowledge of the fundamental and technical concepts of accounting.

Unit I: Accounting – Definition – Functions – Advantages – Limitations – Book Keeping – Difference between Accounting and Book- Keeping – Users of Accounting Information - Accounting Principles – Concepts and Conventions – classification of Accounts – Double entry system – Merits – Rules of Debit and Credit – Accounting Equation **(5 hours)**

Unit II: Journal – Procedure of journalizing - Compound Journal Entry - Subsidiary books – Purchase book – Sales book – Purchase Return book – Sales return book – Single Column Cash book (**10 hours)**

Unit III: Ledger – Features of Ledger Accounts – Difference between Journal and Ledger – Ledger Posting – Balancing of Ledger Accounts- Preparation of Ledger Accounts **(4 hours)**

Unit IV: Trial Balance – Features– objectives – Preparation of Trial Balance **(4 hours)**

Unit V: Final Accounts – Simple problems with Closing Stock, Outstanding and Prepaid adjustments only. **(7 hours)**

(30 hours)

Text Books

1. T.S.Reddy & A.Murthy, Advanced Accountancy, Margham Publications, Chennai.
2. S.P.Jain & K.L.Narang, Advanced Accountancy, Kalyani Publishers, New Delhi.

Reference Books

1. M.C.Shukla and T.S.Grewal, Advanced Accountancy, Sultan Chand &Co, New Delhi.
2. Dr.M.A.Arulanandam&K.S.Raman, Advanced Accountancy, Himalaya Publishing House, Mumbai.
3. P.C.Tulsian, Accountancy, Tata McGraw, Hill edition.

II B. COM (III SEMESTER) – UNDER CBCS
PART IV-NON- MAJOR ELECTIVE -I (ANY ONE) (ONE COURSE) - 2
CONSUMER AWARENESS

L	T	P	C
2	0	0	2

Objectives

1. To create awareness regarding the intellectual property rights and consumer protection.
2. To explain the students about a better quality of living as consumers.

Unit I: Consumer-Consumerism-Types of consumers (age, sex, behaviour , place of residence, income) – objectives -Goods and services-types-evolution and growth of consumer movement in India and Tamil Nadu. **(5 hours)**

Unit II: Exploitation of consumer-Pricing, adulteration, information and labeling, duplication , artificial demand , Spurious goods , late deliveries , advertising , poor after sales service , warranty and services , fitness , not honouring terms and conditions , for sale and services , financial frauds , credit card frauds and product risks. **(8 hours)**

Unit III: Consumer Rights-Meaning and sources-Six rights of the consumers under Consumer Protection Act-Right to Safety-Information-Choice, be heard, Redressal and consumer education-Consumer Responsibility. **(7 hours)**

Unit IV: Consumer protection-Meaning-Need for consumer protection-How to protect consumers-Legal measures-Consumer Protection Act 1986– objectives -Special features of the Act-Three tier features of the Act-Three tier Redressal Agencies-District level , State level and National level. Consumer Protection (Amendment) Act 2003. **(8 hours)**

Unit V: Model form of complaints-with reference to goods and services-Consumer related cases. **(2 hours)**

(30 hours)

Text Books

1. M.J.Antony , Consumer Rights, Clarion book.
2. Shri Ram Khanna , Saivta Hanunspal Sheetal Kapoor , H.K.Awasthi, Consumer affairs, University Press .

Reference Books

1. R.S.N.Pillai and Bhagavathi, Mordern Marketing Principles and Practices, S.Chand and Company.
2. S.A.Sherlekar, Marketing Management , Himalaya Publication House.
3. Mohine Setr and P.Seetharaman, Consumerism A Growing Concept , Phoenix Publishers, New Delhi.
4. Gulshan & Reddy, Consumer Protection.

II B. COM (III SEMESTER) – UNDER CBCS
PART III – SKILL BASED I - CORE
BUSINESS COMMUNICATION

L	T	P	C
4	0	0	4

Objectives

1. To equip the students effectively to acquire skills in reading, writing, comprehension and communication

2. To make them use electronic media for business communication

Unit I: Introduction: Nature and Importance of communication – Types of communication (Verbal & Non Verbal) – Forms of communication – Barriers to communication. **(10 hours)**

Unit II: Business Correspondence: Letter Writing -- Principles of Letter Writing -- Quotations - Orders - Tenders - Sales Letters - Claims and Adjustment Letters – Credit and Collection Letters. **(20hours)**

Unit III: Job Related Communication: Letter of application - Drafting the Application - Elements of Structure of Application - Resume Preparation. **(15hours)**

Unit IV: Attending the Interviews: Types of Interviews - Preparation for Attending the Interview - Before and During the Interview - Interview Process – Tips for Successful Interview. **(5 hours)**

Unit V: Technology and Business Communication: Role and Effectiveness of Technology in Business Communication – Email, Text Messaging, Instant Messaging – Modern Techniques like Video Conferencing, Social Networking – Strategic Importance of E-Communication. **(10 hours)**

(60hours)

Text Books

1. Ragurathan & Santharam, Business Communication, Margham Publication.
2. Ashakaul, Effective Business Communication, Prentice Hall.

Reference Books

1. R.C. Sharma & Krishnamohan, Business Correspondence and Report Writing, Third edition, Tata McGraw Hill.
2. Penrosemesberry, Advanced Business Communication, Myers Thomson South Western.
3. Marry Ellan, Guffey ,Thomson, Business Communication, South Western.
4. P.N. Ghose Rajendra Paul, J.S.Korlahalli, Business Correspondence and Office Management, Sultan Chand and Sons.
5. R.S.N. Pillai, Bagavathi, Office Management, S. Chand & Co.

II B. COM (III SEMESTER) – UNDER CBCS

PART IV

YOGA - COMMON

L	T	P	C
2	0	0	2

II B. COM (IV SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -9
ADVANCED FINANCIAL ACCOUNTING II

L	T	P	C
6	0	0	4

Objectives

1. To understand the nature and system of accounting followed in Partnership firm.
2. To know the procedures to be followed at the time of Admission, Retirement and Death of a partner in a partnership business.
3. To know the procedures to be followed at the time of dissolution of partnership business.

Unit I: Partnership Accounts – Past adjustments and guarantee. **(15 hours)**

Unit II: Admission of a Partner – Revaluation Account – Adjustment regarding goodwill – Adjustment regarding capital. **(20 hours)**

Unit III: Retirement or Death of a Partner – Retirement and Admission – Death of Partner – Retiring Partner's loan – Joint life policy. **(18 hours)**

Unit IV: Dissolution of partnership – Accounting Procedure – Insolvency of a partner, two partners and all partners – Garner vs. Murray rule . **(22 hours)**

Unit V: Amalgamation of firms - Sale to a company – Gradual Realisation of Assets and Piecemeal Distribution. **(15 hours)**

(90 hours)

Text Books

1. S.P.Jain & K.L.Narang, Advanced Accountancy, Kalyani Publishers, New Delhi.
2. T.S. Reddy & A. Murthy, Advanced Accountancy, Margham Publication, Chennai.

Reference Books

1. R.L. Gupta and M. Radhaswamy, Advanced Accountancy, Volume I, Sultan Chand & Sons, New Delhi.
2. M. Shukla and T.S. Grewal, Advanced Accountancy, Volume I, Sultan Chand &Co., New Delhi.
3. Dr.M.A. Arulanandam & K.S.Raman, Advanced Accountancy Volume I, Himalaya Publishing House , Mumbai.
4. S. P. Ayyangar, Advanced Accountancy, Sultan Chand & Sons, New Delhi.

II B. COM (IV SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -10
BUSINESS MATHEMATICS

L	T	P	C
5	0	0	4

Objectives

1. To provide basic knowledge of mathematical techniques as are applicable to business.
2. To provide logical idea to find out practical solutions for the managerial problems.

Unit I: Number systems and equations- Numbers-natural-whole – rational-irrational – real. Equations – linear-quadratic – solutions of simultaneous linear equations with two or three unknowns – solutions of quadratic equations - nature of the roots – forming quadratic equation. **(15 hours)**

Unit II: Indices – Definition – Positive indices – Laws of indices – Negative indices – Zero and unity indices – Fractional indices. Logarithms – Definition –Properties of logarithms-Laws of logarithms-Common logarithm. **(15 hours)**

Unit III: Analytical geometry- Distance between two points in a plane-slope of a straight line – equation of straight line – point of intersection of two lines – applications (1) demand and supply (2) cost-output (3) break-even analysis. **(15 hours)**

Unit IV: Matrices – meaning – types – algebra of matrices – addition and subtraction – scalar multiplication – Multiplication of matrices-transpose of a matrix –Determinant – minors and co-factors –inverse of a matrix – solving simultaneous linear equations using matrix method **(17 hours)**

Unit V: Commercial arithmetic – Simple interest – Compound interest – Depreciation. Discount – true discount – Discounting a Bill of exchange - Banker's discount – Banker's Gain. **(13 hours)**

(75 hours)

Text Books

1. D.S. Sancheti & V.K. Kapoor, Business Mathematics Sultan Chand and Sons, New Delhi.
2. M. Manoharan & C. Elango, Business Mathematics, Palani Paramount Publications, Palani.

Reference Books

1. G.K. Ranganath, Text book of Business Mathematics, Himalaya Publishing House, Delhi.
2. D.C. Sanchetti & B.M. Agarwal, Business Mathematics, Sultan Chand and Sons, New Delhi.

II B. COM (IV SEMESTER) – UNDER CBCS
PART III –MAJOR CORE -11
CAPITAL MARKET

L	T	P	C
5	0	0	4

Objectives

1. To understand the meaning and importance of Financial and Capital markets
2. To create an interest among students towards stock market investment

Unit I: Capital market in India: Financial market – structure, capital market – meaning, classification – primary and secondary – Indian securities market – government securities market **(20 hours)**

Unit II : Primary market: Methods of flotation of capital , public issue – IPO –FPO – Procedure of public issue – Book building process – Role of intermediaries – Private placement. **(15 hours)**

Unit III : Secondary market: Functions of stock exchange – Dematerialisation of securities – Depositories – Major stock exchanges in India – BSE – NSE – Listing – Online trading – Clearance and settlement – Rolling settlement – Investment Vs Speculation **(15 hours)**

Unit IV: Derivatives : Meaning – types of derivatives – Commodity Vs Financial Derrivatives – Forwards – Futures – Options – Trading mechanism – Commodity exchanges

(15 hours)

Unit V: Regulatory Framework of stock exchanges: Securities contract (Regulation) Act (basics only) – Role and functions of SEBI –regulatory functions – development functions – Investor protection fund – purpose – operation. **(10 hours)**

(75 hours)

Text Books

1. Kevin.S, Security Analysis and Portfolio Management , PHI, New Delhi.
2. Nair KGC, Dileep A S ,Priya. S, Systematic Approch to Capital Market, Chand Publications, Thiruvananthapuram.

Reference Books

1. Preethi Singh, Dynamics of Indian Financial System and Markets,Tata Mc Graw – Hill Publishing Co. Ltd., New Delhi.
2. Sojikumar. K and Alex Mathew ,Indian Financial System and Markets,Tata Mc Graw – Hill Publishing Co. Ltd., New Delhi.
3. Bharathi. V Pathak, Indian Financial System, Pearson Education, Noida.

II B. COM (IV SEMESTER) – UNDER CBCS
PART III – MAJOR CORE-12
IMPORT & EXPORT PROCEDURES

L	T	P	C
5	0	0	4

Objectives

1. To identify the procedures regarding import and export business
2. To motivate the students to involve in business activities

Unit I: Internal and International trade - Difference between Internal and International Trade-Features of International Trade-Advantages and disadvantages of giving protection.

(10 hours)

Unit II : Balance of Trade – Meaning - Balance of Trade Vs Balance of Payments – Components of Balance of payments – Equilibrium and disequilibrium in the balance of payments – causes for disequilibrium – measures for correcting disequilibrium exchange control – meaning – objectives – methods of exchange control. **(25 hours)**

Unit III: Export procedure – preliminary steps in exporting – export documents – documents related to goods – certificates related to shipment – documents related to payment.

(10 hours)

Unit IV: Import procedure – Import of capital goods – EPCG scheme – import under duty exemption scheme – procedure for customs clearance – levy of customs duty kinds of customs duty – imports by export oriented units – export processing zone.

(15 hours)

Unit V: Export promotion – objectives – organizational set up – Incentives – marketing assistance – import facilities for exports – major problems of India's export sector.

(15 hours)

(75 hours)

Text Book

Francis Cherunilam, International Trade and Export Management, Himalaya Publishing House, New Delhi.

Reference Book

D.K. Jhurara, Export Management, Galgotia Publishing Company, New Delhi.

II B. COM (IV SEMESTER) – UNDER CBCS
PART III – ALLIED -IV
COMPUTER APPLICATIONS IN BUSINESS

L	T	P	C
3	0	0	3

Objectives

1. To know the applications of E- commerce.
2. To know online Trading
3. To understand E-Payment methods

Unit I: Introduction to Computers: Meaning of computers- Characteristics of computer – Components of computer- Hardware and Software. **(10 hours)**

Unit II: Overview of E-Commerce and E-Business: E-commerce vs. E-business, benefits of E-commerce - Limitations - Business Models - Online trading – E-commerce vs. Traditional commerce. **(9 hours)**

Unit III: Consumer oriented E-Commerce Applications: Mercantile Process Model - Consumers Perspective and Merchant's Perspective. Electronic Payment Systems: Advantages and Risk, Types of Payment system (Credit cards, E- Cash, Smart Cards, Debit Card) **(10 hours)**

Unit IV: Electronic Data Interchange: Non- EDI system, Partial EDI System- Fully Integrated EDI System- Pre-requisites of EDI – EDI vs E-mail. **(8 hours)**

Unit V: E- Marketing techniques: Meaning - Applications of 5 P's (Product, Price, Place, Promotion, Personalization) E- Advertising Techniques: Banners, Sponsorships, Portals and online coupons. **(8 hours)**

(45 hours)

Text Books

1. T.S.Reddy & A.Murthy,E-Commerce, Margham Publications, Chennai.
2. Dr.K.Abirami Devi, Dr.M. Alagammai, E- Commerce, Margham Publications, Chennai- 600017, 2009.
3. V. Rajaraman, Fundamentals of Computers, PHI Pvt Ltd. New Delhi

Reference Books

1. E- commerce: A Managerial Perspective Micheal change, etc A1
2. Electronic Commerce – Security: Greenstein & Feinman Risk Management & Control.
3. Ravi Kala Kota & A.B. Whinston: Frontiers of Electronic Commerce
4. Dr. U. S.Pandey & Er.Saurabh Shukla, E-commerce & Mobile Commerce Technologies.
5. Dr.P.Velmani & Dr.V. Lakshmi Praba, Computer Basics To Advancements-Easy. Learning Text Book, Chess Educational Publishers.

II B. COM (IV SEMESTER) – UNDER CBCS
PART IV- NON – MAJOR ELECTIVE -II (ANY ONE) (ONE COURSE) - 1
FINANCIAL ACCOUNTING

L	T	P	C
2	0	0	2

Objectives

1. To explain the concept and role of Accounting and financial reporting in the modern marketing economy.
2. To explain the regulatory frame work for the operation of fundamental accounting

Unit I: Average Due Date- Utility of average due date- Problems. **(5 hours)**

Unit II: Bank Reconciliation Statement – Meaning causes of difference between balance as per cash book and pass book – Need of Bank Reconciliation Statement – Preparation of Bank Reconciliation Statement **(7 hours)**

Unit III: Self balancing Ledger – general ledger- debtors ledger- creditors ledger- Sectional balancing system. **(8 hours)**

Unit IV: Depreciation – Meaning – Causes – Straight Line method and Written down value method – Simple problems only **(7 hours)**

Unit V: Rectification of Errors- Classification of errors- suspense account- rectifying accounting entries (simple problem only). **(3 hours)**

(30 hours)

Text Books

1. Dr.M.A.Arulanandam&K.S.Raman, Advanced Accountancy, Himalaya Publishing House, Mumbai.
2. P.Jain & K.L.Narang, Advanced Accountancy, Kalyani Publishers, New Delhi.

Reference Books

1. M.C.Shukla and T.S.Grewal, Advanced Accountancy, Sultan Chand &Co, New Delhi.
2. T.S.S. Reddy & A.Murthy, Advanced Accountancy, Margham Publications, Chennai.
3. P.C.Tulsian, Accountancy, Tata McGraw- Hill Company.

II B. COM (IV SEMESTER) – UNDER CBCS
PART IV - NON – MAJOR ELECTIVE -II (ANY ONE) (ONE COURSE) - 2
HUMAN RIGHTS

L	T	P	C
2	0	0	2

Objectives

1. To understand the basic concepts of human rights
2. To have an understanding of the relationship between individual, group, and national rights

Unit I: Human Rights- Definition of Human Rights - Characteristics of human rights - kinds of Human Rights - Civil and political – social, economic and cultural rights **(5 hours)**

Unit II: Violation of human rights - Patterns of violations and abuses - Action against violation of human rights as per Indian law **(7 hours)**

Unit III: Rights of the Disabled Persons - Declaration on the rights of disabled persons 1975 - International year of disabled persons 1981 **(5 hours)**

Unit IV: Bonded labour - Concepts and definitions - Constitutional and legal provisions - Salient features of bonded labour system (abolition) Act 1976 - Role of the national human rights commission **(10 hours)**

Unit V: Minorities Rights commission & its functions - Definitions - National commission for minorities - Functions of the commissions **(3 hours)**

(30 hours)

Text Books

1. Paras Diwan, Peerushi Dewan, Human Rights and Law.
2. Dr. Giriraj Shah, IPS & K.N. Gupta, Human Rights, IPS.
3. Jagannath Mohany, Teaching of Human Rights.

Reference Books

1. C. Nirmala Devi, Human Rights.
2. Concepts, Theories and Practice of Human Rights, Praveen Vadkar, Neha Publishers.
3. Baradat Sergio and Swaranjali Ghosh, Teaching of Human Rights, Dominant Publishers and Distributors, New Delhi, 2009.
4. Roy.A.N., Human Rights Tasks, Duties and Functions: Aavishakar Publications and Distributors, Jaipur.
5. Asish Kumar Das and Prasant Kumar Mohanty, Human Rights in India: Sarup and Sons, New Delhi.

II B. COM (IV SEMESTER) – UNDER CBCS
PART III - SKILL BASED II - CORE
ENTREPRENEURSHIP DEVELOPMENT

L	T	P	C
4	0	0	4

Objectives

1. To develop and strengthen the entrepreneurial quality among the students
2. To know the sources of help and support available for starting a small-scale Industry.

Unit I: Entrepreneurship Essentials- Evolution – Characteristics –Type. Functions of Entrepreneurs – Qualities of Successful Entrepreneurs – Entrepreneur Vs Entrepreneurship – Entrepreneur Vs Intrapreneur – Growth of Entrepreneurship in India. **(15 hours)**

Unit II: Entrepreneurship Dimensions– Entrepreneurial Culture – Entrepreneurial Society – Entrepreneurship Development – Training and other Support Organisational Services - Women Entrepreneurship and Rural Entrepreneurship. **(15 hours)**

Unit III: Project Appraisal- Introduction – Meaning and Methods of Project Appraisal – Economic Appraisal –Financial –Market –Technological Appraisal –Managerial Competence. **(10 hours)**

Unit IV: Launching of New Business- Step by Step Approach for searching New Business – Pre-Launch –Launch –Post-Launch – Entrepreneur to Enterprise –Stage of Start Up and Scale Up –List of Organisations to be Contacted. **(10 hours)**

Unit V: Management of Small Business- Monitoring and Evaluation of Business – Preventing Sickness and Rehabilitation of Business units –Effective Management of Small Business. **(10 hours)**

(60 hours)

Text Books

1. Khanka S.S., Entrepreneurial Development, S. Chand Publishing Company, New Delhi, 1999.
2. Gupta C.B., and Srinivasan N.P., Entrepreneurial Development, Sultan Chand & Sons, New Delhi, 2015.

Reference Books

1. Robert D. Hisrish, Michael P.Peters, Tata McGraw- Hill Publishing Company, New Delhi, 2002.
2. Vasant Desai., Dynamics of Entrepreneurial Development & Management, Himalaya Publishing House, Fifth Edition (2012), New D

III B. COM (V SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -13
CORPORATE ACCOUNTING I

L	T	P	C
5	0	0	4

Objectives

1. To study the issue, allotment and forfeiture of shares of companies.
2. To prepare final accounts according to Companies Act, 2013.
3. To know how to value the goodwill and shares.

Unit I: Issue of shares- Issue at par, Premium and discount- Forfeiture and Re-issue of shares – Pro rata allotment- Redemption of preference shares. Issue of debentures (Excluding reduction of debentures). **(22 hours)**

Unit II: Final Accounts of Companies-as per Schedule II of Companies Act 2013 – excluding managerial remuneration. **(13 hours**)

Unit III: Amalgamation, Absorption and External Reconstruction - Methods of Purchase consideration. (Simple Problems only) (**18 hours)**

Unit IV: Profit Prior to Incorporation- Under Writing of shares or debentures. **(10 hours)**

Unit V: Valuation of Goodwill and Shares- Various methods of valuation of goodwill and shares. **(12 hours)**

(75 hours)

Text Books

1. S.P.Jain & K.L.Narang, Advanced Accountancy, Kalyani Publishers, New Delhi.
2. T.S.Reddy & A.Murthy,Corporate Accounting, Margham Publications, Chennai.

Reference Books

1. R.L.Gupta and M.Radhaswamy, Advanced Accountancy, Sultan Chand &Sons, New Delhi.
2. M.C.Shukla and T.S.Grewal, Advanced Accountancy, Sultan Chand &Co., New Delhi.
3. Dr.M.A.Arulanandam&K.S.Raman, Advanced Accountancy, Himalaya Publishing House, Mumbai.
4. P.C.Tulsian, Corporate Accounting, Tata McGraw Hill Companies.

III B. COM (V SEMESTER) – UNDER CBCS
PART III – MAJOR CORE - 14
COST ACCOUNTING

L	T	P	C
4	0	0	4

Objectives

1. To acquire the basic knowledge of cost in business concerns.
2. To understand the techniques of cost control.

Unit I: Introduction – Cost – Costing – Cost Accounting – Objectives and Functions of Cost Accounting – Advantages and Limitations – Methods of Costing – Types of Costing – Classification of Cost – Elements of Cost – Cost Sheet, Practical problems. **(10 hours)**

Unit II: Process Costing – Costing procedures – Losses and Gains in process – Normal and Abnormal Losses – Abnormal Gain –Practical problems. **(10 hours)**

Unit III: Marginal Costing – Meaning – Definition – Uses and Limitations – CVP Analysis – Marginal Costing Equations – Contribution – Break Even Analysis – P/V Ratio – Margin of Safety – Key Factors – Break Even Chart. **(15 hours)**

Unit IV: Budgetary Control – Budget - Definition – objectives – Budgeting – Advantages and Limitations – Classification of Budgets- Flexible Budgets – Production and Sales Budgets – Cash Budget. **(15 hours)**

Unit V: Standard Costing – Definition – Advantages and Limitations – Variances – Material Variances – Labour Variances – (Overhead and other Variances excluded) – Simple Practical problems. **(10 hours)**

(60 hours)

Text Books

1. R.S.N.Pillai&V.Bagavathi, Cost Accounting, S.Chand & Company LTD, Ramnagar, New Delhi.
2. S.P.Jain & Narang, Cost Accounting, Kalyani Publishers, Ludhiana.

Reference Books

1. S.P.Iyenger , Cost and Management Accounting, Sultan Chand &Sons, New Delhi.
2. A. Murthy, S. Guruswamy, Vijay Nilcole Cost Accounting, Imprints Private Limited , Chennai.
3. T.S. Reddy and Hariprasad Reddy, Cost Accounting, Margham Publications.
4. K, Alex, Cost Accounting, Dorling Kindersley (India) Pvt. Ltd, Noida.

III B. COM (V SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -15
BUSINESS LAW

L	T	P	C
5	0	0	4

Objectives

1. To understand the definition of business law
2. To study the scope and boundaries of business law.

Unit I: Indian Contract Act, 1872 – Fundamental essentials of a valid contract – classification of contracts – offer – acceptance – consideration – capacity – free consent – legality of object – contingent contracts. **(13 hours)**

Unit II: Performance of contract – discharge of contract - breach of contract – remedies – quasi contracts. **(12 hours)**

Unit III: Special contracts – indemnity – guarantee. **(20 hours)**

Unit IV: Bailment – Pledge – contract of agency. **(15 hours)**

Unit V: Sale of goods Act – differences between sale and agreement to sell – sale and hire purchase agreement – classification of goods – documents of title to goods – rights and duties of buyers and sellers – rights of unpaid seller. **(15 hours)**

(75 hours)

Text Books

1. N.D . Kapoor, Elements of Mercantile Law, Sultan Chand & Sons.
2. S.M.Sundaram , Business Law / Commercial and Industial Law, Sree Meenakshi Publication, Karaikudi.

Reference Books

1. N.D . Kapoor, Business Law , Sultan Chand & Sons.
2. P.C. Tulsian , Business Law , Tata Mc Graw Hill Companies.
3. R.S.N. Pillai , Bagavathy, Business Law, S.Chand & Co., New Delhi.
4. M.C.Kuchhal, Business Law , Vikas Publishing House, Pvt. Ltd.
5. Dr.H.K. Saharay & N.K.Saha, Elements of Business Law, New Central Book Agency.

III B. COM (V SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -16
RESEARCH METHODOLOGY

L	T	P	C
4	0	0	4

Objectives

1. To understand the basic concepts of research and its methodologies.
2. To organize and conduct research in a more appropriate manner.

Unit I: Introduction to Research – Types of Research – Significance of Research – Research methods vs. Methodology – Research – Research process – Criteria of Good Research. **(10 hours)**

Unit II: Research Design – Meaning of Research design – need for research design – features of a good design – different research designs. **(10 hours)**

Unit III: Design of sample surveys – sample design – sample survey Vs census survey – Types of sampling designs – Non probability sampling – probability sampling – Complex random sampling design. **(10 hours)**

Unit IV: Data Collection and preparation – Collection of Primary Data – Methods of Collecting Primary Data - Guidelines for Constructing Questionnaire / Schedule- Difference between Questionnaire and schedule - Collection of secondary data – Data Preparation process. **(15 hours)**

Unit V: Interpretation and report writing – Meaning of interpretation – techniques of interpretation – precautions in interpretation – significance of report writing – different steps in writing report – layout of the research report – mechanics of writing a research report – precautions for writing research report. **(15 hours)**

(60 hours)

Text Book

C.R. Kothari, Gau Rav Garg, "Research Methodology methods and techniques", New International Publishers.

Reference Books

1. P. Ravilochanan, "Research Methodology", Margham Publications.
2. P. Saravanavel, " Research Methodology", Kidap Publications.

III B. COM (V SEMESTER) – UNDER CBCS
PART III – MAJOR ELECTIVE -1 (ANY ONE) (ONE COURSE) - 1
INCOME TAX LAW & PRACTICE I

L	T	P	C
4	0	0	4

Objectives

1. To understand the basic concepts of income tax
2. To study the provisions regarding computation of first three heads of income i.e., salary, house property and business income.

Unit I: Basic Concept – Person, Assesses, previous and assessment year, total income, gross total income – concept of income – Agricultural Income. **(8 hours)**

Unit II: Income exempted from tax – Residential status –incidence of taxation - problems. **(12 hours)**

Unit III: Income from Salary – different forms of salary and allowance – perquisites – problems in computation of salary income. **(15 hours)**

Unit IV: Income from House property – Annual value – Standard deduction – Unrealized rent – problems in computation of house property income. **(10 hours)**

Unit V: Income under the Head Business or profession – allowable expenses – Expressly disallowed expenses – computations – problems in computation of business or professional income. **(15 hours)**

(60 hours)

Text Books

1. Dr. H.C. Mehrotra and Dr. S.P. Goyal, Income tax Law and Accounts, Sahitya Bhawan Publications, Agra.
2. V.P. Gaur, D.B. Narang, Pooja Ghai and Rajeev Puri, Income tax Law and Practice, Kalyani Publishers, New Delhi.

Reference Books

1. A.Murthy, Income Tax Law and Practice Assessment Tear - 3rd Edition, Vijay Nicole Imprints Private Limited.
2. B.B. Lal, Income Tax, Darling Kindersley Pvt. Ltd, Noida.

III B. COM (V SEMESTER) – UNDER CBCS
PART III –MAJOR ELECTIVE - I (ANY ONE) (ONE COURSE) - 2
APPLICATION OF TALLY IN ACCOUNTING

L	T	P	C
2	0	2	4

Objectives

1. To impart practical knowledge regarding the concepts of Financial Accounting.
2. To get placement for students in different offices as well as Companies.

Unit I: Fundamentals of Tally.ERP 9-Introduction –salient features of Tally. ERP 9, Getting functional with Tally ERP 9, start up, Quitting Tally. ERP 9 – Create a Company, select a Company, Alter a Company, Shut a Company –Company Features –Configurations.

Unit II: Create Accounting Masters in Tally. ERP 9 –Groups- Pre-defined Groups of Accounts, Creating Single Group, Creating Multiple Groups, Displaying Groups, Altering Group-Ledgers-Creating single ledger, Creating Multiple Ledger, Displaying Ledger, Altering Ledger.

Unit III: Creating Inventory of masters in Tally. ERP 9- Stock Groups-Creating Single, Multiple Stock Group, Displaying and Altering Stock Groups. Stock Categories –Creating Single, Multiple Stock Categories, Displaying and Altering Stock Category- Units of Measure,Godowns- Creating Single Multiple Godowns, Displaying and Altering Godowns-Stock Items- Creating Single, Multiple Stock Items, Displaying and Altering Stock Items.

Unit IV: Voucher Entry in Tally. ERP 9- Voucher Types- Predefined vouchers in Tally. ERP 9, Creating Voucher Type, Displaying voucher Type, Altering Voucher Types – Financial Statements –Balance Sheet, Profit&loss A/c, Trial balance.

Unit V: **Accounting Books &Reports ERP 9**- Cash book, Bank Book, Purchase Register, Sales Register, Journal Register, Debit Note Register, Credit Note Register, Day Book, Statistics, Bank Reconciliation Statement.

Text&Reference Books

1. Using Tally ERP 9, Ramesh.Bangia,Khanna Book Publishing Ltd.2010
2. Mastyering Tally ERP 9, Asok K.Nadhani,BPB Publication.
3. Tally ERP 9 Training Guide,Kitabmahal.

Tally Practicals

1. Preparation of Trial balance
2. Balance Sheet
3. Final A/c with Simple Adjustment
4. Subsidiary Books
5. Petty Cash Book
6. Creation of Stock Item, Stock Groups and Stock Categories
7. Sales Invoice
8. Bank Reconciliation Statement Preparation

SCHEME OF EXAMINATION

Internal - 50 marks

(Theory -25marks , Practical- 25 marks)

Theory (25 marks)

i). The average of best two test
out of three tests - 20 marks

ii). Assignment - 05 marks

Practical (25 marks)

Record Note - 05 marks
Program / Procedure Writing (5x2) - 10 marks
Debugging (2.5 x 2) - 5 marks
Result (2.5 x 2) - 5 marks

External : 50 marks (Practical only)

i). There is no external theory examination for this subject only practical should be conducted as external examination

Practical marks should be awarded as follows **:**

Record Note - 10 marks
Program / Procedure Writing
(10 x 2) - 20 marks
Debugging (5 x 2) - 10 marks
Result (5 x 2) - 10 marks

ii). Practical Examination should be conducted by both internal and external examinations

III B. COM (V SEMESTER) – UNDER CBCS
PART III – MAJOR ELECTIVE - I (ANY ONE) (ONE COURSE) - 3
LOGISTIC MANAGEMENT

L	T	P	C
4	0	0	4

Objectives

1. To understand the role of logistic management in growth of business
2. To understand the functional areas in logistics

Unit I: Logistics - Meaning - Importance - Logistical Competency - Logistical Mission - Service - Total Cost - Logistical Renaissance - Technological Advancement - Regulatory Change - IT Revolution. **(8 hours)**

Unit II: Work of Logistics - Network design - information - Transportation and Inventory - Warehousing - material handling - packaging - integrated Logistics. **(10 hours)**

Unit III: Operating - Rapid response - minimum variance - minimum inventory - movement consideration - quality - Life cycle support - barriers to internal integration in organizational structure - measurement system. **(12 hours)**

Unit IV: Information functionality and inventory functionality - principles of logistics information - Information Architecture - planning - operations - Logistics Information flow - application of new information technologies - electronic data interchange standards - inventory determining order point - lot size. **(15 hours)**

Unit V:Transportation infrastructure - transport functionality - principles - modal classification transportation formats - suppliers of transportation service - storage functionality principles - concept of strategic storage - developing warehouse resource - warehouse strategy. **(15 hours)**

(60 hours)

Text Books

1. Satish C. Ailawadi and Rakesh P. Singh, Logistics Management, PHI Learning Pvt. Ltd., New Delhi.
2. S. K. Bhattacharya, Logistics Management, S.Chand Publishing, New Delhi.

Reference Books

1. Agarwal D K, Textbook of Logistics And Supply Chain Management.
2. Donald J Bowersox, David J. Closs ,Logistical Management (Integrated supply chain Process), Tata McGraw-Hill Companies.
3. Donald J. Bowersox, David J. Closs, and M. Bixby Cooper, Supply chain Logistics Management, Tata McGraw-Hill Companies.
4. Prof. Martin Christopher, Logistics & Supply Chain Management.

III B. COM (V SEMESTER) – UNDER CBCS
PART IV – SKILL BASED -III - COMMON
PERSONALITY DEVELOPMENT / EFFECTIVE COMMUNICATION / YOUTH LEADERSHIP

L	T	P	C
2	0	0	2

III B. COM (V SEMESTER) – UNDER CBCS
PART III – MINI PROJECT

L	T	P	C
6	0	0	3

Objectives

1. To enable the students to apply their conceptual knowledge in a practical situation
2. To learn the act of conducting a study and presenting its findings in the form of a rational report**.**

Guidelines for Mini project

- Group project with the maximum number of 5 students in a group.
- The topic should be subject related.
- Each group must have a guide / project supervisor.
- The project should have minimum 30 pages.
- Mini project can be in the form of case study/ field survey.
- Students must investigate a problem, examine the alternative solutions and propose the most effective solutions.
- The report should consist of introduction, identifying the key problems, background stating the important relevant facts and important issues, proposed solution and recommendations.
- Evaluation will be based on the project report, presentation and viva voce.

III B. COM (VI SEMESTER) – UNDER CBCS
PART III – CORE -17
CORPORATE ACCOUNTING II

L	T	P	C
5	0	0	4

Objectives

1. To know the preparation of liquidator's final statement of accounts.
2. To prepare the final accounts of banking company in a schedule form
3. To train the students to prepare final accounts under double account system.

Unit I : **Introduction**- Liquidator's final statement of accounts. **(13hours)**

Unit II: **Accounts of Banking Companies** – Rebate on Bills discounted- Final Accounts. **(20 hours)**

Unit III: **Double Account System**- Accounts of Electricity companies - Replacement of Asset - Calculation of Reasonable Return- Disposable of surplus. **(12 hours)**

Unit IV: **Holding companies**- Preparation of Consolidated balance sheet. **(22 hours)**

Unit V: **Human Resource accounting** –Objectives -Methods of Human Resource Value Accounting. **(8 hours)**

(75 hours)

Text Books

1. S.P.Jain & K.L.Narang, Advanced Accountancy, Kalyani Publishers, New Delhi.
2. T.S.Reddy & A.Murthy,Corporate Accounting, Margham Publications, Chennai.

Reference Books

1. R.L.Gupta and M.Radhaswamy, Advanced Accountancy, Sultan Chand &Sons, New Delhi.
2. M.C.Shukla and T.S.Grewal, Advanced Accountancy, Sultan Chand &Co., New Delhi.
3. Dr.M.A.Arulanandam&K.S.Raman, Advanced Accountancy, Himalaya Publishing House, Mumbai.
4. P.C.Tulsian, Corporate Accounting, Tata McGraw Hill Companies.

III B. COM (VI SEMESTER) – UNDER CBCS
PART III –- CORE -18
MANAGEMENT ACCOUNTING

L	T	P	C
4	0	0	4

Objectives

- To familiarise the students with the basic management accounting concepts and their applications in managerial decision- making

Unit I: Management accounting – Meaning – Definition – Nature and Scope – Utility and Limitations – Management accounting Principles – Functions of Management accounting – Tools of Management accounting - Management accounting and Financial accounting – Cost accounting and Management accounting. **(5 hours)**

Unit II: Ratio Analysis – Meaning of Ratios – Classification of Ratios – Analysis and Interpretation of different Ratios – Profitability Ratios – Coverage Ratios – Turnover Ratios – Financial Ratios – Uses and Limitations of Ratio Analysis. **(15 hours)**

Unit III: Fund Flow Analysis – Meaning of Fund Flow Statement – Uses of Fund Flow Statement – Parties interested in Fund Flow Statement – Preparation of Fund Flow Statement – Treatment of provision for Taxation, Proposed Dividend and Depreciation – Statement of Changes in Financial position. **(15 hours)**

Unit IV: Cash Flow Analysis – Meaning of Cash Flow Statement – Preparation of Cash Flow Statement (Simple problems only) – Utility and Limitations of Cash Flow Analysis. **(10hours)**

Unit V: Capital Budgeting – Concepts of Capital Budgeting – Importance of Capital Budgeting – Capital Budgeting Process –Traditional methods – Pay- back period method – Net Present Value method -(Simple problems only). **(15 hours)**

(60 hours)

Text Books

1. R.S.N.Pillai & Bagavathi, Management Accounting, S.Chand &Company, New Delhi.
2. T.S.Reddy & Y.Hariprasad Reddy, Management Accounting, Margham Publications, Chennai.

Reference Books

1. Dr.S.N.Maheswari, Principles of Management Accounting, Sultanchand&Sons, NewDelhi.
2. S.P.Jain&K.L.Narang, Cost and Management Accounting, Kalyani Publishers, Ludhiana.
3. S.P.Iyenger, Cost and Management Accounting, Sultanchand&Sons, NewDelhi.
4. A. Murthy, S. Guruswamy, Management Accounting-Theory & Practice, Vijay Nicole Imprints Private Limited , Chennai.

III B. COM (VI SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -19
INDUSTRIAL LAW

L	T	P	C
5	0	0	4

Objectives

1. To acquaint knowledge on industrial relations framework in our country
2. To study various rights and benefits available to the workmen under the legislations.

Unit I : The Factories Act, 1948- definitions - approval, licensing and registration of factories - duties of occupier - inspecting staff - certifying surgeons - provisions for health – safety – welfare - working hours and holidays- employment of young persons and women – annual leave with wages- penalties and procedure. **(18 hours)**

Unit II : Workmen's compensation Act 1923 - Scope and coverage - definitions – rules - personal injury by accident - occupational diseases arising out of and in the course of employment - theory of national extension - amount of compensation- distribution of the compensation- notice and claim. **(16 hours)**

Unit III: Industrial Disputes Act 1947- object - definitions- conciliation - machinery- adjudication machinery- powers and duties of authorities - procedures - voluntary reference to arbitration – award - strike – and lock outs – lay off – retrenchment – transfer and closing down of their undertaking – penalties. **(21 hours)**

Unit IV: The Trade Unions Act, 1926 – Consumer Act 1986 **(10 hours)**

Unit V: The Employees' State Insurance Act 1948 – The payment of Gratuity Act 1972. **(10 hours)**

(75 hours)

Text Books

1. N.D . Kapoor, Elements of Mercantile Law, Sultan Chand & Sons.
2. S.M.Sundaram , Business Law / Commercial and Industial Law, Sree Meenakshi Publication, Karaikudi.

Reference Books

1. Sahanay, H.K, Commercial and Industrial Law, New Central Book Agency.
2. Goswami, V.G , Labour and Industrial Laws, Central Law Agency.
3. Sengupte , Commercial and Industrial Law, New Central Book Agency.
4. S.N. Mithra, Industrial Law.

III B. COM (VI SEMESTER) – UNDER CBCS
PART III –CORE - 20

AUDITING

L	T	P	C
4	0	0	4

Objectives

1. To know the importance of audit in commercial and non-commercial organizations.
2. To understand the procedures to be followed while auditing the business organizations.

Unit I: Introduction – meaning- objectives – difference between accountancy and Auditing – advantages – limitations – audit programme – audit working papers – preliminaries before audit . **(10 hours)**

Uniut II: Internal check – meaning- objectives – difference between internal control and internal audit – advantages and disadvantages of internal check. **(15 hours)**

Unit III: Vouching – meaning – objects – importance of vouchers – precautions to be taken by the auditors while examining vouchers – vouching of various transactions.

(15 hours)

Unit IV: Verification and valuation of assets and liabilities – classification of assets – verification of different types of assets – valuation of investment, stock -in -trade and book debts. **(10 hours)**

Unit V: Company auditor - appointment – qualification and disqualification – removal of an auditor – status – rights – duties and liabilities – auditor's report.

(10 hours)

(60 hours)

Text Books

1. Saxana, Reddy and Appannaiah, Text Book of Auditing, Himalaya Publishing House.
2. Dr.T.R. Sharma, Auditing, Sahitya Publication, Agra.

Reference Books

1. B. N. Tandon, Auditing, S. Chand & Co., New Delhi.
2. Dinkar Pagare, Principles and Practice of Auditing, Sultan Chand & Sons, New Delhi.

III B. COM (VI SEMESTER) – UNDER CBCS
PART III – MAJOR ELECTIVE – II (ANY ONE) (ONE COURSE) -1
INCOME TAX LAW & PRACTICE II

L	T	P	C
4	0	0	4

Objectives

1. To know the procedure for assessment and types of assessment.
2. To understand the computation of tax liability of individuals

Unit I: Income from capital gain – Types – Exemptions – Computation – problems in computation of capital gain. **(10 hours)**

Unit II: Income under the head other sources – Computation – Problems. **(12 hours)**

Unit III: Set off and carry forward of losses - Problems. **(11 hours)**

Unit IV: Deduction from Gross total Income- Problems - Procedures for Assessment – Returns – Types of returns – Types of Assessment – Tax Deducted at source. **(15 hours)**

Unit V: Assessment of Individual – Problems including computation of tax.

(12 hours)

(60 hours)

Text Books

1. Dr. H.C. Mehrotra and Dr. S.P. Goyal, Income tax Law and Accounts, Sahitya Bhawan Publications, Agra.
2. V.P. Gaur, D.B. Narang, Pooja Ghai and Rajeev Puri, Income tax Law and Practice, Kalyani Publishers, New Delhi.

Reference Books

1. A.Murthy, Income Tax Law and Practice Assessment Tear - 3rd Edition, Vijay Nicole Imprints Private Limited, 2015-16.
2. B.B. Lal, Income Tax, Darling Kindersley Pvt. Ltd, Noida.

III B. COM (VI SEMESTER) – UNDER CBCS
PART III – MAJOR ELECTIVE -II (ANY ONE) (ONE COURSE) - 2
RETAIL MANAGEMENT

L	T	P	C
4	0	0	4

Objectives

1. To explore the functionalities in the retail management
2. To understand the retail management concepts

Unit I: Introduction to retailing - nature and importance of retailing - contemporary retailing in India and marketing challenges facing retailers - Strategic planning in retailing - owning or managing business - retailing life cycle. **(15 hours)**

Unit II: Types of retailing institutions - retailing institutions by ownership - retailing institutions by store based and non-store based - vertical marketing system - traditional retailing. **(10 hours)**

Unit III: Strategic planning in retailing - understanding retailing environment - identifying and understanding customers, information gathering. **(10 hours)**

Unit IV: Location and organizational decisions - Trading area analysis site selection - organizational pattern in retailing - operational management - financial decisions - use of technology. **(10 hours)**

Unit V: Merchandise Management - Buying and handling - product assortment decision - Inventory Management - Merchandise pricing - Merchandise Labelling and packing - Role of atmosphere - retail promotion mix strategy - retail store sales promotion schemes. **(15 hours)**
(60 hours)

Text Books

1. Gibson G. Vedamani, Retail Management: Functional Principles & Practices, Jaico Books.
2. Swapna Pradhan, Retailing Management, Tata McGraw-Hill Publishing Company Limited, New Delhi.

Reference Books

1. Michael Levy and Barton A Weot, Retail Management, McGraw-Hill Irwin.
2. Cox, Roger and Paul Brittain, Retail Management, Prentice Hall, Harlow.
3. Michael Levy, Barton A Weitz, Ajay Pandit, Retailing Management, McGraw-Hill Company.
4. Berman Barry, Evans Joel R., Retail Management: A Strategic Approach, Pentice Hall of India.

III B. COM (VI SEMESTER) – UNDER CBCS
PART III – MAJOR ELECTIVE -II (ANY ONE) (ONE COURSE) - 3
VALUES & ETHICS FOR BUSINESS

L	T	P	C
4	0	0	4

Objectives

1. To understand values in business
2. To inculcate the ethical practices in business among the students

Unit I:Introduction to Values - Values in the society, politics, inter-personal relations, economics and business- Morals - Value and Vision statements in organizations - Focusing on Innovation, Reliability, Customer satisfaction, Quality assurance, Profitability, Utility, Productivity etc. and the continuous improvement in their standards. **(15 hours)**

Unit II: Ethics as the art of choosing between right and wrong – Interpreting the consequences and choosing the right- Ideas of freedom of choice, equality, justice, fairness in dealing with customers, society, environment . Application of Values and ethics in business - Examples from Business. **(10 hours)**

Unit III:Government interactions: Use and Misuse of government incentives, subsidies and licenses - Tax evasions. Ethics in Human Resources employment in Business: in hiring, compensating, work assignments - discrimination; Marketing: ethics in Pricing policies and strategies, misleading advertisements; Policies relating to exchange and return of goods sold. **(15 hours)**

Unit IV:Ethics in Production: Poor quality, risky products, defective/untested products, unauthorized copies/imitations, Quality Policy: Zero defect and quality of ingredients, components, ISI, AG Marks, Hall Mark, Patents, Copy rights, post-sales services. **(10 hours)**

Unit V: Legal and self imposed norms- for doing good business and earning goodwill. Handling customer complaints, Problems- examples from consumer goods and services oriented industries (Tourism, Travel, Telephones, Edible goods, Health etc.) **(10 hours)**

(60 hours)

Text and Reference books

1. Colin M. Fisher and Alan Lovell, Business Ethics and Values, F.T. Prentice Hall, 2006.
2. G.P. Martin, Glenn Martin, Human Values and Ethics in the Work place, 2010.

III B. COM (VI SEMESTER) – UNDER CBCS
PART III - MAJOR PROJECT

L	T	P	C
8	0	0	4

Objectives

1. To impart knowledge and develop understanding of research methodology and its applications
2. To study the methods of data collection and its interpretation to develop analytical skills in generalization of things and concepts

Guidelines for group project

1. The topic should be subject related.
2. Each group should consists of a maximum number of 5 students
3. The project report should have minimum 50 pages.
4. Each group must have a guide/ project supervisor.
5. The project should necessarily contain title, statement of the problem, brief and representative review of literature, and objectives of the study, research methodology (sampling, collection of data and tools of analysis), scope / rationale / limitations of proposed study, contents (chapters) and bibliography.
6. The project report must have the following- Cover page, declaration by the guide and candidate, preface and acknowledgement, table of contents, main body (chapters), research instruments (questionnaire), appendix and annexure (if needed) , bibliography.
7. Evaluation will be based on the project report, presentation and viva voce.

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI - 12

CHOICE BASED CREDIT SYSTEM

B.COM., CORPORATE SECRETARYSHIP

(With effect from the Academic Year 2017-2018 onwards)

Sem. (1)	Pt. I/II/ III/ IV/V	Sub. No (3)	Subject Status (4)	Subject Title (5)	Contact Hrs/ Weeks (6)	C Credits (7)
III	III	13	Core -5	Advanced Financial Accounting- I	6	4
	III	14	Core -6	Business Statistics	5	4
	III	15	Core -7	Banking	5	4
	III	16	Core -8	Human Resources Management	5	4
	III	17	Allied -III	Company Secretarial Practice	3	3
	IV	18	Non Major Elective 1 (Any one)	1.Introduction to Accountancy 2.Consumer Awareness	2	2
	III	19	Skill Based - I - Core	Business Communication	4	4
	IV	20	Common	Yoga	2	2
				Sub total	**30***	**25***

***Excluding the hours and credit for Yoga.**

Sem. (1)	Pt. I/II/ III/ IV/V	Sub No (3)	Subject Status (4)	Subject Title (5)	Contact Hrs/ Weeks (6)	C Credits (7)
IV	III	21	Core -9	Advanced Financial Accounting - II	6	4
	III	22	Core -10	Business Mathematics	5	4
	III	23	Core -11	Capital Market	5	4
	III	24	Core -12	Import & Export Procedures	5	4
	III	25	Allied- IV	Corporate Finance	3	3
	IV	26	Non Major Elective II (Any one)	1. Financial Accounting 2. Human Rights	2	2
	III	27	Skill Based II - Core	Entrepreneurship Development	4	4
	V	28	Extension Activity	NCC/ NSS/ YRC/ YWF	-	1
	IV	29	Common	Computer for Digital Era	2	2
				Sub total	**30***	**26***

***Excluding the hours and credit for Computer for Digital Era.**

B.Com. Corporate Secretaryship – V Semester

Sem. (1)	Pt. I/II/ III/ IV/V (2)	Sub No. (3)	Subject Status (4)	Subject Title (5)	Contact Hrs/ Week (6)	C Credits (7)
V	III	30	Core -13	Corporate Accounting I	5	4
	III	31	Core -14	Cost Accounting	4	4
	III	32	Core -15	Business Law	5	4
	III	33	Core -16	Research Methodology	4	4
	III	34	Major Elective I (Any one)	1. Income Tax Law & Practice I 2. Applications of Tally in Accounting 3. Logistic Management	4	4
	IV	35	Skill Based – III Common	Personality Development / Effective Communication / Youth Leadership	2	2
	III	36		Mini Project	6	3
				Sub total	**30**	**25**

B.Com. Corporate Secretaryship – VI Semester

Sem. (1)	Pt. I/II/ III/ IV/V (2)	Sub. No. (3)	Subject Status (4)	Subject Title (5)	Contact Hrs/ Week (6)	C Credits (7)
VI	III	37	Core -17	Corporate Accounting II	5	4
	III	38	Core -18	Management Accounting	4	4
	III	39	Core -19	Industrial Law	5	4
	III	40	Core -20	Auditing	4	4
	III	41	Major Elective II (Any one)	1. Income Tax Law & Practice II 2. Retail Management 3. Values & Ethics for Business	4	4
	III	42		Major Project	8	4
				Sub total	**30**	**24**

- **For problem papers 40% marks for theory and 60% marks for problems.**
- **Proportion of marks between internal evaluation and external evaluation for subjects - 25:75.**
- **Internal – 20 marks for theory and 5 marks for assignment.**
- **Total Credits - 144(excluding the credit for yoga and computer for digital era)**

II B.COM., CORPORATE SECRETARYSHIP (III SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -5
ADVANCED FINANCIAL ACCOUNTING - I

L	T	P	C
6	0	0	4

Objectives

1. To know the system of Accounting followed in Branches and Departments of business organization.
2. To know the pattern of recording transactions in Hire Purchase and Installment Purchase systems.
3. To understand the accounting treatment to be followed at the time of Insolvency of an individual and while taking a lease of a property.

Unit I: Branch Accounting – Debtor's system – Invoice price Method (excluding stock and Debtor's system) – Departmental Accounts – Departmental Trading, Profit and Loss Accounts – Departmental Transfers . **(22 hours)**

Unit II: Contract Account – Completed contracts and incomplete contracts – Farm Accounting. **(15 hours)**

Unit III: Hire purchase and Installment system – Calculation of Cash price and interest – Default and Repossession – Difference between Hire purchase and Installment system. **(21 hours)**

Unit IV: Royalty Account – Meaning – Minimum rent – Short working – Type of recoupment - strike and lock out. **(14 hours)**

Unit V: Insolvency accounts – Insolvency of an individual – Statement of Affairs – Deficiency Account **(18 hours)**

(90 hours

Text Books

1. S.P.Jain & K.L.Narang, Advanced Accountancy, Kalyani Publishers, New Delhi.
2. T.S. Reddy & A. Murthy, Advanced Accountancy, Margham Publication, Chennai.

Reference Books

1. Dr.M.A. Arulanandam & K.S.Raman, Advanced Accountancy, Himalaya Publishing House, Mumbai.
2. M. Shukla and T.S. Grewal, Advanced Accountancy, S.Chand & Co., New Delhi.
3. R.S.N. Pillai, Bagavathi & S. Uma, Fundamentals of Advanced Accounting, S. Chand & Company Ltd., New Delhi.

II B.COM., CORPORATE SECRETARYSHIP (III SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -6
BUSINESS STATISTICS

L	T	P	C
5	0	0	4

Objectives

1. To provide the basic knowledge of statistical techniques as are applicable to business.
2. To enable the students to apply statistical techniques for quantification of data in business.

Unit I: **Introduction**- Definition of statistics – Importance – Application – Limitations - Statistical survey – Planning and design of survey – Collection of Data – Sources - Primary and secondary data – Techniques – Census method and sampling method–Methods of sampling. Classification and tabulation of data –Diagrammatic and graphic presentation of data. **(6 hours)**

Unit II: **Measures of Central Tendency** – Mean – Median – Mode – Geometric Mean - Harmonic Mean. **(25 hours)**

Unit III: Measures of Dispersion-Range – Quartile Deviation – Mean Deviation - Standard Deviation – Co-efficient of Variation. Skewness - methods of studying Skewness - Karl Pearson's Co-efficient of Skewness – Bowley's co-efficient of Skewness. **(14 hours)**

Unit IV: Correlation – meaning – types-scatter diagram – Karl Pearson's Co-efficient of Correlation- Rank correlation – Concurrent deviation method. Regression analysis – uses-Regression line – Regression equations – least square method - deviations taken from actual mean and assumed mean method. **(10 hours)**

Unit V: Index numbers – meaning – types – its problems – Methods of constructing index numbers – unweighted and weighted indices – Index number tests – Consumer price index numbers. Analysis of time series – Meaning – Importance – Components of time series – Secular trend, seasonal, cyclical and irregular variations – Measurement of trend - Graphic method-Semi average method – Moving average method – Method of least square.

(20 hours)
(75 hours)

Text Books

1. Dr. M. Manoharan, Statistical Methods, Palani Paramount Publications, Palani.
2. R.S.N. Pillai & Bhagavathi, Statistics-Theory and Practice, S.S. Chand & Co.

Reference Books

1. Dr. S.P. Gupta, Statistical Method, Sultan Chand & Sons, New Delhi.
2. M. Wilson, Business Statistics, Himalaya Publishing House, Mumbai.

II B.COM., CORPORATE SECRETARYSHIP (III SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -7
BANKING

L	T	P	C
5	0	0	4

Objectives

1. To create an idea of modern banking
2. To familiarise the students with the banking activities

Unit I: Banker and Customer- Relationship between banker and customer – General & Special relationship – Rights of the banker – Negotiable instruments – Promissory note, Bill of exchange & Cheque (Meaning & Features) – Proper Drawing of the cheque – Crossing (Definition & Types) – Endorsement (Definition & Kinds) – Material alternation. **(20 hours)**

Unit II: Banking System- Indigenous Bankers – Commercial Banks – Co-Operative Banks – Land development Banks – Industrial Development Banks - NABARD- EXIM Banks – Foreign Exchange Banks. **(10 hours)**

Unit III: Traditional Banking- Receiving Deposits – General Precautions – Kinds of deposits – Fixed – Current – Saving – Recurring & Others. Lending Loans & Advances – Principles of sound lending – forms of advances – loan , cash credit , over draft & purchasing and discounting of bills. Mode of charging security – lien , pledge , mortgage , assignment & hypothecation. **(20hours)**

Unit IV: Modernised Banking- Core banking – Home banking – Retail banking – Internet banking – Online banking and Offline banking – Mobile banking –Electronic Funds Transfer – ATM and Debit Card – Smart Card – Credit Card – E-Cash – Swift – RTGS. **(10 hours)**

Unit V: Reserve Bank of India- Functions of Reserve Bank of India – Methods of Credit Control. **(15 hours)**

(75 hours)

Text Books

1. K.C.Sherlekar, Banking Theory Law and Practice, Himalaya Publishing House.
2. E.Gordon and K.Natarajan, Banking Theory Law and Practice, Himalaya Publishing House.

Reference Books

1. S.N.Lal, Banking Theory Law and Practice.
2. M.C.Tannen , Banking Theory Law and Practice. Lexix Nexix Vutterworth, Nagpoor.
3. S.S.Gulshan and Gulshan K.Kapoor, Banking Theory Law and Practice.
4. S. Guruswamy, Banking Theory Law and Practice –3rd Edition, Vijay Nicole Imprints Private Limited, Chennai.

II B.COM., CORPORATE SECRETARYSHIP (III SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -8
HUMAN RESOURCE MANAGEMENT

L	T	P	C
5	0	0	4

Objectives

1. To study about the importance of human resource.
2. To study the techniques of performance appraisal of employees.
3. To know the methods to redress the grievances of employees.

Unit I: Introduction- Concept – objectives – characteristics – functions – principles. **(8 hours)**

Unit II: Man power planning – definition – need – process job analysis – job description – specification – job evaluation – recruitment and selection process. **(15 hours)**

Unit III: Employee's training – needs – importance – principles – training methods – promotion types – demotion – labour turnover - performance appraisal methods. **(22 hours)**

Unit IV: Industrial relations – significance – causes of poor industrial relations – suggestions – labour disputes and settlement. **(18 hours)**

Unit V: Workers participation in management – collective bargaining and industrial relations – employee's grievances. **(12 hours)**

(75 hours)

Text Books

1. J. Jaya Sankar, Human Resource Management, Margham Publications, Chennai.
2. G.D. Maheshwari, Human Resource Management, Sultan Chand Publications.
3. T.S.Reddy & A.Murthy, Human Resource Management, Margham Publications, Chennai.

Reference Books

1. Wreather and Davis, Human Resource Management. Pearson Education.
2. TN Chhabra, Human Resource Management, Dhanpat Rai & Co., Delhi.
3. Biswajeet Patttanayak, Human Resource Management, PHI Learning.
4. Khurana Ashok, Human Resource Management, V.K. Publications.
5. Sankalp Gaurav, Human Resource Management, Sahitya Bhawan Publications.

II B.COM., CORPORATE SECRETARYSHIP (III SEMESTER) – UNDER CBCS
PART III – ALLIED III

COMPANY SECRETARIAL PRACTICE

L	T	P	C
3	-	-	3

Objectives

1. To know complete details of the secretary and secretarial practice in various areas
2. To understand the meeting and winding up procedures.

Unit I: Secretary – Definition - kinds of secretaries - function of secretaries – qualification – appointment – dismissal - legal positions, powers, rights, duties, and responsibilities. **(8 hours)**

Unit II: Secretarial practice relating to formation of a company – secretarial practice relating to issue, allotment, calls, forfeiture and surrender of shares – secretarial practice relating to dividend. **(10 hours)**

Unit III: Secretarial practice relating to issue and redemption of debenture – borrowing powers of a company – public deposits – prevention of misuse of public deposits. **(10 hours)**

Unit IV: Meetings-kinds of meetings – requisition of valid meeting – duties of the secretary in connection with board meeting – statutory meeting, extraordinary general meeting and resolution. **(10 hours)**

Unit V: Winding up – procedure for winding up – duties of secretaries in respect of winding up procedures after winding up orders. **(7 hours)**

(45 hours)

Text Books

1. P.K.Ghosh and Dr.V.Bala Chander , Company Law and Secretarial Practice, Sultan Chand & Sons Publications, New Delhi.
2. Bn Tandon, Manual of Secretarial Practice, Sultan Chand & Sons Publications, New Delhi.

Reference Books

1. Dr. V. Balachandran, Company Law & Practice – Part I (Revised), Sultan Chand & Sons Publications, New Delhi.
2. Dr.P.Srirenganayaki, Company Law and Secretarial Practice (As per Company ACT 2013), Charulatha Publications, Chennai.

II B.COM., CORPORATE SECRETARYSHIP (III SEMESTER) – UNDER CBCS
PART IV – NON- MAJOR ELECTIVE -1 (ANY ONE) (ONE COURSE) - 1
INTRODUCTION TO ACCOUNTANCY

L	T	P	C
2	0	0	2

Objectives

1. To enable the students to prepare and provide accounting information to the interested parties.
2. To enhance their knowledge of the fundamental and technical concepts of accounting.

Unit I: Accounting – Definition – Functions – Advantages – Limitations – Book Keeping – Difference between Accounting and Book- Keeping – Users of Accounting Information - Accounting Principles – Concepts and Conventions – classification of Accounts – Double entry system – Merits – Rules of Debit and Credit – Accounting Equation **(5 hours)**

Unit II: Journal – Procedure of journalizing - Compound Journal Entry - Subsidiary books – Purchase book – Sales book – Purchase Return book – Sales return book – Single Column Cash book (**10 hours)**

Unit III: Ledger – Features of Ledger Accounts – Difference between Journal and Ledger – Ledger Posting – Balancing of Ledger Accounts- Preparation of Ledger Accounts **(4 hours)**

Unit IV: Trial Balance – Features– objectives – Preparation of Trial Balance **(4 hours)**

Unit V: Final Accounts – Simple problems with Closing Stock, Outstanding and Prepaid adjustments only. **(7 hours)**

(30 hours)

Text Books

1. T.S.Reddy & A.Murthy, Advanced Accountancy, Margham Publications, Chennai.
2. S.P.Jain & K.L.Narang, Advanced Accountancy, Kalyani Publishers, New Delhi.

Reference Books

1. M.C.Shukla and T.S.Grewal, Advanced Accountancy, Sultan Chand &Co, New Delhi.
2. Dr.M.A.Arulanandam&K.S.Raman, Advanced Accountancy, Himalaya Publishing House, Mumbai.
3. P.C.Tulsian, Accountancy, Tata McGraw, Hill edition.

II B.COM., CORPORATE SECRETARYSHIP (III SEMESTER) – UNDER CBCS

PART IV-NON- MAJOR ELECTIVE -I (ANY ONE) (ONE COURSE) - 2

CONSUMER AWARENESS

L	T	P	C
2	0	0	2

Objectives

1. To create awareness regarding the intellectual property rights and consumer protection.
2. To explain the students about a better quality of living as consumers.

Unit I: Consumer-Consumerism-Types of consumers (age, sex, behaviour, place of residence, income) – objectives -Goods and services-types-evolution and growth of consumer movement in India and Tamil Nadu. **(5 hours)**

Unit II: Exploitation of consumer-Pricing, adulteration, information and labeling, duplication , artificial demand , Spurious goods , late deliveries , advertising , poor after sales service , warranty and services , fitness , not honouring terms and conditions , for sale and services , financial frauds , credit card frauds and product risks. **(8 hours)**

Unit III: Consumer Rights-Meaning and sources-Six rights of the consumers under Consumer Protection Act-Right to Safety-Information-Choice, be heard, Redressal and consumer education-Consumer Responsibility. **(7 hours)**

Unit IV: Consumer protection-Meaning-Need for consumer protection-How to protect consumers-Legal measures-Consumer Protection Act 1986– objectives -Special features of the Act-Three tier features of the Act-Three tier Redressal Agencies-District level , State level and National level. Consumer Protection (Amendment) Act 2003. **(8 hours)**

Unit V: Model form of complaints-with reference to goods and services-Consumer related cases. **(2 hours)**

(30 hours)

Text Books

1. M.J.Antony , Consumer Rights, Clarion book.
2. Shri Ram Khanna , Saivta Hanunspal Sheetal Kapoor , H.K.Awasthi, Consumer affairs, University Press .

Reference Books

1. R.S.N.Pillai and Bhagavathi, Mordern Marketing Principles and Practices, S.Chand and Company.
2. S.A.Sherlekar, Marketing Management , Himalaya Publication House.
3. Mohine Setr and P.Seetharaman, Consumerism A Growing Concept , Phoenix Publishers, New Delhi.
4. Gulshan & Reddy, Consumer Protection.

II B.COM., CORPORATE SECRETARYSHIP (III SEMESTER) – UNDER CBCS
PART III – SKILL BASED I - CORE
BUSINESS COMMUNICATION

L	T	P	C
4	0	0	4

Objectives

1. To equip the students effectively to acquire skills in reading, writing, comprehension and communication

2. To make them use electronic media for business communication

Unit I: Introduction: Nature and Importance of communication – Types of communication (Verbal & Non Verbal) – Forms of communication – Barriers to communication. **(10 hours)**

Unit II: Business Correspondence: Letter Writing -- Principles of Letter Writing -- Quotations - Orders - Tenders - Sales Letters - Claims and Adjustment Letters – Credit and Collection Letters. **(20hours)**

Unit III: Job Related Communication: Letter of application - Drafting the Application - Elements of Structure of Application - Resume Preparation. **(15hours)**

Unit IV: Attending the Interviews: Types of Interviews - Preparation for Attending the Interview - Before and During the Interview - Interview Process – Tips for Successful Interview. **(5 hours)**

Unit V: Technology and Business Communication: Role and Effectiveness of Technology in Business Communication – Email, Text Messaging, Instant Messaging – Modern Techniques like Video Conferencing, Social Networking – Strategic Importance of E-Communication. **(10 hours)**

(60hours)

Text Books

1. Ragurathan & Santharam, Business Communication, Margham Publication.
2. Ashakaul, Effective Business Communication, Prentice Hall.

Reference Books

1. R.C. Sharma & Krishnamohan, Business Correspondence and Report Writing, Third edition, Tata McGraw Hill.
2. Penrosemesberry, Advanced Business Communication, Myers Thomson South Western.
3. Marry Ellan, Guffey ,Thomson, Business Communication, South Western.
4. P.N. Ghose Rajendra Paul, J.S.Korlahalli, Business Correspondence and Office Management, Sultan Chand and Sons.
5. R.S.N. Pillai, Bagavathi, Office Management, S. Chand & Co.

II B.COM., CORPORATE SECRETARYSHIP (IV SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -9
ADVANCED FINANCIAL ACCOUNTING II

L	T	P	C
6	0	0	4

Objectives

1. To understand the nature and system of accounting followed in Partnership firm.
2. To know the procedures to be followed at the time of Admission, Retirement and Death of a partner in a partnership business.
3. To know the procedures to be followed at the time of dissolution of partnership business.

Unit I: Partnership Accounts – Past adjustments and guarantee. **(15 hours)**

Unit II: Admission of a Partner – Revaluation Account – Adjustment regarding goodwill – Adjustment regarding capital. **(20 hours)**

Unit III: Retirement or Death of a Partner – Retirement and Admission – Death of Partner – Retiring Partner's loan – Joint life policy. **(18 hours)**

Unit IV: Dissolution of partnership – Accounting Procedure – Insolvency of a partner, two partners and all partners – Garner vs. Murray rule . **(22 hours)**

Unit V: Amalgamation of firms - Sale to a company – Gradual Realisation of Assets and Piecemeal Distribution. **(15 hours)**

(90 hours)

Text Books

1. S.P.Jain & K.L.Narang, Advanced Accountancy, Kalyani Publishers, New Delhi.
2. T.S. Reddy & A. Murthy, Advanced Accountancy, Margham Publication, Chennai.

Reference Books

1. R.L. Gupta and M. Radhaswamy, Advanced Accountancy, Volume I, Sultan Chand & Sons, New Delhi.
2. M. Shukla and T.S. Grewal, Advanced Accountancy, Volume I, Sultan Chand &Co., New Delhi.
3. Dr.M.A. Arulanandam & K.S.Raman, Advanced Accountancy Volume I, Himalaya Publishing House , Mumbai.
4. S. P. Ayyangar, Advanced Accountancy, Sultan Chand & Sons, New Delhi.

II B.COM., CORPORATE SECRETARYSHIP (IV SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -10
BUSINESS MATHEMATICS

L	T	P	C
5	0	0	4

Objectives

1. To provide basic knowledge of mathematical techniques as are applicable to business.
2. To provide logical idea to find out practical solutions for the managerial problems.

Unit I: Number systems and equations- Numbers-natural-whole – rational-irrational – real. Equations – linear-quadratic – solutions of simultaneous linear equations with two or three unknowns – solutions of quadratic equations - nature of the roots – forming quadratic equation. **(15 hours)**

Unit II: Indices – Definition – Positive indices – Laws of indices – Negative indices – Zero and unity indices – Fractional indices. Logarithms – Definition –Properties of logarithms-Laws of logarithms-Common logarithm. **(15 hours)**

Unit III: Analytical geometry- Distance between two points in a plane-slope of a straight line – equation of straight line – point of intersection of two lines – applications (1) demand and supply (2) cost-output (3) break-even analysis. **(15 hours)**

Unit IV: Matrices – meaning – types – algebra of matrices – addition and subtraction – scalar multiplication – Multiplication of matrices-transpose of a matrix –Determinant – minors and co-factors –inverse of a matrix – solving simultaneous linear equations using matrix method **(17 hours)**

Unit V: Commercial arithmetic – Simple interest – Compound interest – Depreciation. Discount – true discount – Discounting a Bill of exchange - Banker's discount – Banker's Gain. **(13 hours)**

(75 hours)

Text Books

1. D.S. Sancheti & V.K. Kapoor, Business Mathematics Sultan Chand and Sons, New Delhi.
2. M. Manoharan & C. Elango, Business Mathematics, Palani Paramount Publications, Palani.

Reference Books

1. G.K. Ranganath, Text book of Business Mathematics, Himalaya Publishing House, Delhi.
2. D.C. Sanchetti & B.M. Agarwal, Business Mathematics, Sultan Chand and Sons, New Delhi.

II B.COM., CORPORATE SECRETARYSHIP (IV SEMESTER) – UNDER CBCS
PART III –MAJOR CORE -11
CAPITAL MARKET

L	T	P	C
5	0	0	4

Objectives

1. To understand the meaning and importance of Financial and Capital markets
2. To create an interest among students towards stock market investment

Unit I: Capital market in India: Financial market – structure, capital market – meaning, classification – primary and secondary – Indian securities market – government securities market **(20 hours)**

Unit II : Primary market: Methods of flotation of capital , public issue – IPO –FPO – Procedure of public issue – Book building process – Role of intermediaries – Private placement. **(15 hours)**

Unit III : Secondary market: Functions of stock exchange – Dematerialisation of securities – Depositories – Major stock exchanges in India – BSE – NSE – Listing – Online trading – Clearance and settlement – Rolling settlement – Investment Vs Speculation **(15 hours)**

Unit IV: Derivatives : Meaning – types of derivatives – Commodity Vs Financial Derrivatives – Forwards – Futures – Options – Trading mechanism – Commodity exchanges

(15 hours)

Unit V: Regulatory Framework of stock exchanges: Securities contract (Regulation) Act (basics only) – Role and functions of SEBI –regulatory functions – development functions – Investor protection fund – purpose – operation. **(10 hours)**

(75 hours)

Text Books

1. Kevin.S, Security Analysis and Portfolio Management , PHI, New Delhi.
2. Nair KGC, Dileep A S ,Priya. S, Systematic Approch to Capital Market, Chand Publications, Thiruvananthapuram.

Reference Books

1. Preethi Singh, Dynamics of Indian Financial System and Markets,Tata Mc Graw – Hill Publishing Co. Ltd., New Delhi.
2. Sojikumar. K and Alex Mathew ,Indian Financial System and Markets,Tata Mc Graw – Hill Publishing Co. Ltd., New Delhi.
3. Bharathi. V Pathak, Indian Financial System, Pearson Education, Noida.

II B.COM., CORPORATE SECRETARYSHIP (IV SEMESTER) – UNDER CBCS
PART III – MAJOR CORE-12
IMPORT & EXPORT PROCEDURES

L	T	P	C
5	0	0	4

Objectives

1. To identify the procedures regarding import and export business
2. To motivate the students to involve in business activities

Unit I: Internal and International trade - Difference between Internal and International Trade-Features of International Trade-Advantages and disadvantages of giving protection.

(10 hours)

Unit II : Balance of Trade – Meaning - Balance of Trade Vs Balance of Payments – Components of Balance of payments – Equilibrium and disequilibrium in the balance of payments – causes for disequilibrium – measures for correcting disequilibrium exchange control – meaning – objectives – methods of exchange control. **(25 hours)**

Unit III: Export procedure – preliminary steps in exporting – export documents – documents related to goods – certificates related to shipment – documents related to payment.

(10 hours)

Unit IV: Import procedure – Import of capital goods – EPCG scheme – import under duty exemption scheme – procedure for customs clearance – levy of customs duty kinds of customs duty – imports by export oriented units – export processing zone.

(15 hours)

Unit V: Export promotion – objectives – organizational set up – Incentives – marketing assistance – import facilities for exports – major problems of India's export sector.

(15 hours)

(75 hours)

Text Book

Francis Cherunilam, International Trade and Export Management, Himalaya Publishing House, New Delhi.

Reference Book

D.K. Jhurara, Export Management, Galgotia Publishing Company, New Delhi.

II B.COM., CORPORATE SERETARYSHIP (IV SEMESTER) – UNDER CBCS

PART III – ALLIED -IV

CORPORATE FINANCE

L	T	P	C
3	-	-	3

Objectives

1. To understand the corporate finance
2. To know the capital structure and capitalization
3. To know the working capital management, financial system and capital market

Unit I: Corporate Finance – Definition - Scope and importance - Finance function - classification of finance function. **(7 hours)**

Unit II: Capital structure – Financial and operating leverage - Long term and Short term capital. **(10 hours)**

Unit III: Capitalization – Over capitalization – Under capitalization –Capital gearing. **(10 hours)**

Unit IV: Working capital management – Determination of working capital –importance – financing of working capital management. **(10 hours)**

Unit V: Financial systems – money markets – capital markets –recent trends in capital markets. **(8 hours)**

(45 hours)

Text Books

1. Kulkarni, Corporate Finance, Popular Prakashan Publisher.
2. Vasant Deshi, Indian Financial System, Himalaya Publishing House Pvt.,Ltd.

Reference Books

1. I.M.Pondey, Financial Management, Vikas Publishing House.
2. Dr.P.Srirenganayaki, Financial Services, Charulatha Publications.

II B.COM., CORPORATE SECRETARYSHIP (IV SEMESTER) – UNDER CBCS

PART IV- NON – MAJOR ELECTIVE -II (ANY ONE) (ONE COURSE) - 1
FINANCIAL ACCOUNTING

L	T	P	C
2	0	0	2

Objectives

1. To explain the concept and role of Accounting and financial reporting in the modern marketing economy.
2. To explain the regulatory frame work for the operation of fundamental accounting

Unit I: Average Due Date- Utility of average due date- Problems. **(5 hours)**

Unit II: Bank Reconciliation Statement – Meaning causes of difference between balance as per cash book and pass book – Need of Bank Reconciliation Statement – Preparation of Bank Reconciliation Statement **(7 hours)**

Unit III: Self balancing Ledger – general ledger- debtors ledger- creditors ledger- Sectional balancing system. **(8 hours)**

Unit IV: Depreciation – Meaning – Causes – Straight Line method and Written down value method – Simple problems only **(7 hours)**

Unit V: Rectification of Errors- Classification of errors- suspense account- rectifying accounting entries (simple problem only). **(3 hours)**

(30 hours)

Text Books

1. Dr.M.A.Arulanandam&K.S.Raman, Advanced Accountancy, Himalaya Publishing House, Mumbai.
2. P.Jain & K.L.Narang, Advanced Accountancy, Kalyani Publishers, New Delhi.

Reference Books

1. M.C.Shukla and T.S.Grewal, Advanced Accountancy, Sultan Chand &Co, New Delhi.
2. T.S.S. Reddy & A.Murthy, Advanced Accountancy, Margham Publications, Chennai.
3. P.C.Tulsian, Accountancy, Tata McGraw- Hill Company.

II B.COM., CORPORATE SECRETARYSHIP (IV SEMESTER) – UNDER CBCS

PART IV - NON – MAJOR ELECTIVE -II (ANY ONE) (ONE COURSE) - 2
HUMAN RIGHTS

L	T	P	C
2	0	0	2

Objectives

1. To understand the basic concepts of human rights
2. To have an understanding of the relationship between individual, group, and national rights

Unit I: Human Rights- Definition of Human Rights - Characteristics of human rights - kinds of Human Rights - Civil and political – social, economic and cultural rights **(5 hours)**

Unit II: Violation of human rights - Patterns of violations and abuses - Action against violation of human rights as per Indian law **(7 hours)**

Unit III: Rights of the Disabled Persons - Declaration on the rights of disabled persons 1975 - International year of disabled persons 1981 **(5 hours)**

Unit IV: Bonded labour - Concepts and definitions - Constitutional and legal provisions - Salient features of bonded labour system (abolition) Act 1976 - Role of the national human rights commission **(10 hours)**

Unit V: Minorities Rights commission & its functions - Definitions - National commission for minorities - Functions of the commissions **(3 hours)**

(30 hours)

Text Books

1. Paras Diwan, Peerushi Dewan, Human Rights and Law.
2. Dr. Giriraj Shah, IPS & K.N. Gupta, Human Rights, IPS.
3. Jagannath Mohany, Teaching of Human Rights.

Reference Books

1. C. Nirmala Devi, Human Rights.
2. Concepts, Theories and Practice of Human Rights, Praveen Vadkar, Neha Publishers.
3. Baradat Sergio and Swaranjali Ghosh, Teaching of Human Rights, Dominant Publishers and Distributors, New Delhi, 2009.
4. Roy.A.N., Human Rights Tasks, Duties and Functions: Aavishakar Publications and Distributors, Jaipur.
5. Asish Kumar Das and Prasant Kumar Mohanty, Human Rights in India: Sarup and Sons, New Delhi.

II B.COM., CORPORATE SECRETARYSHIP (IV SEMESTER) – UNDER CBCS
PART III - SKILL BASED II - CORE
ENTREPRENEURSHIP DEVELOPMENT

L	T	P	C
4	0	0	4

Objectives

1. To develop and strengthen the entrepreneurial quality among the students
2. To know the sources of help and support available for starting a small-scale Industry.

Unit I: Entrepreneurship Essentials- Evolution – Characteristics –Type. Functions of Entrepreneurs – Qualities of Successful Entrepreneurs – Entrepreneur Vs Entrepreneurship – Entrepreneur Vs Intrapreneur – Growth of Entrepreneurship in India. **(15 hours)**

Unit II: Entrepreneurship Dimensions– Entrepreneurial Culture – Entrepreneurial Society – Entrepreneurship Development – Training and other Support Organisational Services - Women Entrepreneurship and Rural Entrepreneurship. **(15 hours)**

Unit III: Project Appraisal- Introduction – Meaning and Methods of Project Appraisal – Economic Appraisal –Financial –Market –Technological Appraisal –Managerial Competence. **(10 hours)**

Unit IV: Launching of New Business- Step by Step Approach for searching New Business – Pre-Launch –Launch –Post-Launch – Entrepreneur to Enterprise –Stage of Start Up and Scale Up –List of Organisations to be Contacted. **(10 hours)**

Unit V: Management of Small Business- Monitoring and Evaluation of Business – Preventing Sickness and Rehabilitation of Business units –Effective Management of Small Business. **(10 hours)**

(60 hours)

Text Books

1. Khanka S.S., Entrepreneurial Development, S. Chand Publishing Company, New Delhi, 1999.
2. Gupta C.B., and Srinivasan N.P., Entrepreneurial Development, Sultan Chand & Sons, New Delhi, 2015.

Reference Books

1. Robert D. Hisrish, Michael P.Peters, Tata McGraw- Hill Publishing Company, New Delhi, 2002.
2. Vasant Desai., Dynamics of Entrepreneurial Development & Management, Himalaya Publishing House, Fifth Edition (2012), New Delhi.

III B.COM., CORPORATE SECRETARYSHIP (V SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -13
CORPORATE ACCOUNTING I

L	T	P	C
5	0	0	4

Objectives

1. To study the issue, allotment and forfeiture of shares of companies.
2. To prepare final accounts according to Companies Act, 2013.
3. To know how to value the goodwill and shares.

Unit I: Issue of shares- Issue at par, Premium and discount- Forfeiture and Re-issue of shares – Pro rata allotment- Redemption of preference shares. Issue of debentures (Excluding reduction of debentures). **(22 hours)**

Unit II: Final Accounts of Companies-as per Schedule II of Companies Act 2013 – excluding managerial remuneration. **(13 hours**)

Unit III: Amalgamation, Absorption and External Reconstruction - Methods of Purchase consideration. (Simple Problems only) (**18 hours)**

Unit IV: Profit Prior to Incorporation- Under Writing of shares or debentures. **(10 hours)**

Unit V: Valuation of Goodwill and Shares- Various methods of valuation of goodwill and shares. **(12 hours)**

(75 hours)

Text Books

1. S.P.Jain & K.L.Narang, Advanced Accountancy, Kalyani Publishers, New Delhi.
2. T.S.Reddy & A.Murthy,Corporate Accounting, Margham Publications, Chennai.

Reference Books

1. R.L.Gupta and M.Radhaswamy, Advanced Accountancy, Sultan Chand &Sons, New Delhi.
2. M.C.Shukla and T.S.Grewal, Advanced Accountancy, Sultan Chand &Co., New Delhi.
3. Dr.M.A.Arulanandam&K.S.Raman, Advanced Accountancy, Himalaya Publishing House, Mumbai.
4. P.C.Tulsian, Corporate Accounting, Tata McGraw Hill Companies.

III B.COM., CORPORATE SECRETARYSHIP (V SEMESTER) – UNDER CBCS
PART III – MAJOR CORE - 14
COST ACCOUNTING

L	T	P	C
4	0	0	4

Objectives

1. To acquire the basic knowledge of cost in business concerns.
2. To understand the techniques of cost control.

Unit I: Introduction – Cost – Costing – Cost Accounting – Objectives and Functions of Cost Accounting – Advantages and Limitations – Methods of Costing – Types of Costing – Classification of Cost – Elements of Cost – Cost Sheet, Practical problems. **(10 hours)**

Unit II: Process Costing – Costing procedures – Losses and Gains in process – Normal and Abnormal Losses – Abnormal Gain –Practical problems. **(10 hours)**

Unit III: Marginal Costing – Meaning – Definition – Uses and Limitations – CVP Analysis – Marginal Costing Equations – Contribution – Break Even Analysis – P/V Ratio – Margin of Safety – Key Factors – Break Even Chart. **(15 hours)**

Unit IV: Budgetary Control – Budget - Definition – objectives – Budgeting – Advantages and Limitations – Classification of Budgets- Flexible Budgets – Production and Sales Budgets – Cash Budget. **(15 hours)**

Unit V: Standard Costing – Definition – Advantages and Limitations – Variances – Material Variances – Labour Variances – (Overhead and other Variances excluded) – Simple Practical problems. **(10 hours)**

(60 hours)

Text Books

1. R.S.N.Pillai&V.Bagavathi, Cost Accounting, S.Chand & Company LTD, Ramnagar, New Delhi.
2. S.P.Jain & Narang, Cost Accounting, Kalyani Publishers, Ludhiana.

Reference Books

1. S.P.Iyenger , Cost and Management Accounting, Sultan Chand &Sons, New Delhi.
2. A. Murthy, S. Guruswamy, Vijay Nilcole Cost Accounting, Imprints Private Limited , Chennai.
3. T.S. Reddy and Hariprasad Reddy, Cost Accounting, Margham Publications.
4. K, Alex, Cost Accounting, Dorling Kindersley (India) Pvt. Ltd, Noida.

III B.COM., CORPORATE SECRETARYSHIP (V SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -15
BUSINESS LAW

L	T	P	C
5	0	0	4

Objectives

1. To understand the definition of business law
2. To study the scope and boundaries of business law.

Unit I: Indian Contract Act, 1872 – Fundamental essentials of a valid contract – classification of contracts – offer – acceptance – consideration – capacity – free consent – legality of object – contingent contracts. **(13 hours)**

Unit II: Performance of contract – discharge of contract - breach of contract – remedies – quasi contracts. **(12 hours)**

Unit III: Special contracts – indemnity – guarantee. **(20 hours)**

Unit IV: Bailment – Pledge – contract of agency. **(15 hours)**

Unit V: Sale of goods Act – differences between sale and agreement to sell – sale and hire purchase agreement – classification of goods – documents of title to goods – rights and duties of buyers and sellers – rights of unpaid seller. **(15 hours)**

(75 hours)

Text Books

1. N.D . Kapoor, Elements of Mercantile Law, Sultan Chand & Sons.
2. S.M.Sundaram , Business Law / Commercial and Industial Law, Sree Meenakshi Publication, Karaikudi.

Reference Books

1. N.D . Kapoor, Business Law , Sultan Chand & Sons.
2. P.C. Tulsian , Business Law , Tata Mc Graw Hill Companies.
3. R.S.N. Pillai , Bagavathy, Business Law, S.Chand & Co., New Delhi.
4. M.C.Kuchhal, Business Law , Vikas Publishing House, Pvt. Ltd.
5. Dr.H.K. Saharay & N.K.Saha, Elements of Business Law, New Central Book Agency.

III B.COM., CORPORATE SECRETARYSHIP (V SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -16
RESEARCH METHODOLOGY

L	T	P	C
4	0	0	4

Objectives

1. To understand the basic concepts of research and its methodologies.
2. To organize and conduct research in a more appropriate manner.

Unit I: Introduction to Research – Types of Research – Significance of Research – Research methods vs. Methodology – Research – Research process – Criteria of Good Research. **(10 hours)**

Unit II: Research Design – Meaning of Research design – need for research design – features of a good design – different research designs. **(10 hours)**

Unit III: Design of sample surveys – sample design – sample survey Vs census survey – Types of sampling designs – Non probability sampling – probability sampling – Complex random sampling design. **(10 hours)**

Unit IV: Data Collection and preparation – Collection of Primary Data – Methods of Collecting Primary Data - Guidelines for Constructing Questionnaire / Schedule- Difference between Questionnaire and schedule - Collection of secondary data – Data Preparation process. **(15 hours)**

Unit V: Interpretation and report writing – Meaning of interpretation – techniques of interpretation – precautions in interpretation – significance of report writing – different steps in writing report – layout of the research report – mechanics of writing a research report – precautions for writing research report. **(15 hours)**

(60 hours)

Text Book

C.R. Kothari, Gau Rav Garg, "Research Methodology methods and techniques", New International Publishers.

Reference Books

1. P. Ravilochanan, "Research Methodology", Margham Publications.
2. P. Saravanavel, " Research Methodology", Kidap Publications.

III B.COM., CORPORATE SECRETARYSHIP (V SEMESTER) – UNDER CBCS
PART III – MAJOR ELECTIVE -1 (ANY ONE) (ONE COURSE) - 1
INCOME TAX LAW & PRACTICE I

L	T	P	C
4	0	0	4

Objectives

1. To understand the basic concepts of income tax
2. To study the provisions regarding computation of first three heads of income i.e., salary, house property and business income.

Unit I: Basic Concept – Person, Assesses, previous and assessment year, total income, gross total income – concept of income – Agricultural Income. **(8 hours)**

Unit II: Income exempted from tax – Residential status –incidence of taxation - problems. **(12 hours)**

Unit III: Income from Salary – different forms of salary and allowance – perquisites – problems in computation of salary income. **(15 hours)**

Unit IV: Income from House property – Annual value – Standard deduction – Unrealized rent – problems in computation of house property income. **(10 hours)**

Unit V: Income under the Head Business or profession – allowable expenses – Expressly disallowed expenses – computations – problems in computation of business or professional income. **(15 hours)**

(60 hours)

Text Books

1. Dr. H.C. Mehrotra and Dr. S.P. Goyal, Income tax Law and Accounts, Sahitya Bhawan Publications, Agra.
2. V.P. Gaur, D.B. Narang, Pooja Ghai and Rajeev Puri, Income tax Law and Practice, Kalyani Publishers, New Delhi.

Reference Books

1. A.Murthy, Income Tax Law and Practice Assessment Tear - 3rd Edition, Vijay Nicole Imprints Private Limited.
2. B.B. Lal, Income Tax, Darling Kindersley Pvt. Ltd, Noida.

III B.COM (CORPORATE SECRETARYSHIP) (V SEMESTER) – UNDER CBCS
PART III –MAJOR ELECTIVE - I (ANY ONE) (ONE COURSE) - 2
APPLICATION OF TALLY IN ACCOUNTING

L	T	P	C
2	0	2	4

Objectives

1. To impart practical knowledge regarding the concepts of Financial Accounting.
2. To get placement for students in different offices as well as Companies.

Unit I: Fundamentals of Tally.ERP 9-Introduction –salient features of Tally. ERP 9, Getting functional with Tally ERP 9, start up, Quitting Tally. ERP 9 – Create a Company, select a Company, Alter a Company, Shut a Company –Company Features –Configurations.

Unit II: Create Accounting Masters in Tally. ERP 9 –Groups- Pre-defined Groups of Accounts, Creating Single Group, Creating Multiple Groups, Displaying Groups, Altering Group-Ledgers-Creating single ledger, Creating Multiple Ledger, Displaying Ledger, Altering Ledger.

Unit III: Creating Inventory of masters in Tally. ERP 9- Stock Groups-Creating Single, Multiple Stock Group, Displaying and Altering Stock Groups. Stock Categories –Creating Single, Multiple Stock Categories, Displaying and Altering Stock Category- Units of Measure,Godowns- Creating Single Multiple Godowns, Displaying and Altering Godowns-Stock Items- Creating Single, Multiple Stock Items, Displaying and Altering Stock Items.

Unit IV: Voucher Entry In Tally. ERP 9- Voucher Types- Predefined vouchers in Tally. ERP 9, Creating Voucher Type, Displaying voucher Type, Altering Voucher Types – Financial Statements –Balance Sheet, Profit&loss A/c, Trial balance.

Unit V: **Accounting Books &Reports ERP 9**- Cash book, Bank Book, Purchase Register, Sales Register, Journal Register, Debit Note Register, Credit Note Register, Day Book, Statistics, Bank Reconciliation Statement.

Text & Reference Books:

1. Using Tally ERP 9, Ramesh.Bangia,Khanna Book Publishing Ltd.2010
2. Mastyering Tally ERP 9, Asok K.Nadhani,BPB Publication.
3. Tally ERP 9 Training Guide,Kitabmahal.

Tally Practicals

1. Preparation of Trial balance
2. Balance Sheet
3. Final A/c with Simple Adjustment
4. Subsidiary Books
5. Petty Cash Book
6. Creation of Stock Item, Stock Groups and Stock Categories
7. Sales Invoice
8. Bank Reconciliation Statement Preparation

SCHEME OF EXAMINATION

Internal - 50 marks

(Theory -25marks , Practical- 25 marks)

Theory (25 marks)

i). The average of best two test
out of three tests - 20 marks

ii). Assignment - 05 marks

Practical (25 marks)

Record Note - 05 marks
Program / Procedure Writing (5x2) - 10 marks
Debugging (2.5 x 2) - 5 marks
Result (2.5 x 2) - 5 marks

External : 50 marks (Practical only)

i). There is no external theory examination for this subject only practical should be conducted as external examination

Practical marks should be awarded as follows **:**

Record Note - 10 marks
Program / Procedure Writing
(10 x 2) - 20 marks
Debugging (5 x 2) - 10 marks
Result (5 x 2) - 10 marks

ii). Practical Examination should be conducted by both internal and external examinations

III B.COM., CORPORATE SECRETARYSHIP (V SEMESTER) – UNDER CBCS
PART III – MAJOR ELECTIVE - I (ANY ONE) (ONE COURSE) - 3
LOGISTIC MANAGEMENT

L	T	P	C
4	0	0	4

Objectives

1. To understand the role of logistic management in growth of business
2. To understand the functional areas in logistics

Unit I: Logistics - Meaning - Importance - Logistical Competency - Logistical Mission - Service - Total Cost - Logistical Renaissance - Technological Advancement - Regulatory Change - IT Revolution. **(8 hours)**

Unit II: Work of Logistics - Network design - information - Transportation and Inventory - Warehousing - material handling - packaging - integrated Logistics. **(10 hours)**

Unit III: Operating - Rapid response - minimum variance - minimum inventory - movement consideration - quality - Life cycle support - barriers to internal integration in organizational structure - measurement system. **(12 hours)**

Unit IV: Information functionality and inventory functionality - principles of logistics information - Information Architecture - planning - operations - Logistics Information flow - application of new information technologies - electronic data interchange standards - inventory determining order point - lot size. **(15 hours)**

Unit V:Transportation infrastructure - transport functionality - principles - modal classification transportation formats - suppliers of transportation service - storage functionality principles - concept of strategic storage - developing warehouse resource - warehouse strategy. **(15 hours)**

(60 hours)

Text Books

1. Satish C. Ailawadi and Rakesh P. Singh, Logistics Management, PHI Learning Pvt. Ltd., New Delhi.
2. S. K. Bhattacharya, Logistics Management, S.Chand Publishing, New Delhi.

Reference Books

1. Agarwal D K, Textbook of Logistics And Supply Chain Management.
2. Donald J Bowersox, David J. Closs ,Logistical Management (Integrated supply chain Process), Tata McGraw-Hill Companies.
3. Donald J. Bowersox, David J. Closs, and M. Bixby Cooper, Supply chain Logistics Management, Tata McGraw-Hill Companies.
4. Prof. Martin Christopher, Logistics & Supply Chain Management.

III B.COM., CORPORATE SECRETARYSHIP (V SEMESTER) – UNDER CBCS
PART IV – SKILL BASED -1II - COMMON
PERSONALITY DEVELOPMENT / EFFECTIVE COMMUNICATION / YOUTH LEADERSHIP

L	T	P	C
2	0	0	2

III B.COM (CORPORATE SECRETARYSHIP) (V SEMESTER) – UNDER CBCS
PART III – MINI PROJECT

L	T	P	C
6	0	0	3

Objectives

1. To enable the learners to apply their conceptical knowledge in a practical situation
2. To learn the act of conducting a study and presenting its findings in the form of a rational report**.**

Guidelines for Mini project

- Group project with the maximum number of 5 students in a group.
- The topic should be subject related.
- Each group must have a guide / project supervisor.
- The project should have minimum 30 pages.
- Mini project can be in the form of case study/ field survey.
- Students must investigate a problem, examine the alternative solutions and propose the most effective solutions.
- The report should consist of introduction, identifying the key problems, background stating the important relevant facts and important issues, proposed solution and recommendations.
- Evaluation will be based on the project report, presentation and viva voce.

III B.COM., CORPORATE SECRETARYSHIP (VI SEMESTER) – UNDER CBCS

PART III – CORE -17

CORPORATE ACCOUNTING II

L	T	P	C
5	0	0	4

Objectives

1. To know the preparation of liquidator's final statement of accounts.
2. To prepare the final accounts of banking company in a schedule form
3. To train the students to prepare final accounts under double account system.

Unit I : **Introduction**- Liquidator's final statement of accounts. **(13hours)**

Unit II: **Accounts of Banking Companies** – Rebate on Bills discounted- Final Accounts. **(20 hours)**

Unit III: **Double Account System**- Accounts of Electricity companies - Replacement of Asset - Calculation of Reasonable Return- Disposable of surplus. **(12 hours)**

Unit IV: **Holding companies**- Preparation of Consolidated balance sheet. **(22 hours)**

Unit V: **Human Resource accounting** –Objectives -Methods of Human Resource Value Accounting. **(8 hours)**

(75 hours)

Text Books

1. S.P.Jain & K.L.Narang, Advanced Accountancy, Kalyani Publishers, New Delhi.
2. T.S.Reddy & A.Murthy,Corporate Accounting, Margham Publications, Chennai.

Reference Books

1. R.L.Gupta and M.Radhaswamy, Advanced Accountancy, Sultan Chand &Sons, New Delhi.
2. M.C.Shukla and T.S.Grewal, Advanced Accountancy, Sultan Chand &Co., New Delhi.
3. Dr.M.A.Arulanandam&K.S.Raman, Advanced Accountancy, Himalaya Publishing House, Mumbai.
4. P.C.Tulsian, Corporate Accounting, Tata McGraw Hill Companies.

III B.COM., CORPORATE SECRETARYSHIP (VI SEMESTER) – UNDER CBCS

PART III – CORE -18

MANAGEMENT ACCOUNTING

L	T	P	C
4	0	0	4

Objectives

- To familiarise the students with the basic management accounting concepts and their applications in managerial decision- making

Unit I: Management accounting – Meaning – Definition – Nature and Scope – Utility and Limitations – Management accounting Principles – Functions of Management accounting – Tools of Management accounting - Management accounting and Financial accounting – Cost accounting and Management accounting. **(5 hours)**

Unit II: Ratio Analysis – Meaning of Ratios – Classification of Ratios – Analysis and Interpretation of different Ratios – Profitability Ratios – Coverage Ratios – Turnover Ratios – Financial Ratios – Uses and Limitations of Ratio Analysis. **(15 hours)**

Unit III: Fund Flow Analysis – Meaning of Fund Flow Statement – Uses of Fund Flow Statement – Parties interested in Fund Flow Statement – Preparation of Fund Flow Statement – Treatment of provision for Taxation, Proposed Dividend and Depreciation – Statement of Changes in Financial position. **(15 hours)**

Unit IV: Cash Flow Analysis – Meaning of Cash Flow Statement – Preparation of Cash Flow Statement (Simple problems only) – Utility and Limitations of Cash Flow Analysis. **(10hours)**

Unit V: Capital Budgeting – Concepts of Capital Budgeting – Importance of Capital Budgeting – Capital Budgeting Process –Traditional methods – Pay- back period method – Net Present Value method -(Simple problems only). **(15 hours)**

(60 hours)

Text Books

1. R.S.N.Pillai & Bagavathi, Management Accounting, S.Chand &Company, New Delhi.
2. T.S.Reddy & Y.Hariprasad Reddy, Management Accounting, Margham Publications, Chennai.

Reference Books

1. Dr.S.N.Maheswari, Principles of Management Accounting, Sultanchand&Sons, NewDelhi.
2. S.P.Jain&K.L.Narang, Cost and Management Accounting, Kalyani Publishers, Ludhiana.
3. S.P.Iyenger, Cost and Management Accounting, Sultanchand&Sons, NewDelhi.
4. A. Murthy, S. Guruswamy, Management Accounting-Theory & Practice, Vijay Nicole Imprints Private Limited , Chennai.
5.

III B.COM., CORPORATE SECRETARYSHIP (VI SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -19
INDUSTRIAL LAW

L	T	P	C
5	0	0	4

Objectives

1. To acquaint knowledge on industrial relations framework in our country
2. To study various rights and benefits available to the workmen under the legislations.

Unit I : The Factories Act, 1948- definitions - approval, licensing and registration of factories - duties of occupier - inspecting staff - certifying surgeons - provisions for health – safety – welfare - working hours and holidays- employment of young persons and women – annual leave with wages- penalties and procedure. **(18 hours)**

Unit II : Workmen's compensation Act 1923 - Scope and coverage - definitions – rules - personal injury by accident - occupational diseases arising out of and in the course of employment - theory of national extension - amount of compensation- distribution of the compensation- notice and claim. **(16 hours)**

Unit III: Industrial Disputes Act 1947- object - definitions- conciliation - machinery- adjudication machinery- powers and duties of authorities - procedures - voluntary reference to arbitration – award - strike – and lock outs – lay off – retrenchment – transfer and closing down of their undertaking – penalties. **(21 hours)**

Unit IV: The Trade Unions Act, 1926 – Consumer Act 1986 **(10 hours)**

Unit V: The Employees' State Insurance Act 1948 – The payment of Gratuity Act 1972. **(10 hours)**

(75 hours)

Text Books

1. N.D . Kapoor, Elements of Mercantile Law, Sultan Chand & Sons.
2. S.M.Sundaram , Business Law / Commercial and Industial Law, Sree Meenakshi Publication, Karaikudi.

Reference Books

1. Sahanay, H.K, Commercial and Industrial Law, New Central Book Agency.
2. Goswami, V.G , Labour and Industrial Laws, Central Law Agency.
3. Sengupte , Commercial and Industrial Law, New Central Book Agency.
4. S.N. Mithra, Industrial Law.

III B.COM., CORPORATE SECRETARYSHIP (VI SEMESTER) – UNDER CBCS
PART III –CORE - 20

AUDITING

L	T	P	C
4	0	0	4

Objectives

1. To know the importance of audit in commercial and non-commercial organizations.

2. To understand the procedures to be followed while auditing the business organizations.

Unit I: Introduction – meaning- objectives – difference between accountancy and Auditing – advantages – limitations – audit programme – audit working papers – preliminaries before audit . **(10 hours)**

Uniut II: Internal check – meaning- objectives – difference between internal control and internal audit – advantages and disadvantages of internal check. **(15 hours)**

Unit III: Vouching – meaning – objects – importance of vouchers – precautions to be taken by the auditors while examining vouchers – vouching of various transactions.

(15 hours)

Unit IV: Verification and valuation of assets and liabilities – classification of assets – verification of different types of assets – valuation of investment, stock -in -trade and book debts. **(10 hours)**

Unit V: Company auditor - appointment – qualification and disqualification – removal of an auditor – status – rights – duties and liabilities – auditor's report.

(10 hours)

(60 hours)

Text Books

1. Saxana, Reddy and Appannaiah, Text Book of Auditing, Himalaya Publishing House.
2. Dr.T.R. Sharma, Auditing, Sahitya Publication, Agra.

Reference Books

1. B. N. Tandon, Auditing, S. Chand & Co., New Delhi.
2. Dinkar Pagare, Principles and Practice of Auditing, Sultan Chand & Sons, New Delhi.

III B.COM., CORPORATE SECRETARYSHIP (VI SEMESTER) – UNDER CBCS
PART III – MAJOR ELECTIVE – II (ANY ONE) (ONE COURSE) -1
INCOME TAX LAW & PRACTICE II

L	T	P	C
4	0	0	4

Objectives

1. To know the procedure for assessment and types of assessment.

2. To understand the computation of tax liability of individuals

Unit I: Income from capital gain – Types – Exemptions – Computation – problems in computation of capital gain. **(10 hours)**

Unit II: Income under the head other sources – Computation – Problems. **(12 hours)**

Unit III: Set off and carry forward of losses - Problems. **(11 hours)**

Unit IV: Deduction from Gross total Income- Problems - Procedures for Assessment – Returns – Types of returns – Types of Assessment – Tax Deducted at source. **(15 hours)**

Unit V: Assessment of Individual – Problems including computation of tax. **(12 hours)**

(60 hours)

Text Books

1. Dr. H.C. Mehrotra and Dr. S.P. Goyal, Income tax Law and Accounts, Sahitya Bhawan Publications, Agra.
2. V.P. Gaur, D.B. Narang, Pooja Ghai and Rajeev Puri, Income tax Law and Practice, Kalyani Publishers, New Delhi.

Reference Books

1. A.Murthy, Income Tax Law and Practice Assessment Tear - 3rd Edition, Vijay Nicole Imprints Private Limited, 2015-16.
2. B.B. Lal, Income Tax, Darling Kindersley Pvt. Ltd, Noida.

III B.COM., CORPORATE SECRETARYSHIP (VI SEMESTER) – UNDER CBCS
PART III – MAJOR ELECTIVE -II (ANY ONE) (ONE COURSE) - 2
RETAIL MANAGEMENT

L	T	P	C
4	0	0	4

Objectives

1. To explore the functionalities in the retail management
2. To understand the retail management concepts

Unit I: Introduction to retailing - nature and importance of retailing - contemporary retailing in India and marketing challenges facing retailers - Strategic planning in retailing - owning or managing business - retailing life cycle. **(15 hours)**

Unit II: Types of retailing institutions - retailing institutions by ownership - retailing institutions by store based and non-store based - vertical marketing system - traditional retailing. **(10 hours)**

Unit III: Strategic planning in retailing - understanding retailing environment - identifying and understanding customers, information gathering. **(10 hours)**

Unit IV: Location and organizational decisions - Trading area analysis site selection - organizational pattern in retailing - operational management - financial decisions - use of technology. **(10 hours)**

Unit V: Merchandise Management - Buying and handling - product assortment decision - Inventory Management - Merchandise pricing - Merchandise Labelling and packing - Role of atmosphere - retail promotion mix strategy - retail store sales promotion schemes. **(15 hours)**

(60 hours)

Text Books

1. Gibson G. Vedamani, Retail Management: Functional Principles & Practices, Jaico Books.
2. Swapna Pradhan, Retailing Management, Tata McGraw-Hill Publishing Company Limited, New Delhi.

Reference Books

1. Michael Levy and Barton A Weot, Retail Management, McGraw-Hill Irwin.
2. Cox, Roger and Paul Brittain, Retail Management, Prentice Hall, Harlow.
3. Michael Levy, Barton A Weitz, Ajay Pandit, Retailing Management, McGraw-Hill Company.
4. Berman Barry, Evans Joel R., Retail Management: A Strategic Approach, Pentice Hall of India.

III B.COM., CORPORATE SECRETARYSHIP (VI SEMESTER) – UNDER CBCS
PART III – MAJOR ELECTIVE -II (ANY ONE) (ONE COURSE) - 3
VALUES & ETHICS FOR BUSINESS

L	T	P	C
4	0	0	4

Objectives

1. To understand values in business
2. To inculcate the ethical practices in business among the students

Unit I:Introduction to Values - Values in the society, politics, inter-personal relations, economics and business- Morals - Value and Vision statements in organizations - Focusing on Innovation, Reliability, Customer satisfaction, Quality assurance, Profitability, Utility, Productivity etc. and the continuous improvement in their standards. **(15 hours)**

Unit II: Ethics as the art of choosing between right and wrong – Interpreting the consequences and choosing the right- Ideas of freedom of choice, equality, justice, fairness in dealing with customers, society, environment . Application of Values and ethics in business - Examples from Business. **(10 hours)**

Unit III:Government interactions: Use and Misuse of government incentives, subsidies and licenses - Tax evasions. Ethics in Human Resources employment in Business: in hiring, compensating, work assignments - discrimination; Marketing: ethics in Pricing policies and strategies, misleading advertisements; Policies relating to exchange and return of goods sold. **(15 hours)**

Unit IV:Ethics in Production: Poor quality, risky products, defective/untested products, unauthorized copies/imitations, Quality Policy: Zero defect and quality of ingredients, components, ISI, AG Marks, Hall Mark, Patents, Copy rights, post-sales services. **(10 hours)**

Unit V: Legal and self imposed norms- for doing good business and earning goodwill. Handling customer complaints, Problems- examples from consumer goods and services oriented industries (Tourism, Travel, Telephones, Edible goods, Health etc.) **(10 hours)**

(60 hours)

Text and Reference books

1. Colin M. Fisher and Alan Lovell, Business Ethics and Values, F.T. Prentice Hall, 2006.
2. G.P. Martin, Glenn Martin, Human Values and Ethics in the Work place, 2010.

III B.COM., CORPORATE SECRETARYSHIP (VI SEMESTER) – UNDER CBCS
PART III - MAJOR PROJECT

L	T	P	C
8	0	0	4

Objectives

1. To impart knowledge and develop understanding of research methodology and its applications

2. To study the methods of data collection and its interpretation to develop analytical skills in generalization of things and concepts

Guidelines for group project

1. The topic should be subject related.
2. Each group can consist of a maximum number of 5 students
3. The project report should have minimum 50 pages.
4. Each group must have a guide/ project supervisor.
5. The project should necessarily contain title, statement of the problem, brief and representative review of literature, objectives of the study, research methodology (sampling, collection of data and tools of analysis), scope / rationale / limitations of proposed study, contents (chapters) and bibliography.
6. The project report must have the following- Cover page, declaration by the guide and candidate, preface and acknowledgement, table of contents, main body (chapters), research instruments (questionnaire), appendix and annexure (if needed) , bibliography.
7. Evaluation will be based on the project report, presentation and viva voice.

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI
UG COURSES – AFFILIATED COLLEGES

B.A. Economics

(Choice Based Credit System)
(with effect from the academic year 2017-2018 onwards)

III - Semester

Part I	Subject Status	Subject	Hours	Credits
I	Language	Tamil	06	04
II	Language	English	06	04
III	Core 5	Mathematical Methods I	06	04
	Allied III	Entrepreneurial Development I	03	03
	Skill based Core 1	International Economics I	04	04
IV	Non Major Elective I	Economics for Competitive Examination I	02	02
		Filed Work II	03 + 01*	02
	Common 3	Yoga	02	02
Total			30	25

*** Extra Hour**

IV - Semester

Part I	Subject Status	Subject	Hours	Credits
I	Language	Tamil	06	04
II	Language	English	06	04
III	Core 6	Mathematical Methods II	04	04
	Allied IV	Entrepreneurial Development II	03	03
	Skill based Core 2	International Economics II	04	04
IV	Non Major Elective 2	Economics for Competitive Examination II	02	02
	Common 4	Computers for Digital Era	02	02
		Field Work III	03 + 01*	02
V	Extension Activities I	NSS, NCC, YRC, YWF	---	01
Total			30	26

*** Extra Hour**

V - Semester

Part I	Subject Status	Subject	Hours	Credits
III	Core 7	Macro Economics I	06	04
	Core 8	Public Finance I	04	04
	Core 9	Money and Banking I	05	04
	Core 10	Indian Economy I	04	04
	Major Elective I	Labour Economics	04	04
IV	Skilled based Common I	Personality Development / Effective Communication/ Youth Leadership	02	02
		Mini Project I	05	04
Total			30	26

VI - Semester

Part I	Subject Status	Subject	Hours	Credits
III	Core 11	Macro Economics II	06	04
	Core 12	Public Finance II	04	04
	Core 13	Money and Banking II	05	04
	Core 14	Indian Economy II	04	04
	Major Elective II	Planning and Growth	04	04
		Major Project I	07	04
Total			30	24

Total Hours: 180
Total Credits: 145
145-04- 141 (Excluding yoga and computer for digital era)
Core Subjects: 14
Major Elective: 02
Allied: 04
Common: 04
Non-Major Elective: 02
Extension Activities: 01
Major Project: 01
Skill Based Common: 04
Mini Project: 01
Skill Based Core : 02
Field Work: 03 (Optional for non-job oriented UG Programmes)

MATHEMATICAL METHODS - I

L	T	P	C
6	0	0	4

Preamble : To teach the meaning and significance of elementary mathematical tools in students of economics. To enable the students to understand the concepts and methods of mathematical techniques.

Unit - I Number System

Numbers System – Real – Imaginary and Complex Numbers, Rational and Irrational Numbers – Graphs – Application of Graphs in Economics. **(17L)**

Unit - II Set Theory

Meaning – Types of sets – Set operations – Venn diagram – Cartesian Products – Functional Relations and Functions. **(18L)**

Unit - III Functions And Equations

Functions – Types and application of functions in Economics – Equations – Types of equations (Linear, Simultaneous Quadratic and Polynomial) Solving linear and Quadratic Equations – Application of equations in Economics. **(18L)**

Unit - IV Analytical Geometry

Distance between two Point in a Plane – Slope of Straight line. Different types of equations of a Straight line – Intersection of two lines – Perpendicular lines, Parallel – Application of Straight lines in Economics. **(19L)**

Unit – V Commercial Arithmetic

Percentage – Ratio and Proportion – Simple Interest – Annuities – Depreciation – Discounts – Banker's Discount – True Discount. **(18L)**

(Total: 90L)

Text Books:

1. **Mathematical Methods- Dr.Rathina Pandian**
2. **Mathematical Methods- Dr.Bose**

Reference Books:

1. **Mathematics for Economics – Metha – Madnani**
2. **Mathematics for Economics and Business – R.s. Bharathwaj**
3. **Mathematical Analysis for Economics - RGD.Allen**

2017-18/MSU/46th SCAA/Affili. Coll./UG./B.A.(Eco)/Sem.-III / Part-III / Allied - 3

ENTREPRENEURIAL DEVELOPMENT - I

L	T	P	C
3	0	0	3

Preamble : To enable the students of understand the concepts, foundations and methods of entrepreneurships. To develop the skill in establishing and managing business venture.

Unit – I Entrepreneurship

Entrepreneurship – Evolution of the Concept of entrepreneur – Definitions of Entrepreneurship and Entrepreneur, Types of entrepreneurship, Functions of Entrepreneur, Characteristics of Entrepreneur. **(10L)**

Unit – II Entrepreneurial growth

Entrepreneurial growth – Factors affecting entrepreneurial growth – economic, non – economic and governmental – Barriers to Entrepreneurship, Environmental Factors affecting Entrepreneurship. **(10L)**

Unit – III Theories of Entrepreneurs

Kao's Conceptual model of Entrepreneurs – David Meclelland's Achievement Motivation Theory – Role of Entrepreneur in Indian Economy With reference to Self employment development. **(10L)**

Unit – IV Women Entrepreneurship

Women Entrepreneurship – Conceptual model of Entrepreneurs – David Meclelland's Achievement Motivation Theory –Role of Entrepreneur in Indian Economy With reference to Self employment development. **(08L)**

Unit – V Entrepreneurial Development

Qualities of a successful Entrepreneur – Distinction between an Entrepreneurship and a Manager – Nature and types of promoters – steps to start a small scale Industry – Incentives and subsidies available. **(07L)**

(Total: 45L)

Text Books:

1. **Entrepreneurial Development - Dr.N.Srinivasan**
2. **Entrepreneurial Development - Dr.Radha**

Reference Books:

1. **Entrepreneurial Development - S.S.Kanaka**
2. **Entrepreneurial Development - Garden, Nararajan**
3. **Entrepreneurial Development - C.B.Gupta, N.P.Srinivasan**

2017-18/MSU/46th SCAA/Affili. Coll./UG./B.A.(Eco)/Sem.-III/Part-III/S. B. Core - 1

INTERNATIONAL ECONOMICS – I

L	T	P	C
4	0	0	4

Preamble : To familiarize the students with the theories and postulates of international trade. To develop analytical skill of the students for indentifying international problems and relations providing a frame work for economic growth and development.

Unit – I Basis of Trade

Introduction – Basics For Trade – Specialization – Meaning – Internal Trade – and External Trade – Need For Trade Difference between Internal Trade and External Trade – Merits and demerits of International Trade. **(15L)**

Unit – II Theories of International Trade

Theories of International trade – Classical theory of International trade – David Ricardo, Haberler's theory – Heckscher – Ohlin theory. **(15L)**

Unit – III Terms of Trade

Terms of Trade – Meaning – Types – Determinants of Terms of Trade. **(10L)**

Unit – IV Balance of Trade and Balance of Payments

Balance of Trade and Balance of Payments – Meaning – Difference between Balance of Trade and Balance of payments – Current Account and Capital Account of Bop's – Causes for disequilibrium with Bop's Methods for Correcting disequilibrium with Bop's. **(10L)**

Unit – V Free Trade and Protection

Free Trade Vs Protection – Meaning Case far and against free Trade and Protection – Forms of Protection. **(10L)**

(Total: 60L)

Text Books:

1. **International Economics – Dr.Radha**
2. **International Economics – Dr.N.Srinivasan**

Reference Books

1. **International Economics :Francis Cherunilam**
2. **International Economics : M.L.Jhingan**
3. **International Economics : M. Maria John Kennedy**

2017-18 / MSU/46th SCAA/Affili. Coll./UG./B.A.(Eco)/Sem.-III/Part-III / NME-1

ECONOMICS FOR COMPETITIVE EXAMINATIONS – I

L	T	P	C
2	0	0	2

Preamble : To enable the students into introduce various economic concepts to the students of economics. It gives clear idea about the basic economic problems to know well versed for the competitive examination.

Unit – I Introduction to Economics

Meaning and scope of economics – basic concepts in Economics – Human wants – Goods - Utility – Value – Price – Income – Wealth – welfare – Market – Supply – Demand – Cost – Revenue – Capital. **(08L)**

Unit – II Consumption

Meaning of the terms – consumer – consumption – utility maximization – Law of diminishing Marginal utility – Law of Demand – Law of Equi-marginal Utility – The concept of Consumer's Surplus. **(07L)**

Unit – III Production and Distribution

Meaning of the terms – producer – production – Factors of production – law of returns – Meaning of the Rent, wages, interest, profit. **(05L)**

Unit – IV Product pricing

Perfect competition – Imperfect Competition – Monopoly – Oligopoly. **(05L)**

Unit – V Investment

Meaning of the tern investment – Investment opportunities in shares, Bank Deposits, Real estates, Small savings schemes. insurance schemes, investment in companies and investment in gold. **(05L)**

(Total: 30L)

Text Books:

1. **Micro Economics – S.Sankaran**
2. **Micro Economics – Dr.N.Srinivasan**

Reference Books:

1. **Micro Economics - M.L.Seth**
2. **Principles of Economics - K.P.M.Sundaram**
3. **Advanced Economic Theory- M.L.Jhingan**

2017-18 / MSU/ 46th SCAA/Affili. Coll./UG./B.A.(Eco)/Sem.-IV/Part-III / Core-6

MATHEMATICAL METHODS – II

L	T	P	C
4	0	0	4

Preamble : To teach the meaning and significance of elementary mathematical tools in students of economics. To enable the students to understand the concepts and methods of mathematical techniques.

Unit – 1 Differentiation And Its Application

Meaning – Rules of derivatives – Higher order derivative – maxima and minima – order conditions for maximum and minimum – Application of Derivatives in Economics. **(15L)**

Unit – II Partial Derivatives And Its Applications

Meaning – Rules of Partial Derivatives – Euler's Theorem – Application of Partial derivatives in Economics. **(10L)**

Unit – III Integration And Its Application

Meaning – Types of Integrals – rules of Integration – Definite integrals – Application of integrals in economics – Consumer Surplus. **(10L)**

Unit – IV Matrices And Determinants

Meaning – order of a matrix types of matrices – Matrix operations – Determinants – Properties of Determinants – inverse of a Matrix – Application of Matrices to the solution of linear equations – Cramer's rule. **(15L)**

Unit – V Applications of Matrices in Input - Output Analysis

Input – output Analysis – meaning – basic Concepts – assumptions – applications of Matrices in two and three Sector economy. **(10L)**

(Total: 60L)

Text Books:

1. **Mathematical Methods- Dr.Rathina Pandian**
2. **Mathematical Methods- Dr.Bose**

Reference Books:

1. **Mathematics for Economics – Metha – Madnani**
2. **Mathematics for Economics and Business – R.s. Bharathwaj**
3. **Mathematical Analysis for Economics - RGD.Allen**

ENTREPRENEURIAL DEVELOPMENT – II

L	T	P	C
3	0	0	3

Preamble : To enable the students to acquire skills in respect of entrepreneurship for entrepreneurial opportunities. To help the students understand the importance of institutional supports from the Government.

Unit – I Forms of Entrepreneurship

Forms of Entrepreneurship – Small scale entrepreneurship – role of government in the development of small – scale entrepreneurship corporate entrepreneurship and Cooperative Form of entrepreneurship – Government as Entrepreneurs, Role of MNCS as entrepreneurs. **(10L)**

Unit – II General Attitudes of Entrepreneurship

Attitudes and motivation – Self efficacy, Creativity, Risk Taking, Leadership, Communication and influencing ability – planning action – Entrepreneurship as a desirable and Feasible Career option – Characteristics of a successful Entrepreneur. **(10L)**

Unit – III Entrepreneurial opportunities

Overview of Entrepreneur opportunities in contemporary business environment in the early 21 century – Enterprise types - Case studies of entrepreneurship in local tiny, small scale and rural Industries – Factors that influence Entrepreneurship development. **(10L)**

Unit – IV Institutional Supports in Tamil nadu

Institutions and schemes in Tamilnadu For SSI Support – State level Financial Corporations – schemes and programmes : small Industry Development Corporation – other allied schemes and programmes in Tamilnadu. **(08L)**

Unit – V Programmes and Schemes

DIC, DRDA, Roles, Schemes and programmes – Local Commercial Banks, Non – governmental Financial Companies in the Entrepreneur development growth process. **(08L)**

(Total: 45L)

Text Books:

1. **Entrepreneurial Development - Dr.N.Srinivasan**
2. **Entrepreneurial Development - Dr.Radha**

Reference Books:

1. **Entrepreneurial Development - S.S.Kanaka**
2. **Entrepreneurial Development - Garden, Nararajan**
3. **Entrepreneurial Development - C.B.Gupta, N.P.Srinivasan**

INTERNATIONAL ECONOMICS – II

L	T	P	C
4	0	0	4

Preamble : To familiarize the students with foreign exchange market and international financial institutions. It helps to analyze the trade agreements and foreign trade activities.

Unit – I Foreign Exchange

Foreign Exchange – Meaning – Exchange rate – Types of Foreign Exchange – Determination of Foreign Exchange Rate – Methods of Foreign Payments – Determinants of Foreign exchange rate. **(15L)**

Unit – II Tarrifs and Quotas

Tarrifs and Quotas : Meaning and Types – effects of Tarrifs – Quotas – meaning and Types – effects of Quotas – meaning and Types – effects of Quotas – Dumping and Anti – Dumping Measures. **(10L)**

Unit – III International Financial Institutions

International Financial Institutions – IMF – Objectives – Functions, Structure – World Bank [IBRD] Objectives – Functions – structure and special Drawing Rights [SDRs]. **(10L)**

Unit – IV Trade Agreements

International Trade Agreements – GATT – Objectives and Functions – WTO – Objectives and Functions – WTO – objectives and Functions – TRIMS – TRIPS. **(15L)**

Unit – V Foreign Trade

Recent Trends in India's Foreign Trade – Features of Foreign Trade – Volume and Composition of Foreign Trade – Measure for Promoting India's Foreign Trade. **(10L)**

(Total: 60L)

Text Books:

1. **International Economics – Dr.Radha**
2. **International Economics – Dr.N.Srinivasan**

Reference Books

1. **International Economics :Francis Cherunilam**
2. **International Economics : M.L.Jhingan**
3. **International Economics : M. Maria John Kennedy**

2017-18/MSU/46th SCAA/Affili. Coll./UG./B.A.(Eco)/Sem.-IV/Part-III/NME-2

ECONOMICS FOR COMPETITIVE EXAMINATIONS – II

L	T	P	C
2	0	0	2

Preamble : To enable the students into introduce various Macro economic concepts to the students of economics. It gives clear idea about the economic development index and statistical techniques of economics.

Unit – I Micro and Macro Economics

Micro and Macro Foundations – Cobb Douglas Production Function Real balance effect – Paradox of Thrift of Thrift and Stagflation – Keynesian School if Thought. **(06L)**

Unit – II Economic Development Indices

Economic Development – Economic Development and growth – Human development Indices – Physical Quality of life Index (PQLI) – Human Development Index (HDI) – Income inequality in India. **(06L)**

Unit – III Regional Development

Regional Development – Meaning – reasons for regional disparities – problems of balanced regional development – Brain drain – Causes of brain drain. **(06L)**

Unit – IV Aptitude

Logical reasoning – series – Numbers – Letters and Coding – relationships and classification – Analytical Reasoning. **(06L)**

Unit – V Statistical Techniques

Statistics – Data processing – Interpretation of data – uses of statistical techniques of Economics. **(06L)**

(Total: 30L)

Text Books:

1. **Macro Economics-M.Maria John Kennady**
2. **Indian Economy – S.Sankaran**

Reference Books:

1. **Economic Development in India – I.C Dhingra.**
2. **Micro Economics – M.L.Jhingan.**
3. **Statistical Methods – S.P.Gupta.**

2017-18/MSU/46th SCAA/Affili. Coll./UG./B.A.(Eco)/Sem.-V/Part-III/Core-7

MACRO ECONOMICS – I

L	T	P	C
6	0	0	4

Preamble : To enable the students to understand the concepts, theoretical foundations and methods of analysis in macro economics. To develop the skill in evaluating macro economic policies of economic development.

Unit – I Introduction

Meaning of Macro Economics – Difference between Macro and Micro Economics – Importance and Limitations of Macro Economic analysis. **(17L)**

Unit – II National Income

The concept – definition and meaning – Components of National Income – Gross Domestic Product (GDP), Gross National Product (GNP), Net National Product (NNP), Personal Income, Disposable Income and Per Capita Income – Measurement of National Income – National Income – National Income Accounting. **(19L)**

Unit III Theory of Employment

Meaning of full employment – Types of unemployment, seasonal, frictional, technological, structural, voluntary and involuntary, cyclical and disguised unemployment – Keynesian theory of Employment. Classical theory of employment: Say's law of Market – Pigou's view regarding involuntary unemployment. **(18L)**

Unit – IV Consumption Function

Meaning of consumption function – Relationship between consumption and income – Relationship between APC and MPC – Keynes's psychological law of consumption. **(18L)**

Unit – V Multiplier and Accelerator

Multiplier – meaning, relationship with marginal propensity to consume – working of the multiplier – Importance. Acceleration – Meaning – Principle – Assumptions – Working of the accelerator – Importance – Limitations. **(18L)**

(Total: 90L)

Text Books:

1. **Macro Economics-M.Maria John Kennady**
2. **Macro Economics= Cauvery**

Reference:

1. **Macro Economic Theory – M.L.Jhingan**
2. **Macro Economics – D.M. Mithani**
3. **Principles of Macro Economics – C. Rangarajan & B.H. Dholakia**

2017-18/MSU/46th SCAA/Affili. Coll./UG./B.A.(Eco)/Sem.-V/Part-III/Core-8

PUBLIC FINANCE – I

L	T	P	C
4	0	0	4

Preamble : To make the students acquire the adequate knowledge of the nature and characteristics of public finance system in an economy. To provide insights into the formulation and evaluation of effective budgetary policies.

Unit – I : Introduction

Public Finance – Nature and Scope of Public finance – meaning – Distinction between Private and Public Finance – Role of Public Finance in Developing and Developed economics. **(15L)**

Unit – II: Public Expenditure

Public Expenditure – meaning – Need for Public expenditure – Principle of Public expenditure – Causes of Public expenditure – Reasons for the growth of Public Expenditure in India . **(15L)**

Unit – III: Public Revenue

Public Revenue – Meaning – Sources of Public revenue – A Detailed study – A study on Indian Public Revenue. **(10L)**

Unit – IV: Taxation

Taxation – meaning – Classification of taxes – direct and indirect taxes, merits and demerits, Canons of Taxation – Progressive, Proportional – regressive – Goods and Service Tax (GST) – Forms. **(10L)**

Unit – V: Public Debt

Public Debt – meaning – Need for Public debt – Classification of Public debt – Sources of Public debt – Methods of redemption of Public debt. **(10L)**

(Total: 60L)

Text Books:

1. **Public Finance – K.P.M.Sundharam**
2. **Public Economics – M.L.Jhingan**

Reference Books:

1. **Public Finance - H.L.Batia**
2. **Public Finance Administration - S.L.Goel**
3. **Public Finance - B.P.Tyagi**

2017-18/MSU/46th SCAA/Affili. Coll./UG./B.A.(Eco)/Sem.-V/Part-III / Core-9

MONEY AND BANKING – I

L	T	P	C
5	0	0	4

Preamble : To enable the students to understand the concepts and methods of monetary management in the economy. To make the students understand theories of Value of money also the money market and capital market.

Unit – I Evolution Of Money

Barter System Difficulties of Barter System – Definition of money – Standard Function of money – Kinds of money – Qualities of good money – Demerits of money. **(15L)**

Unit – II Monetary Standard

Meaning – Types of Monetary Standard – Gold Standard – Mono metalism – Bimetallism Greshman's Law – Automatic Functions of Gold Standard – Causes and Failure of Gold standard – Paper Currency Standard – Principles of Note issues – Demerits of Paper Currency Standard. **(15L)**

Unit – III Value Of Money

Factors determining Velocity of Circulation of money – Quantity theories of money Fisher's Transactions approach – Cambridge equation of exchange – Keynes Savings and Investment Theory. **(15L)**

Unit – IV Inflation And Deflation

Meaning, Definition – Features – Kinds of Inflation – Causes of inflation Effects of Inflation – Methods of Controlling Inflation – Deflation – Methods – of Controlling Deflation – Disinflation and Stagflation. **(15L)**

Unit – V Money Market And Capital Market

Meaning – Composition of Money Marker – Structure of Money Market – Characteristics of Indian Money market – Demerits of Indian money market – Measures to improve the Indian money market – Capital Market – Meaning – Difference between Money market and Capital market – Securities and Exchange Board of India , (SEBI) **(15L)**

(Total: 75L)

Text Books:

1. **Money & Banking – E. Narayanan Nadar**
2. **Money, Banking and Trade – M.L.Jhingan**

Reference Books:

1. **Money, Banking and International Trade – K.P.M. Sundaram.**
2. **Money, Banking and International Trade – M.C. VAISH.**
3. **Modern Banking - Dutt & Sundaram**

INDIAN ECONOMY – I

L	T	P	C
5	0	0	4

Preamble : To enable the students to analyze various issues pertaining to India' economic development. The performance of the economy is to be addressed also critical appraisal is expected by taking cognizance of the contemporary developments in the economy.

Unit – I Structure And Organisation Of Indian Economy

Indian Economy before Independence – Characteristics of Indian Economy – Problems of Indian Economy – Poverty and Unemployment – Causes and Remedial Measures. **(15L)**

Unit – II Demographic Features Of India

Causes and Consequences of overpopulation in India. – Population Control in India – Migration. **(15L)**

Unit – III Agriculture:

Features of Indian Agriculture – Role of Agriculture in Indian Economy Land reforms – Green Revolution in India – Advantages and Disadvantages of Green Revolution – Agricultural Marketing – Regulated Marketing. **(15L)**

Unit - IV Industries

Need and Importance of Industrialization – Large Scale Industries – Iron and Steel, Cement, Textile, Jute and Sugar – Industrial Policy – Role and Importance of Small scale Industries in India. **(15L)**

Unit – V Planning And Economic Returns

Need and Importance of Planning exercises in India – Five year Plans – Objectives and Achievements – NITI Aayog – Economic returns in India. **(15L)**

(Total: 75L)

Text Books:

1. **Indian Economy- S.Sankaran**
2. **Indian Economy – Agarwal.**

Reference Books:

1. **Indian Economy – Dutt & Sundaram**
2. **Indian Economy – Misra & Puri**
3. **Indian Economy – I.C.Dhingra**

LABOUR ECONOMICS

L	T	P	C
4	0	0	4

Preamble : To enable the students to understand the analysis of labour markets. A knowledge of the empirical evidence on trade unions and industrial disputes also stress the importance of labour welfare and social security measures.

Unit – I Labour as as factor of production

Meaning of Labour – Characteristics of Indian labour, Migratory Character – Causes of Migration – effects of Migration – Absenteeism – Meaning and Causes. **(15L)**

Unit – II Trade Unions and Industrial Disputes

Types of Trade union – objectives – Functions – Industrial Disputes – Causes – Methods of Settling Industrial disputes Collective Bargaining – objectives – Process of Collective bargaining – Industrial Sickness – Meaning and Causes. **(15L)**

Unit – III Workers Participation in Management and Workers Education

Works Committee – Joint Management Council – Workers Participation in Management – in India – Workers education – objectives – Functions – Workers education in India. **(10L)**

Unit – IV Labour Welfare

Meaning and Scope of labour Welfare – objectives – principles of labour welfare ILO – Aims and Functions – India and ILO. **(10L)**

Unit – V Social Security

Objectives – Social Security Measures in India – Social Insurance – Social Assistance. **(10L)**

(Total: 60L)

Text Books:

1. **Labour Economics - S.R.Saxena**
2. **Labour Economics - B.P.Tyagi**

Reference Books:

1. **Labour Economics - Bhagaliwal**
2. **Labour Economics - C.B,Memoria**
3. **Labour Economics - Stephen Smith**

PERSONALITY DEVELOPMENT

L	T	P	C
2	0	0	2

Preamble: To enable the students to groom their personality and prove themselves as good Samaritans of the Society. This paper consists of individual or in-group class presentations pertaining to the applications of concepts, Theories or issues in human development.

Unit – I Personality

Personality – Definition – Determinants – Personality Traits – Importance of Personality Development - Self Awareness – Meaning, Importance – Goal Setting – Meaning and Importance. **(06L)**

Unit – II Self Monitoring

Self Monitoring – Meaning – Advantages and Disadvantages – Perception – Definition – Errors in Perception – Attitude – Meaning – Types – Methods of attitude Charge – Assertiveness – Meaning and Improving Assertiveness. **(06L)**

Unit – III Team Building

Team Building – Meaning – Types – Importance – Leadership – Definition – Qualities of effective leadership – Negotiation Skills – Meaning – Types. **(06L)**

Unit – IV Communication

Communication – Definition – Importance – Stress Management – Meaning – Sources of Stress – Symptoms of Stress – Managing Stress. **(06L)**

Unit – V Social Graces

Social Graces : Meaning - Table Manners – Meaning – Do's and Dont's of Table etiquettes – Dress code – Meaning – Dress code for an Interview – Group Discussion – Meaning – Process of Group Discussion – Group Discussion Topics – Interview – Definitions – Types of Skills – Planning for the Interview – Interview Questions. **(06L)**

(Total: 30L)

Text Books:

1. **Personality Development – Swami Vivekananda**
2. **Organisal Behaviour- Nirmal Singh**

Reference Books:

1. **Personality Development - Joan Aurthm**
2. **Organisal Behaviour - Chandan**
3. **New Vistas in Personality Development - Ranjit Singh**

2017-18/MSU/46th SCAA/Affili. Coll./UG./B.A.(Eco)/Sem.-VI/Part-III/Core-11

MACRO ECONOMICS -II

L	T	P	C
6	0	0	4

Preamble: To enable the students to understand the concepts, theoretical foundations and method of analysis in macro economics. To develop the skill in evaluating macro economic policies of economic development.

Unit – I Theories of Distribution

The Ricardian or classical theory of distribution – Criticisms – Marxian theory of Income distribution – critical evaluation – Kaldor's theory of distribution – Critical appraisal of Kaldor's theory. **(18L)**

Unit – II The Investment Function

Meaning of Capital and Investment : Types of Investment – Induced Vs Autonomous – Determinants of Investment – Rate of Interest – The Marginal Efficiency of Investment (MEI) – Relation between the MEC and the MEI – Factors affecting induced investment. **(18L)**

Unit – III Keynesian Economics

Keynesian tools and concepts – Effective demand – Under employment equilibrium – Inflationary gap Liquidity preference – Multiplier – Characteristics of Keynesian Economics – Relevance of Keynesian theory in underdeveloped countries. **(19L)**

Unit – IV Marxian Economics

Economic ideas of Karl Marx – Characteristics of Marxian Economy – Comparison of Karl Marx ideas with Classical and Modern Economists ideas. **(17L)**

Unit – V Macro Economic Policy

Monetary Policy: Instruments of monetary Policy and its working – Expansionary and Restrictive monetary policy. Instruments of fiscal policy and its working – Pump priming and compensatory fiscal policy. **(18L)**

(Total: 90L)

Text Books:

1. **Macro Economics-M.Maria John Kennady**
2. **Macro Economics – Cauvery**

Reference Books:

1. **Macro Economic Theory – M.L.Jhingan**
2. **Macro Economics – D.M. Mithani**
3. **Principles of Macro Economics – C. Rangarajan & B.H. Dholakia**

PUBLIC FINANCE – II

L	T	P	C
4	0	0	4

Preamble: To enable the students to understand the budgetary policy, fiscal policy for the economic development. To understand the local bodies functions and also it stress the importance of finance commission in India.

Unit-I : Public Goods

Failure of market Economy – Public goods – Pure and Partial Public goods, Private goods and merit goods, characteristics of Public goods. **(15L)**

Unit-II: Budget

Budget – meaning – Functional Classification of budget – preparation and passing process of budget in India – Government budget and its Structure – Zero budgeting – Highlights of the Current year's budget. **(15L)**

Unit-III: Fiscal Policy

Meaning and Objectives of Fiscal Policy – Modern Concept of Fiscal Policy - Role of Fiscal Policy in a developing Country like. **(10L)**

Unit-IV: Local Bodies

Meaning and Structure of local Finance – Difference between State Finance and local Finance – Sources of revenue of local bodies – Problems of local bodies in India. **(10L)**

Unit-V: Finance Commission

Meaning – Functions of Finance Commission – Procedure and Powers of the Commission – Recent Finance Commission – Major recommendations of the Recent Finance Commission. **(10L)**

(Total: 60L)

Text Books:

1. **Public Finance – K.P.M.Sundharam**
2. **Public Economics – M.L.Jhingan**

Reference Books:

1. **Public Finance - H.L.Batia**
2. **Public Finance Administration - S.L.Goel**
3. **Public Finance - B.P.Tyagi**

2017-18/MSU/46th SCAA/Affili. Coll./UG./B.A.(Eco)/Sem.-VI/Part-III/Core-13

MONEY AND BANKING – II

L	T	P	C
5	0	0	4

Preamble: To enable the students to understand the evolution of banking and banking systems in India. Also it highlights the modern banking system.

UNIT-I : Evolution Of Banking

Definition of Banking – Types of Banking – Unit Banking – Merits and Demerits – Branch Banking – Merits and Demerits. **(15L)**

UNIT-II: Commercial Banking

Definition, Function of Commercial Banks – Nationalisation of Commercial Banking in India Role of Commercial Bank in a developing economy – Credit Creation of Commercial Banks. **(15L)**

UNIT-III: Central Banking

Meaning and Orgin of Central Banking – Functions of Central Banking Reserve Bank of India (RBI) – Credit Control – Evaluation of function of RBI**.** **(15L)**

UNIT-IV: Monetary Policy

Meaning, objectives – instruments of Monetary Policy – Role of Monetary Policy in a developing economy. **(15L)**

UNIT-V: Modern Banking

Definition, Functions of Modern Banking – E- Banking – NEFT – RGTS – IMPS – Mobile Banking – Debit Cards – Cards. **(15L)**

(Total: 75L)

Text Books:

1. **Money & Banking – E. Narayanan Nadar**
2. **Money, Banking and Trade – M.L.Jhingan**

Reference Books:

1. **Money, Banking and International Trade - K.P.M. Sundaram.**
2. **Money, Banking and International Trade - M.C. VAISH.**
3. **Modern Banking - Dutt & Sundaram**

2017-18/MSU/46th SCAA/Affili. Coll./UG./B.A.(Eco)/Sem.-VI/Part-III/Core-14

INDIAN ECONOMY – II

L	T	P	C
4	0	0	4

Preamble: To enable the students to understand capital formation in India. To know the role of service sector in India and also it stress the impact of globalization in India.

UNIT-I Human Capital

Human Capital – Meaning and Importance – Concept and Forms – Key role in development – Improves Quality of life – Progress and Suggestion – Achievement. **(15L)**

UNIT-II Capital Formation in India

Capital Formation in India – Capital Formation – Meaning – Importance – Factors influencing reduction of Capital Formation in India – Domestic Capital Formation – Role of Capital Formation in Economic Development. **(15L)**

UNIT-III Service Sector

Service Sector – Meaning – Sub Sector of Service Sector in India – Emerging Performance of Service Sector in India – Foreign Trade in Service Sector Role of Technology in Service Section. **(10L)**

UNIT-IV Globalisation

Globalisation and its impact on India – Globalisation – Meaning – Impact of Globalisation in India – Foreign Investment Flows – Employment Situation in India during the era of globalization. **(10L)**

UNIT-V Current Affairs of India

Current Affairs of India – Corruption – Black money – Cyber Crime – Demonetization and its impact on Indian economy. **(10L)**

(Total: 60L)

Text Books:

1. **Indian Economy- S.Sankaran**
2. **Indian Economy – Agarwal.**

Reference Books:

1. **Indian Economy – Dutt & Sundaram**
2. **Indian Economy – Misra & Puri**
3. **Indian Economy – I.C.Dhingra**

2017-18/MSU/46th SCAA/Affili. Coll./UG./B.A.(Eco)/Sem.-VI/Part-III/Elec.-2

PLANNING AND GROWTH

L	T	P	C
4	0	0	4

Preamble: To help the students to understand the different aspects of process of planning and issues relating to growth and development. To make the students familiar with the developmental issues and solutions of both developed and developing countries.

Unit – I : Introduction

Definition and meaning of development distinction between economic growth and development – Characteristics of under development economy – Vicious circle of poverty. **(15L)**

Unit – II: Theories of development

Classical theory – Rostov stages of development – balanced growth and unbalanced growth theory – big bush theory critical minimum effort theory – maximum theory. **(15L)**

Unit – III : Growth Models

Meaning and uses of growth models Harrod Doman Model -wage goods models. **(10L)**

Unit – IV : Development issues

Case issues and against industrial and agricultural development – technology intensive and capital intensive technology – technology problems and remedies. **(10L)**

Unit - V : Planning

Meaning – objectives – types – evaluation – of Indian planning – five year plans achievements and failures – NITI AAYOG – economic reforms. **(10L)**

(Total: 60L)

Text Books:

1. **Planning & Growth – Dr.N.Srinivasan**
2. **Economics of Development and Planning : M.L.Jhingan**

Reference Books:

1. **Economics of Development and Planning : Kundan Lal, Agarwal**
2. **Economics of Development : Bright Singh**
3. **Leading issues in Economic Development : Gerald M. Merer.**

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI
UG COURSES – AFFILIATED COLLEGES

B.A. English

(Choice Based Credit System)

(with effect from the academic year 2017-2018 onwards)

Sem	Part I/II/ III/IV	Sub. No	Subject Status	SUBJECT TITLE	Hrs/ Week	Credits	Marks				
							Maximum			Passing Minimum	
							Int.	Ext.	Tot	Ext.	Tot.
III	I	1	Language	TAMIL/OTHER LANGUAGE	6	4	25	75	100	30	40
	II	2	Language	ENGLISH	6	4	25	75	100	30	40
	III	3	Core- 7	HISTORY OF ENGLISH LITERATURE-I	5	4	25	75	100	30	40
	III	4	Core - 8	BRITISH POETRY	4	4	25	75	100	30	40
	III	5	Allied – 3	CARIBBEAN LITERATURE	3	3	25	75	100	30	40
	III	6	Skilled-Based Core-1	PHONETICS AND SPOKEN ENGLISH	4	4	25	75	100	30	40
	IV	7	Non Major Elective - 1	ENGLISH FOR EMPLOYABILITY	2	2	25	75	100	30	40
	IV	8	Common	YOGA	2	2					
	SUB TOTAL				30*	25*					

* Excluding Yoga

Sem	Part I/II/ III/IV	Sub. No	Subject Status	SUBJECT TITLE	Hrs/ Week	Credits	Marks				
							Maximum			Passing Minimum	
							Int.	Ext.	Tot	Ext.	Tot.
IV	I	1	Language	TAMIL/OTHER LANGUAGE	6	4	25	75	100	30	40
	II	2	Language	ENGLISH	6	4	25	75	100	30	40
	III	3	Core- 9	HISTORY OF ENGLISH LITERATURE-II	5	4	25	75	100	30	40
	III	4	Core- 10	BRITISH DRAMA	4	4	25	75	100	30	40
	III	5	Allied - 4	CHICANO LITERATURE	3	3	25	75	100	30	40
	III	6	Skill Based Core-2	ECO ENGLISH	4	4	25	75	100	30	40
	IV	7	Non Major Elective-2	BUSINESS COMMUNICATION	2	2	25	75	100	30	40
	IV	8	Common	COMPUTER FOR DIGITAL ERA	2	2					
	V	9	Extension Activity	NCC, NSS, YRC,YWF		1					
	SUBTOTAL				30*	26*					

* Excluding “Computer for Digital Era.”

Sem	Part III/ IV	Sub. No	Subject Status	SUBJECT TITLE	Hrs/ week	Credits	Marks				
							Maximum			Passing Minimum	
							Int.	Ext.	Tot	Ext.	Tot
V	III	1	Core - 11	NON-FICTION	5	4	25	75	100	30	40
	III	2	Core - 12	LITERARY CRITICS AND APPROACHES	5	4	25	75	100	30	40
	III	3	Core - 13	WORLD LITERATURE IN TRANSLATION	5	4	25	75	100	30	40
	III	4	Core - 14	CANADIAN LITERATURE	5	4	25	75	100	30	40
	III	5	Major Electives (select 2 courses out of 3)	WOMEN'S WRITING	4 + 4	4 + 4	25	75	100	30	40
	III	6		JOURNALISM AND MASS COMMUNICATION / CREATIVE WRITING IN ENGLISH							
	IV	7	Skilled-Based Subject-(Common)	PERSONALITY DEVELOPMENT / EFFECTIVE COMMUNICATION / YOUTH LEADERSHIP	2	2	25	75	100	30	40
	SUB TOTAL				30	26					

Sem	Part III/IV	Sub. No	Subject Status	SUBJECT TITLE	Hr Week	Credits	Marks				
							Maximum			Passing Minimum	
							Int.	Ext.	Tot	Ext.	Tot.
VI	III	1	Core - 15	SHAKESPEARE	6	4	25	75	100	30	40
	III	2	Core - 16	SOUTH-ASIA LITERATURE IN ENGLISH	6	4	25	7	100	30	40
	III	3	Core - 17	SHORT-STORIES AND ONE-ACT PLAYS	5	4	25	75	100	30	40
	III	4	Core - 18	REGIONAL LITERATURE IN TRANSLATION	5	4	25	75	100	30	40
	IV	5	Major Electives (Select 2 out of 3)	AFRICAN LITERATURE	4 + 4	4 + 4	25	75	100	30	40
				WRITING FOR THE MEDIA							
				COMPARATIVE LITERATURE							
	SUB TOTAL				30	24					

Hrs/Week	Credits
5	4

History of English Literature – I

Objectives:

1. To give a clear and systemic understanding of the national changes and developments that influenced British Literature.
2. To familiarize the students about the historical movements that influenced the transformation of the literary tastes and standards.

Unit-I

The Age of Chaucer (1340-1044)
From Chaucer to 'Tottel's Miscellany' (1400-1557)

Unit-II

The Development of the Drama to 1561
The Age of Shakespeare – Non-Dramatic Verse, the Drama & the Prose

Unit-III

The Age of Milton – Milton, other Poets & Prose Writers

Unit-IV

The Age of Dryden – Verse, Prose & the Drama

Unit-V

The Age of Pope – Verse, Prose & the Drama

Text Prescribed:

William Henry Hudson: *An Outline History of English Literature*. Mahaam Publishers, Chennai – 78. mahampublishers@gmail.com.

References:

Aditi Chowdhury and Rita Gowswamy. *A History of English Literature: Traversing the Centuries*. Orient Blackswan Pvt. Ltd.

Hrs/Week	Credits
4	4

British Poetry

Objectives:

1. To provide a historical perspective of British poetry.
2. Interpretation and appreciation of the selected texts from the genre of poetry.

Unit-I:

John Milton	:	Lycidas
Dryden	:	Alexander's Feast

Unit-II :

P. B. Shelley	:	Ode to Skylark
John Keats	:	Ode to a Nightingale

Unit-III:

Tennyson	:	Ulysses
Browning	:	My Last Duchess

Unit-IV:

Hopkins	:	The Windhover
W. B. Yeats	:	A Prayer for my Daughter

Unit-V:

Wilfred Owen	:	Strange Meeting,
Ted Hughes	:	Work and Play

Hrs/Week	Credits
3	3

Caribbean Literature

Objectives:

1. To provide a socio-cultural perspective of Caribbean Writings.
2. Interpretation and appreciation of the selected texts.

Unit-I: Poetry

Derek Walcott	:	A Far Cry from Africa
Mervyn Morris	:	Judas
Nancy Morejon	:	Black Woman

Unit-II : Poetry

Kamau Braithwaite	:	Ananse
John Agard	:	Half-Caste
Edward Baugh	:	The Carpenter's Complaint

Unit-III: **Short-Stories**

Olive Senior	:	Summer Lightning
Jamaica Kincaid	:	In the Night

Unit-IV: **Fiction**

V. S. Naipaul	:	*Half a Life*

Unit-V: **Fiction**

Derek Walcott	:	*Dream on Monkey Mountain*

Prescribed Text:

Selections from Caribbean Literature. Mahaam Publishers, Chennai – 78. mahampublishers@gmail.com.

V. S. Naipaul. *Half a Life*. Pan Macmillan.

MSU/2017-18/UG-Colleges/Part-III (B.A. English) / Semester-III / Skilled Based Core -1

Hrs/Week	Credits
4	4

Phonetics and Spoken English

Objectives:

1. To impart proficiency in pronunciation and oral communication.
2. To use appropriate language skills for various communicative functions in different socio-cultural contexts.

Unit - I

Organs of Speech & Vowels,

Unit - II

Consonants, Stress, & Intonation

Unit – III

Transcription of words, sentences and marking of stress

Unit – IV

At a Bank I – At a Bank, II – At a hotel reception Hall, Helping a friend to obtain a flat I, II and III – A discussion between two friends Booking Accommodation at an outstation hotel, Enquiring about flight/Arrivals. Enquiry for information. At the Restaurant, Visiting a Doctor, At the library.

Unit - V

Greeting, Introduction, Information, Invitation, Permission, Request, Offers, Compliments, Sympathy, Apology Complaint, Gratitude, Persuasion, Suggestion, Warning, Opinion, Turn taking, Interview, Group Discussion, Public Speaking.

Texts Prescribed:

1. P. Iyyadurai. *English Phonetics for Beginners.* Jones Publication.
2. Jayashree Balan. *Spoken English* (Vijaya Publication).
3. Saraswathy and Noorjahan. *Spoken English*

MSU/2017-18/UG-Colleges / Part-III (B.A. English) / Semester-III / Non-Major Elective - 1

Hrs/Week	Credits
2	2

English for Employability

Objectives:

1. To enhance the language skill of the students..
2. To enhance the employability skills of the students.

Unit-I

1. The Verbs
2. Sentence Structure

Unit-II

3. Concord
4. Spotting Errors

Unit-III

5. Letter Writing – Formal
6. Curriculum Vitae

Unit-IV

7. Report Writing
8. Job Interview

Unit-V

9. Functional Communication
10. Group Discussion

Texts Prescribed:

T.M. Farhathullah & D.S.Kesava Rao: *Strengthen Your English for competitive Examinations*. Emerald Publishers, Chennai.

MSU/2017-18/UG-Colleges/Part-III (B.A. English) / Semester-IV / Core - 9

Hrs/Week	Credits
5	4

History of English Literature - II

Objectives:

1. To give a clear and systemic understanding of the national changes and developments that influenced British Literature.
2. To familiarize the students about the historical movements that influenced the transformation of the literary tastes and standards.

Unit-I

The Age of Johnson – General Prose, the Novel & the Verse

Unit-II

The Age of Wordsworth– The Older Poets & the Younger Poets

Unit-III

The Age of Tennyson – Verse, General Prose & the Novel

Unit-IV

The Age of Hardy

Unit-V

The Present Age

Texts Prescribed:

William Henry Hudson: *An Outline History of English Literature*. Mahaam Publishers, Chennai – 78. mahampublishers@gmail.com.

MSU/2017-18/UG-Colleges / Part-III (B.A. English) / Semester-IV / Core - 10

Hrs/Week	Credits
4	4

British Drama

Objectives:

1. To acquaint the students to the growth and development of English drama from a historical perspective.
2. To accustom the students to the various dramatic devices and techniques used in the genre.

Unit-I

Christopher Marlowe : *Dr. Faustus*

Unit-II

Oliver Goldsmith : *She Stoops to Conquer*

Unit-III

Richard Brinsley Sheridan : *School for Scandal*

Unit-IV

John Galsworthy : *Strife*

Unit-V

Bernard Shaw : *Candida*

Hrs/Week	Credits
3	3

Chicano Literature

Objectives:

1. To provide a socio-cultural perspective of Chicano Writings to the students.
2. To understand the culture of this ethnic group through the interpretation and appreciation of the selected texts.

Unit-I: Prose

Luis Alberto Urrea : Across the Wire (Preface alone)

Unit-II : Poetry

Sandra Cisneros : Cloud
Luis J. Rodriguez : The Concrete River
Jimmy Santiago Baca: I am Offering this Poem

Unit-III: **Short-Stories**

Francisco Jimenez : Under the Wire
The Circuit
Christmas Gift

Unit-IV: **Fiction**

Rudolfo A. Anaya : *Bless Me, Ultima*

Unit-V : **Fiction**

Luiz Valdez : *Zoot, Suit*

Text Prescribed: *Petals of Chicano Literature*. Angel Publishers. Chennai-8

MSU/2017-18/UG-Colleges/Part-III (B.A. English) / Semester-IV/Skilled Based Core-2

Hrs/Week	Credits
4	4

Eco English

Objectives: The course will enable the students:

- To improve their communicative competence in English both speaking and writing.
- To augment their ability to read fast with better understanding.
- To express themselves clearly and concisely using right words in right places.

Unit I:

1. A Mini-story
2. Will the world come to an End?

Unit II:

3. Noah Today
4. Mass Extinction

Unit III:

5. A Poem about Climate Change
6. No one is Happy!

Unit IV:

7. "The Happy Man's Shirt" – Italian Folktale – Retold
8. Polluting the World

Unit V:

9. Can Earth be Earth?
10. Animal Farm

Prescribed Text:

Eco English: Learning English through Environmental Issues: An Integrated, Interactive Anthology. N. Krishnaswamy, Lalitha Krishnaswamy and Dr. B. S. Valke. Bloomsbury Pub. India. Pvt. Ltd. New Delhi.

MSU/2017-18/UG-Colleges/Part-III (B.A. English) / Semester-IV / Non-Major Elective - 2

Hrs/Week	Credits
2	2

Business Communication

Objectives:

- To impart the young graduates the basic concepts and practices of business communication and their application in the business world today.

Unit-I

1. Language and Communication
2. Communication in Organisation

Unit-II

3. Audio-Visual Aids
4. e-mail drafting

Unit-III

5. Formal Report
6. Technical Proposals

Unit-IV

7. Business Correspondence
8. Notice, Agenda, Minutes & Manual

Unit-V

9. Advertising
10. Graphic Aids

Prescribed Text: Krishna Mohan & Meera Benerjee: *Developing Communication Skills,* Macmillian.

Hrs/Week	Credits
5	4

Non-Fiction

Objectives:

1. To familiarize the students to the prose writings of the representative writers.
2. To develop a sense of literary appreciation in the minds of students

Unit-I :

Francis Bacon	-	Of Studies, and Of Friendship
Joseph Addison	-	Sir Roger at Theatre

Unit-II :

Richard Steele	-	Sir Roger and the Widow
Oliver Goldsmith	-	The Man in Black

Unit-III:

Charles Lamb	-	Dream Children
William Hazlitt	-	On Disagreeable People

Unit-IV:

A. G. Gardiner	-	The Fellow Traveller
Robert Lynd	-	The Money Box

Unit-V :

A. J. Cronin	-	The Best Investment I ever made.
G. K. Chesterton	-	The Worship of the Wealthy

Text Prescribed: *Elegant English Essays*. Board of Editors. Emerald Publishers. Chennai.

MSU/2017-18/UG-Colleges / Part-III (B.A. English) / Semester-V / Core-12

Hrs/Week	Credits
5	4

Literary Critics and Approaches

Objectives:

1. To introduce the major schools of literary criticism to the students.
2. To develop the critical sensibilities of the students

Unit-I

Plato
Aristotle

Unit-II

Philip Sidney
Dryden

Unit-III

Dr. Johnson
William Wordsworth

Unit – IV

Matthew Arnold
T. S. Eliot

Unit-V

The Moral Approach (Introduction)
The Psychological Approach (Introduction)
The Sociological Approach (Introduction)
The Formalistic Approach (Introduction)
The Archetypal Approach (Introduction)

Texts:

1. *An Introduction to English Criticism*. B. Prasad
2. *Five Approaches of Literary Criticism*. Wilbur Scott

MSU/2017-18/UG-Colleges / Part-III (B.A. English) / Semester-V / Core-13

Hrs/Week	Credits
5	4

World Literature in Translation

Objectives:

1. to familiarize the students with the literary classics written and translated from different parts of the world.
2. To acquaint the students with the global literary and cultural sensibilities prevalent in other parts of the globe.

Unit-I: Prose

Walter Benjamin	:	Unpacking my Library: A Talk about Book Collecting
Michel de Montaigne	:	Of Friendship

Unit-II: Poetry

Khalil Gibran	:	Your Children are not your Children
Gothe	:	The Reunion
Pablo Neruda	:	If You Forget Me

Unit-III: Short Story

Anton Chekov	:	Vanka
Gabriel Garcia Marquez	:	A Very Old Man with Enormous wings
Ivan S. Turgenev	:	The District Doctor

Unit – IV: Drama

Kalidasa	:	*Shakuntala* (Translated by Arthur W. Ryder)

Unit-V: Fiction

Hermann Hesse	:	*Siddhartha*.

Text: *World Literature in Translation*. Angel Publishers. Chennai-8

Hrs/Week	Credits
5	4

Canadian Literature

Objectives:

1. To introduce the students to Canadian literature through the close reading of the selected texts.
2. To make them approach selected texts for their literary value and cross cultural importance.

Unit I: Poetry

Al Pardy	-	Listening to Myself
Wilfred Campbell	-	The Winter Lake
A. J. M. Smith	-	Live as Old Proud King in Parable

Unit II: Short- Stories

Alice Munro	–	Red Dress
Margaret Atwood	–	The Resplendent Quetzal
Alistair MacLeod	-	As Birds Bring Forth the Sun

Unit III: Drama

George Ryga	-	*Ecstasy of Rita Joe*

Unit IV: Fiction

Michael Ondaatje	-	*In the Skin of a Lion*

Unit V: Fiction

Joy Kogawa	-	*Obasan*

Prescribed Text: *Mosaics: An Anthology of Canadian Literature*. Mainspring Publishers. Chennai-600042.

Reference: The Arnold Anthology of Post-colonial Literatures. Ed. John Thieme. Arnold Pub. New York.

Hrs/Week	Credits
4	4

Major Electives (Select 2 out of 3 Papers)

Women's Writing

Objectives:

1. To sensitise the students about the problems women face in the patriarchal cultural milieu.
2. Employ literature to analyse issues and questions relating to women's experience and empowerment.

Unit-I: Poetry

Maya Angelou	-	Phenomenal Woman
Judith Wright	-	Woman to Man
Kishwar Naheed	-	I am not that Woman
Carol Ann Duffy	-	Originally

Unit-II: Prose

Jean Rhys	-	The Day they burned the Books
Virginia Woolf	-	Shakespeare's Sister

Unit-III: Short-Story

Nadine Gardiner	-	A Correspondence Course
Katherine Mansfield	-	An Ideal Family
Alice Munroe	-	The Photographer

Unit-IV: Fiction

Meena Alexander	-	*Nampally Road*

Unit-V:Drama

Suzan-Lori Parks	-	*Topdog/Underdog*

Texts Prescribed:

Women's Writing: Anthology. Mainspring Publishers. Chennai-600042.
Nampally Road. Meena Alexander. Orient Blackswan.

Reference:

The Arnold Anthology of Post-colonial Literatures. Ed. John Thieme. Arnold Pub. New York.

MSU/2017-18/UG-Colleges/Part-III (B.A. English) / Semester-V/Major Electives – 2

Hrs/Week	Credits
4	4

Journalism and Mass Communication

Objectives:

1. To introduce the students to the challenges of the constantly evolving world of journalism and Mass Communication.
2. To develop multi-tasking skills required in the dynamic multi-media and convergent environment.

Unit-I

1. Journalism and Mass Communication
2. Journalism of Print Media

Unit-II

3. News Agencies
4. News Gathering and Reporting

Unit-III

5. History of Indian Journalism
6. Communication and Mass Communication

Unit-IV

7. Radio Broadcasting in India
8. Television Broadcasting in India

Unit-V

9. Information Technology
10. Web Journalism

Text Prescribed:

Hena Naqvi. *Journalism and Mass Communication*. Upkar Prakashan, Agra–2.

Reference:

Keval J. Kumar. Mass Communication in India 4th Ed. Jaico Publishing House. Mumbai-1

Hrs/Week	Credits
4	4

Creative Writing in English

Objectives:

To introduce the students the basic knowledge and skills in creative writing.

To develop the creative writing skills latent in the students.

Unit-I: What is Creative Writing?

Defining Creativity, Measuring Creativity, Inspiration and Agency, Creativity and Resistance, Art and Propaganda, Creativity and Madness, What is Creative Writing? Imagination and Writing, Restriction on an Open Field, Can Creative Writing be Taught?, The Importance of Reading.

Unit-II: The Art and Craft of Writing: Troupes and Figures.

i). Based on Similarity: Simile, Metaphor, and Homonym

ii). Based on Association: Metonymy, Synecdoche, Allusion, and Symbol

iii). Based on Difference: Antithesis, Paradox, and Oxymoron

iv). Based on Extension of Ideas: Personification, and Hyperbole

v). Based on Obliqueness: Irony, Euphemism, Ambiguity, and Pun

vi). Based on Utterance: Alliteration, Assonance, Consonance, Onomatopoeia, and Homophones

vii). Based on Work Building: Chiasmus, Acronyms, and Palindrome

Unit-III: Style and Register, Formal and Informal Usage Varieties of English, Language and Gender, Disordered Language, Playing with Words, Grammar and Word Order, Tense and Time, Grammatical Differences.

Unit-IV: Modes of Creative Writing.

Writing to Communicate: The Writer and the Reader, Section-I: Poetry, Writing Poetry, Definition of Poetry: What is Poetry?, The Four Functions of Language, What to Write and How to Start, Poetry and Prose, Shape, Form and Technique.

Unit-V: Section-II: Fiction.

Fiction, Non-Fiction, Fiction and the 20th Century, The Importance of History, Types of Novels, Literary and Popular Fiction, The Short-Story and the Novel, Character, Plot, Point of View (Modes of Narration), Setting (Milieu).

Text Prescribed: Anjana Neira Dev, Anuradha Marwah and Swati Pal. *Creative Writing: A Beginners Manual.* Pearson: Longman. Delhi/Chennai/Chandigarh.

References:

David Morley. *The Cambridge Introduction to Creative Writing*. Canbridge University Press.

Paul Mills. *The Routledge Creative Writing Course Book*. Routledge. London and New York.

Hrs/Week	Credits
6	4

Shakespeare

Objectives:

1. To acquaint the students to the dramatic and theatrical conventions of Shakespeare.
2. To enable the learners to analyse plot, characters, themes and stage craft of his plays.

Unit – I: Shakespeare's Sonnets:

Sonnet: 18: Shall I compare thee to a summer's day?

29: When in disgrace with fortune and men's eyes

33: Full many a glorious morning I have seen

104: To me, fair friend, you never can be old

Unit – II

As You Like It

Unit – III

Othello

Unit – IV

Julius Caesar

Unit – V

Elizabethan Stage & Audience
Fools and Clowns
Women in Shakespeare
Supernatural Elements in Shakespeare

MSU/2017-18/UG-Colleges/Part-III (B.A. English) / Semester-VI / Core- 15

Hrs/Week	Credits
6	4

South-Asian Literature in English

Objectives:

1. Learning the complexities of the region through its literature.
2. An understanding of South Asia's social, historical, local and global contexts.
3. Learning to read texts critically in order to analyse the distinctive literary strategies and devices deployed in these texts.

Unit-I

Poetry

Yasmine Gooneratne : This Language, This Woman
Imtiaz Dharkar : Minority
Alamgir Hashmi : So What if I Live in a House made by Idiots.

Unit-II

Prose

Natantara Sahgal : Martland
Jamil Ahmed : The Sins of the Mother
(from *The Wandering Falcon.)*

Unit-III

Short-Stories

Hanif Kureshi : The Assault
Jackie Kabir : Silent Noise
Gita Hariharan : The Remains of the Feast

Unit – IV

Fiction

Khaled Hossain : *A Thousand Splendid Sun*.

Unit-V

Drama

Mahaswetha Devi : *Mother of 1084*.

Text Prescribed: *South Asian Literature in English*. Mainspring Publishers. Chennai-600042.

Hrs/Week	Credits
5	4

Short-Stories and One-Act Plays

Objectives:

1. Help the students analyzing and evaluating the plot and characters in short stories and one-act plays.
2. Enable the students to make comparisons in terms of theme, rhetorical structure, and genre.

Unit-I

Short-Stories

Leo Tolstoy	:	God Sees the Truth, but Waits
Jerome K Jerome	:	Uncle Podger Hangs a Picture
A.J. Cronin	:	Two Gentle Men of Verona

Unit-II

Short-Stories

Oscar Wilde	:	The Selfish Giant
Guy de Maupassant	:	At the Church Door
Sinclair Ross	:	The Lamp at Noon

Unit-III

Short-Stories

Stephen Leacock	:	The Errors of Santa Claus
Anton Chekhov	:	Misery
Catherine Mansfield	:	The Doll's House

Unit – IV

One-Act Plays

J. B. Priestley	:	Mother's Day
Anton Chekov	:	The Swan Song

Unit-V

One-Act Plays

Erisa Kironde	:	The Trick
Lady Gregory	:	The Rising of the Moon

Prescribed Text: *Echoes: An Anthology of Short Stories and One-Act Plays.* Mainspring Publishers. Chennai-600042.

Hrs/Week	Credits
5	4

Core XII
Regional Literature in English

Objectives:

1. To acquaint the students to the rich cultural and literary heritage of the native literature.
2. To inculcate in the students a flair to enjoy and appreciate native literature.

Unit-I: Poetry

Tiruvalluvar	-	*Tirukkural* (Translated by G. U. Pope)
		Chapter-8: The Possession of Love
		Chapter-11: Gratitude
		Chapter-40: Learning

Unit-II: Poetry

Subramanya Bharathi	-	There is no fear
Mu. Mehta	-	Charge Sheet
Adavan Theetchanya	-	Self-Realization

Unit-III: Short-Story

U. R. Anantha Murthy	-	A Horse for the Sun
Vaikom Muhammad Basheer-		Walls
Ambai (C.S.Lakshmi)	-	Gifts

Unit-IV: Fiction

Sundara Ramaswamy	-	*Tamarind History*

Unit-V: Drama

Girish Karnad	-	*Nagamandala*

Text Prescribed: *Regional Literature in English*. Ed. Board of Studies.Angel Publishers. Chennai-8
Tamarind History. Sundara Ramaswamy. Penguin India.

MSU/2017-18/UG-Colleges/Part-III (B.A. English) / Semester-VI / Major Elective-1

Hrs/Week	Credits
4	4

Major Elective (Select 2 out of 3)

African Literature

Objectives:

1. To enable the students to understand the cross-cultural and historical approaches to the works by major writers of Africa.
2. To understand the role of African literature in developing a national identity in the former colonies of Africa.

Unit-I
Poetry

Mazisi Kunene	-	A Note to all Surviving Africans
Jean-Joseph Rabearivelo	-	Cactus
Tsegaye Gabre-Medhin	-	Home Coming Son

Unit-II
Poetry

Walter Odame	-	Dear Child
Wole Soyinka	-	Telephone Conversation
John Pepper Clarke	-	The Casualties (to Chinua Achebe)

Unit-III
Short-Story

Oral tradition	-	Nwashisisana, The Hare
Assia Djebar	-	My Father writes to my Mother
Henry Lopes	-	The Advance

Unit-IV
Fiction

Chinua Achebe	-	*The Arrow of God*

Unit-V
Drama

Wole Soyinka	-	*The Lion and the Jewel*

Text Prescribed: *African Literature: Expanding Horizons*. Mahaam Publishers.
Chennai-78. email: mahaampubishers@gmail.com

Hrs/Week	Credits
4	4

Writing for Media

Objectives:

1. To teach the fundamentals of good writing
2. To help the students aware of the basic conventions of fiction writing
3. To provide the students the tools for self expression in this medium

Unit I

The Making of a Writer

Writing for Print Media

News and News Writing

Unit II

Freelance Writer

The Art of Interviewing

Editorial Writing

Unit III

Script Writer

Play writing

Script Writing

Unit IV

Copy Writer
Writing for Advertisement
Copy Writing

Unit V

Writing Novels
Writing a Bestseller
Writing effectively

Text Book: *Writing for the Media*. Sunny Thomas, Vision Books Pvt. Ltd., New Delhi.

Hrs/Week	Credits
4	4

Comparative Literature

Objectives:

1. To gain insight into the affinities among various literatures
2. To enable the students to gain insights into the different cultures and milieu.

Unit I

Introduction
Definition and scope of comparative literature
National. Comparative, General and World Literature
French, American and Russian Schools of Comparative Literature
Indian School of Comparative Study

Unit II

The study of Influence
Analogy/Parallel Studies
Reception Study
Periodisation
The Matology

Unit III

The Study of Genres
Introduction
Theory of Genres
Problems of Genre Studies

Unit IV

Literature and other Disciplines
Literature and Sociology
Literature and Philosophy
Literature and other Arts

Unit V

Literature and the History of Ideas
Comparative Literature and Translation
Short Notes on Comparative Literature

Text Book: Comparative Literature: Prof. S. Yusuf. Manimekala Publishing House, 39, North Chithirai Street, Madurai – 625 001. Phone-(0452) 2623420, 4230321.

References: Susan Bassnett. *Comparative Literature: A Critical Introduction*. Blackwell Pub. Inc.
Steven Totosy de Zepetnak. *Comparative Literature: Theory, Method, Application.* Rodophi Publication.

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI
UG COURSES – AFFILIATED COLLEGES
B.A. History
(Choice Based Credit System)
(with effect from the academic year 2017-2018 onwards

ELIGIBILITY

A pass in 10 +2 pattern of education with History as a subject or a pass in any equivalent course duly recognized by any Board of Education in India.

III - Semester

Part	Subject Status	Subject	Hours	L	C
I	Language	Tamil	06	06	04
II	Language	English	06	06	04
III	Core 7	History of India (1526 - 1772 A.D.)	04	04	04
	Core 8	History of Tamil Nadu (1800 -1967 A.D.)	05	04	04
	Allied III	Constitution of India /Economics /Sociology	03	03	03
IV	Skill Based Core - 1	Human Rights	04	04	04
V	Non- Major Elective 1	Freedom Movement in India	02	02	02
VI	Common III	Yoga	-	-	02
	Total		30		27

IV - Semester

Part	Subject Status	Subject	Hours	L	C
I	Language	Tamil	06	06	04
II	Language	English	06	06	04
III	Core 9	History of India (1772-1947 A.D.)	04	04	04
	Core 10	History of Europe (476 – 1453 A.D.)	04	04	04
	Allied - IV	Modern Political Thought /Economics /Sociology	03	03	03
	Skill Based Core - 2	Principles and Methods of Archaeology	05	04	04
IV	Non- Major Elective 2	Indian Polity	02	03	02
V	Common IV	Computer for Digital Era	-	02	02
VI	Extension Activities	NSS, NCC, YRC, YWF	-	01	01
	Total		30		28

V Semester

Part	Subject Status	Subject	Hours	L	C
III	Core 11	Elements of Historiography	05	04	04
	Core 12	History of Europe (1453-1789 A.D)	05	04	04
	Core 13	History of China (1839-1966 A.D)	06	04	04
	Core 14	Indian Public Administration	04	04	04
V	Major Elective 1	Constitutional History of India(1773-1947)	04	03	04
	Major Elective 2	Panchayat Raj in India	04	03	04
	Skill Based Common (Any one)	Personality Development (or) Effective Communication (or) Youth Leadership	02	02	02
	Total		30		26

VI Semester

Part	Subject Status	Subject	Hours	L	C
III	Core 15	History of Europe (1789-1945 A.D)	05	04	04
	Core 16	History of Science and Technology Since 17th Century	05	04	04
	Core 17	History of India since 1947	05	04	04
	Core 18	Women's Studies	04	04	04
	Core 19	Group Project	07	-	07
IV	Major Elective 3	Epigraphy	04	03	04
	Total		30		27

Total Credits 158

Total - UG History 158 Credits

II B.A. History - III Semester

Core Paper 7 - History of India (1526-1772 A.D.)

L	C
4	4

Objectives :

1. To understand the advent of a new political culture in India.
2. To have a wider discussion on a new administration, economic policy and religion.
3. To study in detail the emergence of Hindu revivalism by way of Maratha imperialism.
4. To realize the impact of the advent of Europeans in India and its permanent results.

Unit I : The Mughal Empire - Sources - India on the eve of Babur's invasion - Babur - conquests - Administration - Humayun - causes for his failure - Shersha - conquests - administration. **(12 L)**

Unit II : Akbar, the great - Conquests - administration - Religious Policy - Jahangir - Rule of Nurjahan - Shahjahan - Golden Age - war of Succession. **(12 L)**

Unit III : Aurangzeb - conquests - Deccan policy - Religious policy - Downfall of Mughals - Mughal Administration - Social, economic and cultural conditions under the Mughals - Mughal art and architecture. **(12 L)**

Unit IV : The Marathas - Shivaji - Early Career - Conquests - administration - Decline of Marathas - Peshwas – Balaji Viswanth – Baji Rao - Balaji Baji Rao -Third battle of Panipat. **(12 L)**

Unit V : The Advent of Europeans - Portuguese – Dutch - English and French - The Anglo – French rivalry in the Carnatic - Carnatic wars - Robert Clive - Battle of Plassery - Buxar - Dual government in Bengal. **(12 L)**

(Total : 60 L)

Reference Books :

1. Satish Chandra, *History of Medieval India*, Orient Blackswan, NewDelhi, 2009.
2. J.L. Mehta, *Advanced study in the History of Medieval India,* Sterling Publishers, NewDelhi, 2006.
3. R.P. Thripathi, *Rise and fall of Mughal Empire*.
4. Meerasingh, *Medieval History of India,* Vikas Publishing House, NewDelhi, 1978.
5. R.C.Majumdar, *An Advanced History of India*, Macmillan India Limited, NewDelhi, 2001.

II B.A. History - III Semester

Core Paper 8 - History of Tamil Nadu, (1800-1967 A.D.)

L	C
4	4

Objectives :

1. To study more on alien Political domination and native resistance.
2. To estimate the colonial contribution in the development of Indian Social fabric.
3. To understand the emergence of Nationalism in Tamil Nadu.
4. To study about the rise of regional Sub-nationalism in Tamil Nadu.

Unit I : Results of South Indian Rebellion - Vellore Mutiny of 1806 - causes, course and consequences - The British Administration in Tamilnadu - Land Revenue Administration - Ryotwari system - Judicial administration. **(12 L)**

Unit II : Introduction of western education - Christian missionary activities - Socio religious reform movements - Ramalinga Adigal- Vaikunda Swamigal - Temple Entry Movement - the rise and fall of Justice party - EVR - Self Respect Movement. **(12 L)**

Unit III : Role of Tamilnadu in freedom struggle - V.O. Chidambaram Pillai - Subramania Bharathi - Vanchinathan - Subramania Siva - Rajaji - Satya moorthy - Kamaraj. **(12 L)**

Unit IV : Tamilnadu under Congress rule - Rajaji - Kamaraj - administration - Industrial development under Kamaraj - educational development - Bhaktavatsalam - The Anti-Hindi Agitation of 1965. **(12 L)**

Unit V : The Rise of DMK to power - C.N. Annadurai - The economic development of Tamilnadu after 1947 - the development of industries - social welfare measures. **(12 L)**

(Total : 60 L)

Reference Books :

1. K. Rajayyan, *History of Tamilnadu from 1565 to the present day,* Madurai Publishing house, Madurai, 1978.
2. N. Subramanian, *Social and Cultural History of Tamilnadu (1336-1984),* Ennes publication, Udumalpet, 2007.
3. R.L. Hardgrave, *The Dravidian Movement,* Popular Prakashan, Bombay, 1965.
4. T. Stalin Gunasekaran, *The Role of Tamilnadu in Freedom Struggle* (Tamil) Nivethitha Pathippagam, Veerappan Chandram 2000.
5. S.S. Raghavayangar, Progress of Madras Presidency during last forty years.

II B.A. History - III Semester

Allied III - Constitution of India.

L	C
3	3

Objectives :

1. To study about the genesis of the Constitution of India.
2. To understand the fundamental rights and duties guaranteed by the Indian Constitution.
3. To realize how a bill become law in India?
4. To have a wider idea on centre state relations.

Unit I : Framing of the constitution - salient features - constitutional amendment - Indian federal system - citizenship - Fundamental Rights. **(9 L)**

Unit II : Directive Principles of State Policy - Fundamental Duties - The President - Election procedure - powers - The Prime minister and Council of ministers. **(9 L)**

Unit III : The Union Legislature - The Parliament - The Lok Sabha - The Rajya Sabha – Functions and Powers - Process of law making. **(9 L)**

Unit IV : The Union Judiciary - Supreme Court - High Court - Jurisdiction - appointment of Judges - powers and functions. **(9 L)**

Unit V : State government - Governor - powers - State Legislature - Centre - State relations - Election Commission. **(9 L)**

(Total : 45 L)

Reference Books :

1. M.V. Pylee, *India's Constitution*, S. Chand and Company Ltd., Delhi, 2011.
2. J. Graville Austin, *The Indian constitution*, Oxford university press, Madras, 1966.
3. Acharya Durgadoss Basu, *Introduction to the constitution of India*, Prentice Hall of India Pvt. Ltd., Delhi, 1997.
4. J. Dharmaraj, *The Indian Constitution* (Tamil) Tensy Publications, Sivakasi, 2013.
5. C.N. Joshi, *The constitution of India*, Mac. Millan India Limited, Madras, 1983

II B.A. History - III Semester

Skill Based Core 1 - Human Rights

L	C
4	4

Objectives :

1. To enable the students acquire knowledge about theories and characteristics of Human Rights.
2. To enable the students understand the Indian Societal Problems and Obstacles in enforcing Human Rights.
3. To know more about the grievance redressal Mechanism in guaranteeing human rights.
4. To study more about Right to Information which protect human rights.

Unit I : Definition of Human Rights - Origin and Development of Human Rights - Theories - Kinds: Natural, Moral, Legal, Political, Economic and Civil. **(10 L)**

Unit II : Universal Declaration of Human Rights 1948 - International Covenant in Civil and Political Rights 1966 - International Covenant on Economic, Social and Cultural Rights 1966 - Convention on Elimination of all forms of Racial Discrimination 1965 - Convention on Elimination of all forms of Racial Discrimination against Women 1979 - Convention on the Rights of the Child 1989 - U.N. Declaration, Duties and responsibilities of Individuals, 1997 - U.N. Agencies to monitory compliance such as UN High commission for Human Rights and the Committees under the various conventions. **(14 L)**

Unit III : Constitutional Provisions - Difference between Human rights and Fundamental rights - Human Rights Organizations - National & State Human Rights Commissions - Grievance Redressal Mechanism - NGO's Social Movements - Pressure Groups. **(12 L)**

Unit IV : Core Problems - Poverty, unemployment and Illiteracy, Caste and Class - Custodial violence- Problems of health and environmental protection - problems of Aged and Physically Challenged - Discrimination against Women and Children. **(12 L)**

Unit V : Special laws volatile of Human Rights - POTA - TATA - TESMA - Lack of accountability and transparency in Government functioning - Right to Information - Inadequate functioning of democratic institutions. **(12 L)**

(Total : 60 L)

Reference Books :

1. Arunima Baruah, *Child Abuse*, Reference Press, New Delhi, 2003.
2. Asima Jabu, *Human Rights Violation and the Law,* Pointer Publication, Jaipur, 1999.
3. Justice, Krishna Iyer, V.R., *Human Rights Miscellany,* B.R.Publishing Corporations, Delhi, 1995.
4. Narorem Sanajaoba, *Human Rights, Principles and abuses,* Om sons Publications, New Delhi, 1994.
5. Patil, V.T., *Human Rights Third Millenium Vision,* Authors Press, New Delhi, 2001.

II B.A. History - III Semester

Non - Major Elective 1 - Freedom Movement in India

L	C
2	2

Objectives :

1. To imbibe the sprit of Nationalism and Patriotism to the students.
2. To make the students understand the various trends and currents of freedom struggle.
3. To make the students to realize the sacrifices of our leaders.
4. To study about the history of the Indian Independence Movement.

Unit I : Origin of Indian Nationalism - Birth of Indian National Congress - Moderates and Extremists. **(6 L)**

Unit II : Home Rule movement - Jallian Wallah Bagh Tragedy - The Khilafat Movement. **(6 L)**

Unit III : Non - Co-operation Movement - Swarajist Party - Simon commission - Nehru Report. **(6 L)**

Unit IV : Civil Disobedience movement - Dandi March - Round Table conferences - Gandhi - Irwin fact. **(6 L)**

Unit V : Quit India movement - Indian National Army – Wavell Plan - Mount Batten Plan - Dawn of Indian Independence. **(6 L)**

(Total : 30 L)

Reference Books :

1. B. Shiva Rao, *Indian Freedom Movement*, Orient Longman Limited, NewDelhi, 1972.

2. Tara Chand, *History of Freedom Movement in India,* Gowardha Kapur and Sons, NewDelhi, 1970.

3. Bipan Chandra, *India's struggle for Independence*, Penguin books, NewDelhi, 1989.

4. B.R. Tomilinzon, *The Indian National Congress and the Raj (1929-1942)*, The Macmillan, Newyork, 1976.

5. Sumit Sarkar, *Modern India, 1885-1947*, Macmillan, Chennai, 2010.

II B.A. History - IV Semester

Core Paper 9 -History of India, (1772-1947 A.D.)

L	C
4	4

Objectives :

1. To explain the students about the Imperialistic policies of the British Rule.
2. To make the students to understand the various social reforms initiated in India.
3. To understand the Indian upheaval against the Colonial Raj.
4. To estimate the role of Indian leaders in liberating mother India from alien rule.

Unit I : Lord Warren Hastings - reforms – impeachment - Lord Cornwallis - reforms - Permanent Revenue Settlement - Lord Wellesley - The Subsidiary system - wars with Hyder Ali and Tipusultan. **(12 L)**

Unit II : Lord William Bentinck - reforms - Lord Dalhousie - Doctrine of Lapse - policy of annexation - The Indian revolt of 1857 - Nature, causes and results. **(12 L)**

Unit III : India under the Crown - Lord Canning - Ripon - reforms - Lord Curzon - policies and administration - Birth of Indian National Congress - Extremist movement - Home Rule Movement - Ghandhi and his role in the freedom movement - Partition - Independence. **(12 L)**

Unit IV : Socio Religious Reform Movements - Brahmo Samaj - Arya Samaj - The Theosophical society – Rama Krishna Mission - Development of Education - Growth of Local - Self Government - impact and legacy of British rule in India. **(12 L)**

Unit V : Indian National leaders - Dadabai Nauroji - G.K. Gokhale - B.G. Tilak - Lala Lajpat Roy - Annie Besant - V.O. Chidambaram Pillai – Jawaharlal Nehru - Kamaraj. **(12 L)**

(Total : 60 L)

Reference Books :

1. B.K. Keswani, *History of Modern India, (1800-1984)*, Himalaya Publishing House, Delhi, 1996.
2. S.C. Ray Choudri, *History of Modern India*, Surjeet Publication, Delhi, 1989.
3. S.N. Sen, *History of Freedom Movement in India (1857-1947)*, Wiley Eastern Ltd., Calcutta, 1989.
4. Hukam Chand, *History of Modern India*, Anmol Publications, Pvt. Ltd., NewDelhi, 2005.
5. V.D. Mahajan, *History of Modern India*, S. Chand and Co, NewDelhi, 1972.

II B.A. History - IV Semester

Core Paper 10 -History of Europe, (476-1453 A.D.)

L	C
4	4

Objectives :

1. To explain the students about the glorious legacy of Roman Empire.
2. To understand the significance of the basic tenets of various Religious.
3. To have a clear cut idea on the influence of Renaissance and Enlightenment.
4. To study more on the Society during the Middle Ages.

Unit I : Rise and fall of Roman Empire – Causes for the downfall – Legacy of Rome – establishment of Venice – occupation of Western Europe by Barbarians. **(12 L)**

Unit II : Eastern Roman Empire – Emperor Justinian – Cultural contribution – Rise and spread of Christianity – papacy - Monastries – The Frankish Kingdom – Charlemagne – Break up of Carolingian Kingdom – Carolingian Renaissance. **(12 L)**

Unit III : The spread of Islam – The Legacy of Islam to Europe – The Holy Roman Empire – Henry the Fowler – Otto, the Great – Feudalism – Manorial System – The Capetian Kings of Frances – Social and economic condition. **(12 L)**

Unit IV : The struggle between Empire and Papacy – The Crusades – the rise of Universities – Growth of Towns – Guild System – The Hundred years War – Church during Later Medieval Ages. **(12 L)**

Unit V : Enlightenment and Renaissance – Plague – France and Germany during later Medieval period – Trade and Commerce – Guild System – Rise and growth of Representative Institutions – The Ottoman Empire – Society at the end of Middle Ages. **(12 L)**

(Total : 60 L)

Reference Books :

1. A.J. Grant, *Outline of European History* (London: Longmans Green and Co., 1958).
2. Chifford R. Backeman, *Sources of Medieval European History* (Clarandon: Oxford University Press, 2014).
3. Edward Gibbon, *Decline and Fall of the Roman Empire* (London: Modern Library Publications, 2000).
4. Christopher Tyermas, *The Crusades, A very short Introduction* (Clarandon: Oxford University Press, 2006).
5. Eugene Rogan, *The Fall of the Ottoman Empire* (London: Penguin Publications, 2016).
6. J. Dharmaraj, *History of Europe* (Tamil) (476 – 1453) (Sivakasi: Tensi Publications, 2016).

II B.A. History - IV Semester

Allied IV - Modern Political Thought

L	C
3	3

Objectives :

1. To understand the political philosophy of various Thinkers.
2. To focus more attention on the importance of socialism.
3. To study in depth about Democracy and popular rights.
4. To estimate the political thought of Mahatma Gandhi in Indian Politics

Unit I : Sovereignty - Thomas Hobbes - John Lock - Political philosophy of Rousseau - Montesquieu - David Hume - Edmund Burke. **(9 L)**

Unit II : Utilitarianism - Jeremy Bentham - James Mill - John Stuart Mill - Idealist theory of state - Immanuel Kant - Individualism - Herbert Spencer. **(9 L)**

Unit III : Socialism - Definition - kinds of Socialism - Fabianism - Marxism - Karlmarx - Communism. **(9 L)**

Unit IV : Democracy - Definition - Liberalism - Nationalism - Internationalism - Imperialism - Fascism - Nazism. **(9 L)**

Unit V : Pluralism - Herold J. Laski - Betrand Russel - Indian Political thought - Mahatma Gandhi. **(9 L)**

(Total : 45 L)

Reference Books :

1. R.P. Sharma, *Political Thought, Plato to Hugo Grotiius, Bhopal*, Sterling Publication, 1984.
2. W. Francis Cocker, *Reading in Political Philosophy*, Newyork Macmillan, 1938.
3. Bhandari, *History of European Political Philosophy*, Bangalore, Bangalore Press, 1994.
4. V. Sharma, *Modern Political Thought*.
5. Sachdeva and Gupta, *A simple study to Political Thought*.

II B.A. History - IV Semester

Skill Based Core 2 - Principles and Methods of Archaeology

L	C
4	4

Objectives :

1. To study about the basic ideas of historical antiquity.
2. To understand the Colonial Contribution in bringing out the Indian Archaeology.
3. To have a wider knowledge on the role of archaeologists in bringing out the cultural significance.
4. To shed more light on various archeological sites including Kizhadi.

Unit I : Definition and scope - Archaeology and allied subjects - kinds of Archaeology - uses of Archaeology. **(12 L)**

Unit II : Indian Archaeology - origin and growth - Sir William Jones - Alexander Cunningham - Lord Curzon - John Marshall - Mortimer wheeler. **(12 L)**

Unit III : Functions of Archaeologists - surface exploration - scientific aids in exploration - excavation personals - excavation equipments - kinds of excavation. **(12 L)**

Unit IV : Dating methods : Radio carbon dating - Thermo luminescence dating - Dendro chronology - Documentation - Register and excavation report - conservation of artifacts. **(12 L)**

Unit V : Archaeology in TamilNadu - Archaeological sites - Athirapakkam - Pyyampalli - Attichanallur - Kaviripumpattinam - Kodumanal - Korkai - Arikkamedu - Kizhadi. **(12 L)**

(Total : 60 L)

Reference Books :

1. K. Rajan, *Archaeology, Principles and Methods*. (Thanjavur: Manoo Pathippakam, 2002).
2. C. Edward Harris, *Principles of Archaeological Stratigraphy* (London: Academic Press Ltd., 1989).
3. A.L. Basham, *The Wonder that was India* (Delhi: Rupa Co., 1967)
4. K. Dilip Chakrabarthi, *India: An Archaeological History, Palaeotithic Beginnings to Early Historic Foundations* (New Delhi: Oxford University Press, 1999).
5. V. Gordon Childe, *A Short Introduction to Archaeology* (New York: Collier Publications, 1960).

II B.A. History - IV Semester

Non-Major Elective 2 - Indian Polity.

L	C
3	2

Objectives :

1. To enable the learners aware of the rights and duties of Indian citizen.
2. To enhance their role as enlightened citizens.
3. To understand the importance of centre - state relations.
4. To focus more attention on constitutional amendments.

Unit I : Nature of the Indian Constitution - The Preamble - Fundamental Rights - Fundamental Duties - The Directive Principles of State Policy. **(6 L)**

Unit II : The Union Government - Executive, Legislature and Judiciary - Supreme Court. **(6 L)**

Unit III : The State Government - The Governor - Chief Minister - Legislature - High Court - Panchayat Raj. **(6 L)**

Unit IV : The Centre & State Relations - Emergency Provisions - Recommendations of the Constitutional Review Commission - Important Amendemets : 42, 44, 73, 74, 84 & 92. **(6 L)**

Unit V : Constitutional Functionaries - Election Commission - General Elections - Electoral Process - National and Regional Parties. **(6 L)**

(Total : 30 L)

Reference Books :

1. Gopal Chowdhary, *Constitution of India,* Vee Kumar Publications Pvt. Ltd., New Delhi, 2005.

2. Graville Austin, J., *The Indian Constitution,* Oxford University Press, Madras, 1966.

3. Joshi, C.N., *The Constitution of India,* Mac. Millan India Limited, Madras, 1981.

4. Poornima G.R. and Suresh Kumar M.N., *The Constitution of India,* Sura College of Competition, Chennai, 2007.

5. Venkatesan, G., *History of Contemporary India 1947 - 2007,* V.C. Publications, Rajapalayam, 2010.

III B.A. History - V Semester

Core Paper 11 - Elements of Historiography

L	C
4	4

Objectives :

1. To make the students to understand the fact that History is a utility subject.
2. To educate the students to have basic knowledge on Historical research methodology.
3. To know more about the Pioneers in Historiography.
4. To study the contributions of Indian Historiographers in writing objective history.

Unit I : History - Meaning and Scope - Nature - Purpose - Definitions of History - Subjects related to History - Kinds of History - History Art or Science? - Uses and Abuses - Lessons of History. **(12 L)**

Unit II : Theory of Causation - Role of Individuals, Institutions and ideas - The concept of Historical Progress. **(12 L)**

Unit III : Reputed Historians - Herodotus - Thucydides- Edward Gibbon - Hegal – Immanuel Kant - Leopold Von Ranke - Karl Marx- A.J. Toynbee **(12 L)**

Unit IV : Indian Historians - Kalhana - Abul Fazl - Jadunath Sarkar - Neelakanda Sastri - R.C. Majumdar - Ranajith Guha – Romila Thappar – Irfan Habib - K. Rajayyan **(12 L)**

Unit V : Historical Research - Pre - requisites of a Research Scholar - Selection of Topic- Collection of Sources - External Criticism - Internal Criticism - Objectivity in Historical Writing - Foot Notes - Bibliography. **(12 L)**

(Total : 60 L)

Reference Books:

1. B. Sheik Ali, *History its Theory and Method,* Penguin Books, New Delhi, 1966.
2. K. Rajayyan, *History in Theory and Method,* Ratna Publications, Madurai, 2000.
3. N. Subramanian, *Historiography*, Ennes Publications, Udumalai Pettai.
4. S. Manickam, *Theory of History and Methods of Research,* Puduman Publications, Madurai, 1987.
5. J. Dharmaraj, *Historiography (Tamil),* Tensy Publications, Sivakasi, 2013.

III B.A. History - V Semester

Core Paper 12 - History of Europe (1453 -1789A.D.)

L	C
4	4

Objectives

1. To impart the students about the historical significance of the dawn of Modern Age.
2. To study about the Christian Reformation and Counter Reformation.
3. To under the power struggle that affected Europe during the period under review.
4. To understand the emergence of the age of Benevolent Despotism in Europe.

Unit I : Beginning of Modern Age - Renaissance - Meaning - Causes - Renaissance in Italy - Renaissance in literature, art, science and polities - Results of Renaissance - The geographical discoveries - Important discoveries. **(12 L)**

Unit II : The Reformation Movement - Meaning - Causes - Martin Luther-Spread of Reformation - Counter reformation - Results. **(12 L)**

Unit III : Rise of Spain - Charles V - His wars - Philip II - The Dutch war of Independence - Causes, Course and results. **(12 L)**

Unit IV : Rise of France - Henry IV - Thirty years war - Causes, Course and Results - Cardinal Richelieu - Cardinal Mazarin. **(12 L)**

Unit V : Age of Enlightenment - Louis XIV - Reforms - Foreign policy - Peter, the Great - Catherine II - Frederick, the Great of Prussia - Maria Theresa of Austria - Joseph II - Causes for his failure. **(12 L)**

(Total : 60 L)

Reference Books :

1. J.P. Sinha, *History of Europe,* 1453 to present day, Kedarnath Ramnath Publications, Meerat, 1974.
2. B.V. Rao, *History of Europe* (1450 – 1815) (New Delhi: Sterling Publishers Pvt. Ltd., 2001).
3. H.A.L. Fisher, *A History of Europe Vol. II* (Delhi: Surjeet Publications, 1981)
4. Charles Downer Hazan, *Modern Europe upto 1945* (New Delhi: S. Chand & Co., 1983).
5. Denys Hay (ed.), *A General History of Europe* (London: Longmans Green and Co., 1968).

III B.A. History - V Semester

Core Paper 13 - History of China (1839 -1966 A.D.)

L	C
4	4

Objectives

1. To study in depth the significance the advent of Europeans in China.
2. To know more about the series of Chinese failures.
3. To understand the emergence of Chinese Nationalism.
4. To study the various strategies in the establishment of Peoples Republic of China in the land of Iron Curtain.

Unit I : Advent of Europeans - First Opium War - Treaty of Nanking - Tai Ping Rebellion - Second Opium War - Taiping reforms. **(12 L)**

Unit II : Western impact on China - Sino - Japanese War, 1894-95 - Western exploitation of China - open door policy - Hundred days reform - Boxer Rebellion. **(12 L)**

Unit III : The Revolution of 1911 - Dr. Sun yat sen - His ideas - Dawn of Chinese Republic. **(12 L)**

Unit IV : Yuan shi-kai- China and First World War - 21 Demands - May Fourth Movement - Washington Conference. **(12 L)**

Unit V : Rise of Kuomintang - Chiang Kai Sheik - Formation of Communist Party - Second Sino – Japanese war - China and Second World War- Mao Tsetung - Establishment of Peoples Republic of China - Cultural Revolution. **(12 L)**

(Total : 60 L)

Reference Books :

1. M.D. David, *The Making of Modern China,* Himalaya Publishing House, New Delhi, 1993.

2. Shiv Kumar and S. Jain, *History of Far East in Modern Times*, S. Chand & Co. Ltd., New Delhi, 1982.

3. S. Kathirvel, *Modern China, Madurai Publishing House*, Madurai, 1978.

4. Clyde and Beers, The Far East - A History of Western Impacts and Eastern Response 1830-1975, Prentice Hall of India, New Delhi, 1988.

5. Fairbauk and John King, China - A New History.

III B.A. History - V Semester

Core Paper 14 – Indian Public Administration

L	C
4	4

Objectives

1. To understand the basic principles of public administration
2. To study more on functions, pavers of chief Executive
3. To have a wider knowledge on the principles of organization and its structure
4. To understand the role of planning commission and Nidhi Ayog in the development of Indian economy.

Unit I : Meaning, Nature and scope of Public Administration – Evolution of Public administration in developed and developing countries. **(12 L)**

Unit II : Chief Executive – Functions and powers of Chief Executives – Departments as fundamental units of administration – Location of authority in a department – Public Enterprises – its growth – Independent Regulatory Commission. **(12 L)**

Unit III : Principles of Organisation – Hierarchy – Span of Control – Unity of Command – Centialised and decentralized administration – structure of organistion – 73rd and 74th constitutional amendments. **(12 L)**

Unit IV : Management issues – Participative Management – Planning Commission – Nidhi Ayog – National Development Council – Finance Commission. **(12 L)**

Unit V : Administrative Reforms Commission – its recommendations – Right to Information Act – Disaster Management – Contemporary challenges in Public Administration. **(12 L)**

(Total : 60 L)

Reference Books :

1. S.R. Maheswari, *Public Administration in India An Introduction* (Delhi: Mac Millan India Ltd., 2000).
2. Rumki Basu, *Public Administration Concepts and Theries* (New Delhi: Sterling Publisher Pvt. Ltd., 2012).
3. C.N. Bhalerao (ed.) *Administration, Politics and Development in India* (Bombay: Lalwani Publishing House, 1972).
4. A. Avasthi and S. Maheswari, *Public Administration* (Agra: Lakshmi Narair Agarwal, 1983).
5. R.B. Jain*, Contemporary Issues in Indian Administration* (New Delhi: Vishal Publishers, 1976).

III B.A. History - V Semester

Major Elective 1 - Constitutional History of India, (1773-1947)

L	C
3	4

Objectives

1. To study about a focus on the various constitutional experiments in India.
2. To understand the significance of charter Acts and its implications.
3. To have a clear cut idea on the content of Indian Councils Acts.
4. To know more about the skeleton of the proposed Indian Constitution.

Unit I : The Regulating Act of 1773- Circumstances - Provisions - Significance - Defects - The Act of 1781 - Pitt's India Act of 1784 - Provisions - Significance. **(12 L)**

Unit II : Circumstances – Provisions – Significance of the Charter Act of 1793, 1813, 1833 and 1853 - The Act of 1858 - The Queen's Proclamation of 1858 - Significance. **(12 L)**

Unit III : The Indian Councils Act of 1861 and 1892- Circumstances - Provisions - Significance. The Minto - Morley Reforms of 1909 - Circumstances Provisions - Significance. **(12 L)**

Unit IV : Montague Chelmsford Reforms of 1919- Provisions - Dyarchy in the provinces - significance - The Government of India Act of 1935 - Provisions - Provincial autonomy. **(12 L)**

Unit V : Constitutional Development between 1935-1947 -August Offer - Cripp's Proposals - Cabinet Mission Plan - Formation of Constituent Assembly - The Indian Independence Act of 1947. **(12 L)**

(Total : 60 L)

Reference Books

1. Dutgadoss Basu, *Introduction to the Constitution of India*, Prentice Hall of India Pvt. Ltd., Delhi, 1997.

2. C.N. Joshi, *The Constitution of India*, Mac Millan India Limited, Madras, 1983.

3. R.C. Agarwal, *Constitutional Development and National Movement of India*.

4. Herma Finer, *The Theory and Practice of Modern Government,* Surject Publications, Delhi, 1977.

5. M. Laxmikanth, *Indian Polity*, Tata Mc Graw Hill, New Delhi, 2011.

III B.A. History - V Semester

Major Elective 2 - Panchayat Raj in India

L	C
3	4

Objectives

1. To understand the evolution of Panchayat Raj as an institution in India.
2. To study the impact of Gandhian views on Panchayat Raj.
3. To make aware of the students about the history of Panchayat Raj over the years.
4. To understand gross root democracy and decision making from the bottom - up.

Unit I : Local Self Government - an introduction - Evolution of Panchayat Raj in India - Little Republics - Local Self Government during the Chola period - The contribution of British Colonial Government to the development of Local Self - Government - The Experiments of Lord Rippon. **(12 L)**

Unit II : Grama Rajya - Gandhian Principles - Bhoodan Movement - Sarvodaya Philosophy - Role of Non - Governmental Organisation in Panchayat Raj Institutions - 73rd Constitutional Amendment. **(12 L)**

Unit III : Panchayat Raj system in India - Development from 1947-2001 - Panchayat finance - Panchayat administration. **(12 L)**

Unit IV : Urban Local Government - Financial Administration - State Control over Urban Local Government - Balwant Roy Mehta Committee - Ashok Mehta Committee. **(12 L)**

Unit V : Rural Local Government - Village Panchayats - Panchayat Samitis - Zillah Parishad - Income of Rural Local Governments - Municipalities - Corporations - 74th Constitutional Amendment - Role of people in Panchayat Raj institutions. **(12 L)**

(Total : 60 L)

Books for References :

1. Ravi Goel, *Panchayati Raj in India* (New Delhi: Sonali Publications, 2012).
2. L.P. Shukla, *A History of Village Panchayats in India* (Dharwar: Institute of Economic Research, 1964).
3. R.L. Khanna, *Panchayati Raj in India* (Ambala: The English Book Depot., 1972).
4. Shweta Mishra, *Democratic Decentralisation in India* (New Delhi: Mittal Publications, 1994).
5. M. Aslam, *Panchayati Raj in India* (New Delhi: National Book Trust, 2007).
6. Ravi Goswami, *Panchayati Raj in India* (Delhi: Signature Books International, 2012).

III B.A. History - VI Semester

Core Paper 15 - History of Europe (1789-1945 A.D.)

L	C
4	4

Objectives

1. To make the students learn major issues and current issues during the period under study.
2. To make the students understand the reaction to Nationalism and Liberalism.
3. To understand the impact of World wars on Global Society.
4. To estimate the role of UNO in maintaining World Peace.

Unit I : French Revolution - Causes, Course and Results - Rise of Napoleon Bonaparte - Napoleonic Wars - Continental System - Domestic reforms - Causes for the failure of Napoleon. **(12 L)**

Unit II : Vienna Congress - Holy Alliance - Concert of Europe - Matternich System – Charles X - Revolution of 1830 and 1848 - Napoleon III. **(12 L)**

Unit III : Unification of Italy- various stages - Unification of Germany - Role of Bismark in the Unification of Germany. **(12 L)**

Unit IV : Eastern Question - Greek War of Independence - The Young Turk Movement - The Crimean War - Balkan Wars. **(12 L)**

Unit V : First World War - Treaty of Versailles - League of Nations - The Russian Revolution of 1917 - Lenin - Fascism in Italy - Nazism in Germany - Second World War - Formation of UNO. **(12 L)**

(Total : 60 L)

Reference Books :

1. A.J.Grant, *Europe in the Nineteenth and Twentieths Centuries*, 1789 - 1950, Longman Publications, London, 1980.

2. H.A.L. Fisher, *A History of Europe,* Vol. II, Surject Publications, Delhi, 1994.

3. B.V. Rao, *History of Europe,* Sterling Publishers, New Delhi, 2002.

4. J. Dharmaraj, *History or Europe*, 1789 to Present day (Tamil) Tensy Publications, Sivakasi, 2014.

5. S.P. Nanda, History of Modern Europe and the World, Anmol Publications, New Delhi, 2000.

III B.A. History - VI Semester

Core Paper 16 - History of Science and Technology Since 17th Century.

L	C
4	4

Objectives

1. To understand more about the history of Science and Technology during the period under study.
2. To realize the Scientific inventions during the 18th C in protecting human beings.
3. To study about the emergence of new scientific inventions.
4. To trace the contributions of Indian Scientists in preserving global peace and development.

Unit I : Science and Technology in the Seventeenth Century - Royal Academies - Physics and Mathematics - Issac Newton - Medical Science - William Harvey - Marcello Malpige. **(12 L)**

Unit II : Science and Technology in the Eighteenth Century - Inventions in Textile Industry - Progress in Chemistry - Henry Cavendish - Joseph Priestly - Lavoisier Medical Science - John Hunter - Edward Jenner. **(12 L)**

Unit III : Science and Technology in the 19th Century - Biology - Charles Darwin - Physics - Michael Faraday - Maths - Janes Clerk Maxwell - Chemistry - John Dalton - Medicine - James Young Simpson - Louis Pasteur. **(12 L)**

Unit IV : Science and Technology in 20th Century – Alfred Nobel - Albert Einstein – Rontgen and X-ray – Mary Curie – Marconi – Telephone and Telegram - Television and Computers – Radars. **(12 L)**

Unit V : Science and Technology in Modern India - Space Research - Space Missions - Atomic Energy Commission - D.R.D.O.-Pioneers of Modern Science - J.C. Bose - B.C. Roy - Srinivasa Ramanujam - C.V. Raman - Chandrasekar - APJ Abdul Kalam - M.S. Swaminathan. **(12 L)**

(Total : 60 L)

Reference Books:

1. R. Venkatraman, *A History of Science and Technology,* N.S. Publications, Madurai, 1988.
2. Kalpana Rajaram, *Science and Technology in India,* Spectrum India, New Delhi, 1993.
3. S.F. Mason, *History of Science,* Thomas Nelco and Sons Ltd., London, 1973.
4. Kuppuram, *History of Science and Technology in India,* Sundeep Prakashan, Delhi, 1991.
5. B. Jagadish Nair, *Inventions and Discoveries,* Computech Publications, Thiruvananthapuram, 1986.
6. J. Dharmaraj, *History of Science and Technology,(Tamil),* Tensy Publications, Sivakasi, 2017.

III B.A. History - VI Semester
Core Paper 17 - History of India Since 1947

L	C
4	4

Objectives :

1. To understand the conditions of India on the eve of Independence.
2. To study the contributions made by the architects of India.
3. To know more about the foreign policy of India which is always working for global peace.
4. To understand the emergence of regional sub-nationalism in India and its results.

Unit I : Position of India on the eve of Independence -The Problems of Partition - Integration of Indian States - States re-organisation. **(12 L)**

Unit II : Prime Ministers of India - Jawaharlal Nehru - Internal and Foreign Policy - Lal Bahadur Sastri - Indira Gandhi - Emergency - Birth of Bangladesh. **(12 L)**

Unit III : Rajiv Gandhi - Foreign Policy - National Front Government - Narasimha Rao - Atal Bihari Vajpaye. **(12 L)**

Unit IV : Peasants Struggle - Terrorism in Punjab - Assam Struggle - Telengana Struggle - Foreign Policy of India - India and Non- Aligned Movement - India and UNO - SAARC. **(12 L)**

Unit V : Development of Education - Planned Economic Development - Transport and Communication - Cultural Activities in India. **(12 L)**

(Total : 60 L)

Reference Books :

1. Biphan Chandra, *India after Independence, (1947-2000*) Penguin Books, New Delhi, 2000.

2. P.K. Braw, *Politics of India since Independence*, New Delhi, 1999.

3. S.R. Chakaravarthy, *Contemporary India*, New Delhi, 2005.

4. *'Varalatru Suvadugal'* (Tamil) Thina thanthi Pathippagam, Veperi, Chennai, 2010.

5. J.Dharamraj, *Contemporary History of India,* (Tamil) Tensy Publications, Sivakasi, 2014.

III B.A. History - VI Semester

Core Paper 18 - Women's Studies

L	C
4	4

Objectives :

1. To make the students understand the need for change among the women.
2. To make them understand the need for the empowerment of women and realization of that goal.
3. To understand the various reasons for the secondary status given to the Indian women.
4. To estimate the contributions made by pioneering Indian women leaders in uplifting the women folk.

Unit I : Women's Studies - definition - importance and purpose - Feminism - Definition - Feminist - Concept of Feminism. **(12 L)**

Unit II : Causes for the rise of Feminism - Rise and Growth of Feminism in U.S.A. - in England - kinds of feminism - Modern Feminist thinkers. **(12 L)**

Unit III: Women's Rights - UNO and Women's Rights - Women's right Conferences - Social Status of Indian Women, a historical view - social evils in India. **(12 L)**

Unit IV: Rise of Indian Feminism - Women's Organizations - Struggle for Women's Suffrage - Protection of Women's rights Acts - Government schemes for women - Central and state level - Women's Right Commission - Nation and State. **(12 L)**

Unit V : Pioneering Indian Women - Jhansi Rani Lakshmi Bai - Annie Besant - Nivethitha - Pandit Ramabai - Sarojini Naidu - Indira Gandhi - Muthulakshmi Reddi - Women and Self help Groups - Contemporary social problems faced by women. **(12 L)**

(Total : 60 L)

Reference Books :

1. Nirmala Jeyaraj (Ed.)., *Women and Society,* Lady Doak College, Madurai, 2005.
2. CarloBuswell, *Women in Contemporary Society,* Mac Millan Ltd., 1989.
3. Uma Sahnar Jha, *Indian Women Today,* Kanishka Publications, New Delhi, 1996.
4. Chandra Babu and *Thilagavathy, Women - Her History and Her Struggle for Emancipation*.
5. J.Dharmaraj, *Women's Studies (Tamil),* Tensy Publications, Sivakasi, 2012.

III B.A. History - VI Semester

Core Paper 19 - Group Project and Viva

L	C
0	7

Objectives :

The Group Project / Dissertation with Viva - Voce in B.A. Degree Course in History has to be guided by the Course teacher. Students (not more than 5 members in a Group) can chose a topic of their own interest related to their subject in consultation with the respective teachers under whom they are assigned to work.

Students have to submit the Project/ Dissertation atleast 15 days before the commencement of their Theory Paper Examinations. Students have to write the Project / Dissertation in not less than 40 pages and not more than 50 pages adopting the techniques of Historical Research Methodology offered during the V Semester. It has to contain 3 to 4 chapters apart from the Introduction and Conclusion. There shall be a review of the progress of the Group project / Dissertation writing every week by the teachers who guide the students so as to expedite the completion of the work.

Group Project / Dissertation

Internal Mark : 40
(To be awarded by the guide)

External Mark : 60
(To be awarded by the External Expert)

Total : 100 marks

A Group consists of not more than 5 members.

III B.A. History - VI Semester

Major Elective 3 - Epigraphy

L	C
3	4

Objectives :

1. To understand the historicity of a country with the study of Epigraphy.
2. To know more about the evolution of various scripts.
3. To estimate the contribution made by both foreign and indigenous epigraphists in writing the History of India.
4. To understand the significance of inscriptions and Copper plates.

Unit I : Introduction - Importance of Epigraphy - Origin and Growth - Kinds of Inscriptions - Literary, Political, Religious, Memorial, Legal, Welfare, Social Status and Spurious - Contents and Conventions. **(12 L)**

Unit II : Evolution of Scripts - Paleography - Pictograph - Ideograph - Phonograph - Logograph - Cuneiform - Graffiti - Linear - Brahmi - Vatteluthu - Grantha - Writing Materials - Decipherment. **(12 L)**

Unit III: Dating System - Eras - Saka Era - Kali Era - Vikrama Era - Kollam Era. **(10 L)**

Unit IV: Eminent Epigraphists - James princep - George Buhler - J.F.Fleet - James Burgess - H.Krishna Sastri - V. Venkayya - B.L. Rice - Robert Sewell - E. Hultzeh - K.V. Raman - Nagasamy - Iravatham Mahadevan- Natanakasinathan-Kudavail Balasubramaniam. **(14 L)**

Unit V : Inscriptions - Uttaramerur - Manur - Kanyakumari - Copper Plates - Kurram - Velvikudi - Estampage Training. **(12 L)**

(Total : 60 L)

References Books :

1. Radhakrishna Chaudry, *Inscriptions of Ancient India* (New Delhi: Begam Bridge Publications, 1983).
2. T.A. Gobinatha Rao, *Elements of Hindu Iconography* (New Delhi: Motilal Banarasidass Publisher, 1997).
3. N. Subramanian & R. Venkataraman, *Tamil Epigraphy – A Study* (Madurai: Ennes Publications, 1980).
4. Sreethar, *Tamil Brahmi Inscriptions* (Tamil) (Chennai: Dept. of Archaeology Publications, 2010).
5. R. Nagasamy, *Epigraphy (Tamil)* (Chennai: Dept. of Archaeology Publications, 2010).
6. J. Dharmaraj, *Epigraphy (Tamil)* (Sivakasi: Tensy Publications, 2015).

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES
Common Course Structure for **B.A. Degree Programmes**

B.A. History (Vocational) Tourism

(Choice Based Credit System)

(with effect from the academic year 2017-2018 onwards)

III Semester

Part	Subject Status	Subject	Hours	L	C
I	Language	Tamil	06	06	04
II	Language	English	06	06	04
III	Core 7	Principles and Methods of Archaeology	04	04	04
	Core 8	Travel Geography	05	05	04
	Allied III	1. Organizational Behaviour 3. Public Relation and Advertising 3. Office Administration	03	03	03
IV	Skill Based Core 1	Communicative Hindi	04	04	04
V	Non- Major Elective 1	Introduction to Tourism	02	02	02
VI	Common III	Yoga	-	-	02
	Total		30		27

IV Semester

Part	Subject Status	Subject	Hours	L	C
I	Language	Tamil	06	06	04
II	Language	English	06	06	04
III	Core 9	Constitutional History of India(1773-1947)	04	04	04
	Core 10	Tourism Marketing	04	04	04
	Allied IV	1. Principles of Management 3. Front Office Management 3. Business Communication in Tourism	03	03	03
	Skill Based Core 2	Computer Applications To Tourism	05	05	04
IV	Non- Major Elective 2	Air Travel, Ticketing and Fare Construction	02	02	02
V	Common IV	Computer for Digital Era	-	02	02
VI	Extension Activities	NSS, NCC, YRC, YWF	-	01	01
	Total		30		28

V Semester

Part	Subject Status	Subject	Hours	L	C
III	Core 11	History Of India (C. 1750s – 1970s)	05	05	04
	Core 12	Cultural History of South India - I	05	05	04
	Core 13	Economics of Tourism	06	06	04
	Core 14	Eco Tourism	04	04	04
V	Major Elective 1	Elements of Historiography	04	04	04
	Major Elective 2	Travel Agency Management	04	04	04
	Skill Based Common (Any one)	Personality Development (or) Effective Communication (or) Youth Leadership	02	02	02
	Total		30		26

VI Semester

Part	Subject Status	Subject	Hours	L	C
III	Core 15	Social History of India	05	05	04
	Core 16	Cultural History of South India - II	05	05	04
	Core 17	Art And Architecture In India (South India)	05	05	04
	Core 18	Art And Architecture In India (North India)	04	05	04
	Core 19	Group Project	07	-	07
IV	Major Elective 3	Tourism Policy and Planning	04	04	04
	Total		30		27

B.A History (vocational) Tourism

III Semester

Core

Principles and Methods of Archaeology

L	C
4	4

Objectives:

The module is prescribed in the course to inform the students about the basic ideas of historical antiquity and to make the students to understand the Colonial Contribution in bringing out the Indian Archaeology and also shed more light on various archeological sites including Kizhadi.

Unit I : Definition and scope - Archaeology and allied subjects - kinds of Archaeology - uses of Archaeology. **(12 L)**

Unit II : Indian Archaeology - origin and growth - Sir William Jones - Alexander Cunningham - Lord Curzon - John Marshall - Mortimer wheeler. **(12 L)**

Unit III : Functions of Archaeologists - surface exploration - scientific aids in exploration - excavation personals - excavation equipments - kinds of excavation. **(12 L)**

Unit IV : Dating methods : Radio carbon dating - Thermo luminescence dating - Dendro chronology - Documentation - Register and excavation report - conservation of artifacts. **(12 L)**

Unit V : Archaeology in TamilNadu - Archaeological sites - Athirapakkam - Pyyampalli - Attichanallur - Kaviripumpattinam - Kodumanal - Korkai - Arikkamedu - Kizhadi. **(12 L)**

(Total : 60 L)

Reference Books :

1. K. Rajan, *Archaeology, Principles and Methods*. (Thanjavur: Manoo Pathippakam, 2002).
2. C. Edward Harris, *Principles of Archaeological Stratigraphy* (London: Academic Press Ltd., 1989).
3. A.L. Basham, *The Wonder that was India* (Delhi: Rupa Co., 1967)
4. K. Dilip Chakrabarthi, *India: An Archaeological History, Palaeotithic Beginnings to Early Historic Foundations* (New Delhi: Oxford University Press, 1999).
5. V. Gordon Childe, *A Short Introduction to Archaeology* (New York: Collier Publications, 1960).

B.A History (vocational) Tourism

III Semester

Core

TRAVEL GEOGRAPHY

L	C
5	4

Objectives:

The module is prescribed in the course to inform the students about the importance of geography and to make the students to develop their skill in said area as it is relevant to tourism.

Unit – I:

Geographical features, location, physiography, metrology etc. – topography and geology-natural vegetation – population and human development – drainage.

(15 L)

Unit- II :

Geography of tourism: Overview- world‘s continents – longitude and Gratitude of map reading skills – Exploring the countries of the world and cities.

(15 L)

Unit- III:

Natural tourist resources – land forms & terrains – tourist destinations – water bodies – hill af mountain resorts – sanctuaries – monuments, historical and archaeological sites, museum and art galleries etc. **(15 L)**

Unit – IV:

Development of Tourism in India with special reference to geography – Impact Assessment – approaches, methodology and techniques **(15 L)**

Unit – V:

World time zones – Elapsed travel times – international date line

(15 L)

(Total : 75 L)

Books for Reference:

1. Bhatia A.K. - Tourism Development, Principles and Practices
2. Dubey & Negi - Economic Geographic
3. Jagmohan Negi - Tourism Guide and Tour Operation : Planning and Organizing

B.A History (vocational) Tourism

III Semester

Allied - 1

ORGANIZATIONAL BEHAVIOUR

L	C
3	3

Objectives:

The module is prescribed in the course to inform the students about the various attitudes of people in organization and to make them to understand how it is important in tourism industry.

Unit – I:

Importance and scope of organizational psychology – individual difference – intelligence tests – measurement of intelligence – personality tests – nature, types and uses.

(9 L)

Unit – II:

Perception – factors affecting perception – motivation – theories – financial and nonfinancial motivation - techniques of motivation – transactional analysis – brainstorming.

(9 L)

Unit – III:

Job Satisfaction – meaning – factors – theories – management of job satisfaction –
morale – importance – employee attitude and behavior and their significance to employee productivity – job enrichment – enlargement.

(9 L)

Unit – IV:

Hawthorne experiment – importance – group dynamics – cohesiveness – co-operation – competition – conflict – types of conflict – resolution of conflict – socio-metry – group norms – role – position – status – supervision style – training for supervision.

(9 L)

Unit – V:

Leadership – types – theories – leadership training and evaluation – organizational
climate – organizational effectiveness – organizational development – counseling and guidance – importance of counselor – types of counseling – information needed for counseling.

(9 L)

(Total : 45 L)

Books for Reference:

Fred Luthans	:	Organisational Behaviour
Prasad, L.M.	:	Organisatinal Behaviour
Hippo	:	Organisational Behaviour
Keith Davis	:	Human Behaviour at work
Ghos	:	Industrial Psychology

B.A History (vocational) Tourism

III Semester

Allied - 1

PUBLIC RELATION AND ADVERTISING

L	C
3	3

Objectives:

The module is prescribed in the course to inform the students about the importance of PR and advertisement in tourism and to develop their skill in the relevant area..

Unit-I:

Principles of public relations &communication-Definition-Nature-Functions-Role of public relations in marketing-sales-Exhibition and Fairs-Definition of communications- Tools and media of public relations concepts and classifications. Classification of newspaper Visual communication-Media Relation-Public Relations and Writings.

(9 L)

Unit-II:

Corporate Public Relations-Emerging Corporate India-PR Challenges-challenges of the public relations changing business environment-Media Relations-Employees Relations

(9 L)

Unit-III:

Editing &Production of Publications-Corporate-Scope-Type-Editing techniques of PR- Photography-Graphics and Colour-Good Layout-Proof Reading.

(9 L)

Unit-IV:

Advertising Theory &Practice-Advertising Theory-Types &Classification-Planning and Managing Advertising Compaigns-Creating Audio&Visuals Advertising media.

(9 L)

Unit-V:

The Role of Public Relations in Promoting Tourism-Need for PR department in Tourism-PR functions & Role in Tourism-PR as an effective marketing Tour PR and publicity in Tourism.

(9 L)

(Total : 45 L)

Books for reference:

1. Bernecker Paul-Mmethods of Media of Tourist Publicity,Austrian National Tourist office 1961.
2. Hollow JC-the Business of Tourism,Pitman London 1980.
3. Jenkins IR&Jif JJ.Planning the Advertising Campaign,Macmillan Publishing 1973.
4. Morrison J.W-Travel Macmillan Publishing 1973.
5. Morrison J.W-Travel Agents & Tourism Acro Publishing Inc.New York 1980.
6. chmoll G.M-Tourism Promotion.Tourism International Press London 1977.
7. Van Harsell-Tourism in exploration,Prentice Hall 1970.
8. S.A.Chunawalla & K.C.Sethia-Foundations of Advertising-Theory and Practice, Himalaya Phb 2002.

B.A History (vocational) Tourism

III Semester

Allied - 1

OFFICE ADMINISTRATION

L	C
3	3

Objectives:

The module is prescribed in the course to inform the students about the concept of administration to develop their skill in administration.

Unit-I:

Meaning of office – Importance of an office – Functions of an office – meaning of office administration – office manager – functions.

(9 L)

Unit-II:

Office layout – objectives – importance – principles of office layout – open office – private office. Office furniture – need for standardized furniture – selection of furniture – types of furniture.

(9 L)

Unit-III:

Filling – Functions – significance – Advantages. methods of classification of files – filing system and equipments. Indexing.

(9 L)

Unit-IV:

Office forms – kinds – Forms control – Objectives of forms control – forms designing – principles of form designing continuous stationary supplies. **(9 L)**

Unit-V:

Office mechanization – objects – need for office machanisation – office automation – selection of office machines – types of machines.

(9 L)

(Total : 45 L)

Books for Reference:

1. Office organization and Management - R.K.Chopra

Office Management and commercial correspondence – Balraj Digga

B.A History (vocational) Tourism

III Semester Skilled Based Core

Skill Based Core - 1
COMMUNICATIVE HINDI

L	C
4	4

Objectives:

The module is prescribed in the course to inform the students about the importance of Hindi in tourism field and develop their skill both in oral and written.

Unit-I:

Starts with alphabets, word construction sentence formations with applied grammer, numerals, functional Hindi, names of flowers, relations vegetables, parts of conversational Hindi. **(12 L)**

Unit-II:

Conversation in day-to-day life, between two friends, teacher, students, market places, shops, enquires in bus stand, railway airport, about current affairs,sports and in college. **(12 L)**

Unit-III:

Some phrases proverbs and idioms also will be practiced. Creative Writing and Reading. **(12 L)**

Unit-IV:

Essays connection with temples, festivals of India, important incidents and simple stories. Translation **(12 L)**

Unit – V:

10-15 sentences in English to Hindi and Hindi to English. **(12 L)**

(Total : 60 L)

Books for reference:

1. Anuvadmala Part – 1, Dakshan Bharat Hindi Prachar Sabha , Chennai – 17

2. Manohar Kahaniyam , Dakashan Bharat Hindi Prachar Sabha , Chennai -17.

3. Gadhya Sankam, Dakshan Bharat Hindi Prachar Sabha, Chennai – 17.

4. Tamil Nadu, Veera Raghavan, Publication Division, Ministry of Information and Broadcasting, Patiala House, New Delhi.

5. Temples of India: Myths and Legends , Mathuram Bhoothalingam, Ministry of Information and Broadcasting.

B.A History (vocational) Tourism

III – SEMESTER

: **Non Major Elective**

INTRODUCTION TO TOURISM

L	C
2	2

Objectives:

The module is prescribed in the course to inform the students about the importance of tourism and make them to aware of it.

Unit-I:

Historical evaluation and development of tourism - Murphy‘s factors on the evolution of tourism – Paid holidays and transition to modern tourism.

(6 L)

Unit-II:

Tourism Phenomenon: Concepts, forms and types and nature – Future trends – Purpose of tourism

(6 L)

Unit-III:

Tourism system – Basic concepts and Impacts: Introduction, concepts of pull and push – Demand and supply – Motivations and factors for travel – Measurements of tourism and statitics – Economic, social, physical and environment impacts of tourism.

(6 L)

Unit-IV:

Travel formalities and procedures – arrival formalities – departure formalities – Travel and tourism terminology – air, ship and rail travel – hotel terminology, general terms – tourism abbreviations – steamship code abbreviation

(6 L)

Unit-V:

Growth and Development of Tourism in India – Tourism Commities – pre and post – Independence periods National Committee on tourism – National Action Plan and Policies for Civil Aviation and Tourism.

(6 L)

(Total : 30 L)

Books for Reference:

1. Bhatia A.K. : Tourism Development – Principles and practices National Action Plan 1992.
2. Burhat and Medlit : Tourism – Past, Present and Future Raul. R.H. : Dynamics of Tourism
3. Christopher J.Holloway : The Business of Tourism Macdonald and Evans 1983.
4. Selvaraj .C. : Principles of Tourism.

B.A History (vocational) Tourism

IV – SEMESTER

Core

Constitutional History of India, (1773-1947)

L	C
4	4

Objectives

1. To study about a focus on the various constitutional experiments in India.
2. To understand the significance of charter Acts and its implications.
3. To have a clear cut idea on the content of Indian Councils Acts.
4. To know more about the skeleton of the proposed Indian Constitution.

Unit I : The Regulating Act of 1773- Circumstances - Provisions - Significance - Defects - The Act of 1781 - Pitt's India Act of 1784 - Provisions - Significance. **(12 L)**

Unit II : Circumstances – Provisions – Significance of the Charter Act of 1793, 1813, 1833 and 1853 - The Act of 1858 - The Queen's Proclamation of 1858 - Significance. **(12 L)**

Unit III : The Indian Councils Act of 1861 and 1892- Circumstances - Provisions - Significance. The Minto - Morley Reforms of 1909 - Circumstances Provisions - Significance. **(12 L)**

Unit IV : Montague Chelmsford Reforms of 1919- Provisions - Dyarchy in the provinces - significance - The Government of India Act of 1935 - Provisions - Provincial autonomy. **(12 L)**

Unit V : Constitutional Development between 1935-1947 -August Offer - Cripp's Proposals - Cabinet Mission Plan - Formation of Constituent Assembly - The Indian Independence Act of 1947. **(12 L)**

(Total : 60 L)

Reference Books

1. Dutgadoss Basu, *Introduction to the Constitution of India*, Prentice Hall of India Pvt. Ltd., Delhi, 1997.
2. C.N. Joshi, *The Constitution of India*, Mac Millan India Limited, Madras, 1983.
3. R.C. Agarwal, *Constitutional Development and National Movement of India*.
4. Herma Finer, *The Theory and Practice of Modern Government,* Surject Publications, Delhi, 1977.
5. M. Laxmikanth, *Indian Polity*, Tata Mc Graw Hill, New Delhi, 2011.

B.A History (vocational) Tourism

IV – SEMESTER

Core

TOURISM MARKETING

L	C
5	4

Objectives:

The module is prescribed in the course to inform the students about the principles and concept of tourism marketing and to develop their skill in marketing.

Unit-I:

Definition-market segmentation-marketing in tourism-marketing mix-tourism product.

(15 L)

Unit-II:

Advertising-purpose in tourism-planning for advertising-production of advertisement-display of posters-media-travel writing.

(15 L)

Unit-III:

Display and sale in tourism market-conference,conventions and exhibition services-distribution channels for tourists supply-characteristics of tourist product distribution-distributive functions.

(15 L)

Unit-IV:

Sales forecasting-techniques-factors-methods-forecasting tourism products-carrying capacity analysis.

(15 L)

Unit-V:

Marketing communication-Public Relation-Personality-Marketing Research-types-Organisation- Marketing Research in Tourism-sorces of data for research in tourism.

(15 L)

(Total : 75 L)

Books for reference:

1. Manish Srivatsava - National and State Tourism Marketing
2. Jha S.M - Tourism Marketing
3. Beri G.C - Marketing Research

B.A History (vocational) Tourism

IV – SEMESTER

Allied -II

PRINCIPLES OF MANAGEMENT

L	C
3	3

Objectives:

The module is prescribed in the course to inform the students about the principles and concept of management to develop their skill in management.

UNIT -I:

HISTORICAL DEVELOPMENT

Definition of Management - Science or Art - Management and Administration - Development of Management Thought - Contribution of Taylor and Fayol - Functions of Management - Types of Business Organisation.

(9 L)

UNIT –II:

PLANNING Nature & Purpose - Steps involved in Planning - Objectives - Setting Objectives - Process of Managing by Objectives - Strategies, Policies & Planning Premises- Forecasting - Decision- making.

(9 L)

UNIT –III:

ORGANISING Nature and Purpose - Formal and informal organization - Organization Chart - Structure and Process - Departmentation by difference strategies - Line and Staff authority - Benefits and Limitations - De-Centralization and Delegation of Authority - Staffing - Selection Process - Techniques - HRD - Managerial Effectiveness.

(9 L)

UNIT -IV

DIRECTING Scope - Human Factors - Creativity and Innovation - Harmonizing Objectives - Leadership - Types of Leadership Motivation - Hierarchy of needs - Motivation theories - Motivational Techniques - Job Enrichment - Communication - Process of Communication - Barriers and Breakdown - Effective Communication - Electronic media in Communication.

(9 L)

UNIT –V:

CONTROLLING System and process of Controlling - Requirements for effective control - The Budget as Control Technique - Information Technology in Controlling - Use of computers in handling the information - Productivity - Problems and Management - Control of Overall Performance - Direct and Preventive Control –

Reporting - The Global Environment - Globalization and Liberalization - International Management and Global theory of Management.

(9 L)
(Total : 45 L)

Books for Reference:

1. Harold Kooritz & Heinz Weihrich "Essentials of Management", Tata McGraw-Hill,1998
2. Joseph L Massie "Essentials of Management", Prentice Hall of India, (Pearson) Fourth Edition, 2003.
3. Tripathy PC And Reddy PN, " Principles of Management", Tata McGraw-Hill, 1999.
4. Decenzo David, Robbin Stephen A, "Personnel and Human Reasons Management", Prentice Hall of India, 1996

B.A History (vocational) Tourism

IV Semester

Allied - II
Front Office Management

L	C
3	3

Objectives:

The module is prescribed in the course to inform the students about the functions of front office in hotel industry and to develop their skill in same area.

UNIT -I:

Lobby and Bell Desk Operation: Role of lobby managers and executives – function of bell desk I functioning of hospitality desk – handling VIPs – luggage handling procedure.

(9 L)

UNIT –II:

Front office cash / checkout and settlement: Role of front desk cashier-checkout and account settlement – checkout options – unpaid account balance.

(9 L)

UNIT –III:

Front office accounting: Hotel credit management – foreign currency awareness and handling procedures 0 guest folio – internet control transcript, cash sheet, cash banks.

(9 L)

UNIT -IV

Night Audit: function of night audit – operating model- Night Audit process

(9 L)

UNIT –V:

Guest complaint handling / problem solving – common complaints/ problems / situation handling.

(9 L)

(Total : 45 L)

Books for Reference:

1. Colin & Chirs Baiird : front Office Operation
2. Sudhir Andrews : Front Office Training Manual
3. Kasavana & Brooks : Managing Front Office Operations
4. James Bard : Hotel From Office management
1. USA. Pp.574.

B.A History (vocational) Tourism

IV Semester

Allied II

BUSINESS COMMUNICATION

L	C
3	3

Objectives:

The module is prescribed in the course to inform the students about the importance of communication in business and to develop their skill in communication.

Unit – I:

Importance of Communication in Tourism – types – Structure of business letter –essentials of a good business letter – application – orders for travel & tours – cancellation – change of conditions. **(9 L)**

Unit – II:

Methodology of preparing a report – essentials of a good report. **(9 L)**

Unit – III:

Travel and tour correspondence – characteristics – letters between travel agency and tour operators and its customers – letters between travel agencies.

Unit – IV:

Conversational strategies in different occasions. **(9 L)**

Unit – V:

Group discussion – understanding group dynamics – group decision making techniques – debate – describing a person / a thing / an event / a process / a recipe, etc.

(9 L)
(Total : 45 L)

Books for Reference:

Bahl.J.C. & S.M. Nagamia : Business Correspondence, Minutes and reports

Gartside : Modern Business Correspondence

Sharma & Krishna Mohan : Business Correspondence and Report Writing

B.A History (vocational) Tourism

IV Semester

Skill Based Core- 2
COMPUTER APPLICATIONS TO TOURISM

L	C
5	4

Objectives:

The module is prescribed in the course to inform the students about the role of Computer Information systems in travel trade. The prescribed unit enhance the skills of students especially when they will be attached for practical.

Unit-1:

• Introduction to computers: what is computer, block diagram, components of a computer system,generation of computers, programming languages, generation of languages, storage devices, floppy disks, CDROM'S. **(15 L)**

Unit-II :

• Operating systems: introduction, functions, types, components, case studies-DOS, windows. **(15 L)**

Unit-III:

•Word processing, spread sheets and presentations: what is word processing, features of MS WORD, editing commands and mail merge-what is spread sheet, features, formulae and functions, if statement, preparing sample worksheets, different graphs. **(15 L)**

Unit-IV:

• Features of POWERPOINT-preparing a presentation-preparing an organization chart **(15 L)**

Unit-V:

• Introduction to internet: what is internet, network, network of networks, WWW.e- mail,websites,introduction to e-comerce -introduction to tournet-feature of tournet- feature of tour manager:costing-evaluation of cancellation.

(15 L)

(Total : 75 L)

Books for Reference

1. Fundamental of Computer, V.Rajaram,Prentice Hall India.
2. Mastering Micro Office,Lonnie E.Mosely&David M.Boody,BPB Publications.

B.A History (vocational) Tourism

IV Semester
Non Major Elective

AIR TRAVEL, TICKETING AND FARE CONSTRUCTION

L	C
2	2

Objectives:

The module is prescribed in the course to inform the students about the various methods of air ticketing and to develop their skill in said area.

Unit – I:

Air travel and world airlines – air transport regulations – passenger aircraft and aeroplanes – airlines policies and practices. **(6 L)**

Unit – II :

World side city-to-city schedules- Familiarization with OAG: letter city and airport code, airline designated code, minimum connecting time, global indicator – air transport abbreviation and meaning. **(6L)**

Unit – III:

Introduction to fare construction: Elements of air fares – types of fares – far sheets- Abbreviation used in the fare formula. **(6L)**

Unit – IV:

Air far construction : Guidelines - mileage principles, fare construction with Extra Mileage Allowance (EMA), Extra Mileage Surcharge.

(6L)

Unit – V:

Air Ticketing techniques : Reservation Sheets – Airline Reservations – Domestic Airline ticketing – International Airline Tickets.

(6L)
(Total : 30 L)

Books for Reference:

1. Jagmohan Negi, _Air travel Ticketing and Fare construction‘, Kanishka, New Delhi,2005
2. OAG, Consultant, IATA, Geneva
3. Air Tariff Book
4. Stephen Shaw, _Airlines in Shifts & Mgt‘, Ashgate Pub, USA,2004
5. IATA, Geneva
6. R. Doganis, _Airport Business‘

7. K.Sikdar, All you wanted to know about airlines functions
8. Journal of Air Transport Management by Elsevier Science
9. Joel Lech, _Airfare secrets exposed', Powell Books, London, 2002

B.A History (vocational) Tourism

V – SEMESTER

Core

HISTORY OF INDIA (c. 1750s – 1970s)

L	C
5	4

Objectives:

The module is prescribed in the course to inform the students about the colonial rule, developments during the pre and post independent period and to and make the students to aware of it.

Unit - I

The First Century of Colonial Rule: Expansion and Consolidation of British Power Institutions and Policies Making of a Colonial Economy Cultural Responses – Tradition and Reform **(15L)**

Unit - II

The Revolt of 1857: Social and regional spread, consequences. **(15L)**

Unit – III

Modern Colonial State After the Revolt: 1858 – 1947. Idioms of Rule: (i) Knowing India – Race Caste, Religion, Custom (ii) Representative Politics – Constitutional Developments. **(15L)**

Unit - IV

Colonial Economy and Society: Features of Colonial economy Patterns of Trade Decline of traditional industry Commercialization and Agrarian stagnation Growth of Modern industry 1914 – 1947 **(15L)**

Unit – V

Features of Colonial Society English Education and Middle Class Indian capitalist class and growth of working class **(15L)**

(Total : 75 L)

Suggested Books

Sugata Bose and Ayesha Jalal: Modern South Asia:History, Culture, Political Economy, New Delhi, 1998

Sekhar Bandyopadhyay From Plassey to Partition Barbara D Metcalf andT.R. Metcalf A Concise History of India, Cambridge, 2002

C.A. Bayly: An Illustrated History of Modern India 1600 – 1947, London 1990 Sumit Sarkar Modern India 1885 – 1947,

Mamillan, 1983 Mushirul Hasan John Company to the Republic: A story of Modern India.

R.P. Dutt India Today. Thomas Metcalf Ideologies of the Raj.

R. Jeffery, J Masseloss, P Reeves (ed) From Rebellion to the Republic.

Bipan Chandra: Nationalism and Colonialism.

B.A History (vocational) Tourism

V – SEMESTER

Core

Cultural History of South India - I

L	C
5	4

Objectives:

The module is prescribed in the course to inform the students about the significance of Indian Culture and its ethos.

Unit I

Definitions of Culture and its various aspects :(i) Perspective on Cultures: Indian Cultural tradition: An overview (ii) Plurality of Cultures: Social Content of Culture **(15L)**

Unit II

Language and Literature, Sanskrit: Kavya - Kalidasa'sRitusambhara, Prakrit:GathaSaptasati, Development of vernacular language and literature, Indo-Persian Literature: Amir Khusro's works, Urdupoetry and prose: Ghalib **(15L)**

Unit III

Performing Arts, Hindustani, Carnatic classical Music ,Devotional music: bhakti and sufi Classical and Folk Dance, Theatre: Classical, Folk, Colonial and Modern **(15L)**

Unit IV

Architecture: Meanings, form and Function, Rock-cut-Mamallapuram, Structural – temple architecture- Khajuraho complex and Tanjavur temple. **(15L)**

Unit V

Fort – Dalulatabad or Chittor forts; Palace-dargahat FatehpurSikri; Colonial – Lutyen's Delhi

(15L)
(Total : 75 L)

Suggested Readings

- Asher Catherine, (ed.): Perceptions of India's Visual Past, AIIS, Delhi, 1994.
- Asher Catherine, Architecture of Mughal India.
- Basham A.L., The Wonder that was India. Volume I, New Delhi.
- Brown Percy, Indian Architecture, Buddhist Hindu and Islamic, Vol. I, II, Mumbai, 1956.
- Chandra Prainod, ed, Studies in Indian Temple Architecture; Chapter 1. AIIS, 1975.
- Deva, B.C., An introduction to Indian Music, Delhi, 1973.

B.A History (vocational) Tourism

V – SEMESTER

Core

ECONOMICS OF TOURISM

L	C
6	4

Objectives:

The module is prescribed in the course to inform the students about the concept and perception of economic significance of tourism and to make the students to understand the students in the said areas.

Unit I:

Nature, scope and application of economics in tourism and hospitality; Tourism scenario in India – tourist arrival data and Indian economy **(18L)**

Unit II:

Law of Demand, Determinants of Demand; Elasticity of Demand; Nature of tourism demand analysis and its forecasting; Law of supply; Determinants of tourism and hospitality supply; Elasticity of supply analysis and forecasting **(18L)**

Unit III:

Liberalization, privatization, globalization and tourism Input-Output decisions, Production function, short-run analysis; Long-run function; short run and long-run cost functions. Empirical estimation of production and costs **(18L)**

Unit IV:

Price-Output Decisions; Tourism and hospitality market structures; Price determination under different market conditions; Pricing practices and strategies; Profit measurement and profit policy; Determinants of investment decision in tourism and hospitality **(18L)**

Unit V:

ourism development and economic planning, review of the economic planning of tourism through the annual and five year plans, foreign exchange earnings and contribution to GDP through tourism.

(18L)
(Total : 90 L)

Books for reference:

1. Hailstones, Thomas J. and Rathwell, John C., Managerial Economics, Prentice Hall International, New Delhi.
2. Chopra, O.P., Managerial Economics, Tata-McGraw Hill, New Delhi.
3. Agarwal, Manju, Economics for decision Making, Indian Institute of Finance, 1997, Delhi.
4. Davis, J.R. and Chang, Simon, Principles of Managerial Economics, Prentice Hall International, New Delhi.

1. Mehta, P.L., Managerial Economics, Sultan Chand, New Delhi.

2. Petterson: Managerial Economics, 3rd Ed., Prentice Hall of India, Delhi.

3. Adhikary M., Managerial Economics, Khosla Pub.

4. Salvatore, Domnick, Managerial Economics in a global economy, Irwin McGraw Hill.

5. Tribe, J. 2001, The Economics of Leisure and Tourism, New Delhi, Butterworth – Heineman.
6. Cullen, P. 1997, Economics for Hospitality Management, London, International Thomson Business Press.
7. Sinclair, M.T. and Stabler, M., 1997, The Economics of Tourism, London, Routledge

B.A History (vocational) Tourism

V – SEMESTER

Core

ECO TOURISM

L	C
4	4

Objectives:

The module is prescribed in the course to inform the students about sustainability of tourism by imparting the significance of eco tourism.

Unit I:

Environmental Studies : Definitions, components of environment, types of environment (an overview of food chains, food web and energy flow). Bio – Geo Chemical cycles, **(12L)**

Unit II:

Environmental Pollution – Air, Water and Noise Pollution with special reference to tourism activities. Green house effect. Depletion of ozone layer treats due to global warming. **(12L)**

Unit III:

Concept and Origin : Emergence of Eco-tourism, growth and development. Definitions. Principles of Eco-tourism. An overview of Eco-tourists. **(12L)**

Unit IV:

Eco-tourism Resources in India – Caves, National Parks, Wild life sanctuaries, Tiger Reserves, Biosphere Reserves, Wet lands, Mangroves, Coral reefs and desert Ecosystem. **(12L)**

Unit V:

Eco-tourism Planning and development strategies – Eco-tourism strategies with special reference to Environmental Protection (Environmental Impact Analysis) Role of Eco tourism in WTO, UNDP, UNEP, Ministry of Tourism GOI - Eco tourism in Tamilnadu. **(12L)**

(Total : 60 L)

Books for Reference

1. Baldvin J.H. (1985) Environmental Planning and Management. I.B.D. Dehradun
2. Singh Ratandeep : Handbook of Environmental Guidelines for Indian Tourism – Kanishka Publishers, New Delhi.

3. Romila Chawla : Wildlife Tourism and Development; Sonali Publications, New Delhi. 4. Dash M.C. (1993) fundamentals of Ecology (New Delhi), Tata McGraw Hill Co.Ltd., Publishing Co.Ltd.)
4. Kormandy E.J. (1989) Environmental issues Concerns and Strategies (New Delhi) Ashish
5. Kandari O. P., Chandra Ashish : Tourism Biodiversity & Sustainable Development, Isha Books, Delhi.

B.A History (vocational) Tourism
V – SEMESTER
Major Elective – 1: Elements of Historiography

L	C
4	4

Objectives :

1. To make the students to understand the fact that History is a
2. To educate the students to have basic knowledge on Historical research methodology.
3. To know more about the Pioneers in Historiography.
4. To study the contributions of Indian Historiographers in writing objective history.

Unit I : History - Meaning and Scope - Nature - Purpose - Definitions of History - Subjects related to History - Kinds of History - History Art or Science? - Uses and Abuses - Lessons of History. **(12 L)**

Unit II : Theory of Causation - Role of Individuals, Institutions and ideas - The concept of Historical Progress. **(12 L)**

Unit III : Reputed Historians - Herodotus - Thucydides- Edward Gibbon - Hegal – Immanuel Kant - Leopold Von Ranke - Karl Marx- A.J. Toynbee **(12 L)**

Unit IV : Indian Historians - Kalhana - Abul Fazl - Jadunath Sarkar - Neelakanda Sastri - R.C. Majumdar - Ranajith Guha – Romila Thappar – Irfan Habib - K. Rajayyan **(12 L)**

Unit V : Historical Research - Pre - requisites of a Research Scholar - Selection of Topic- Collection of Sources - External Criticism - Internal Criticism - Objectivity in Historical Writing - Foot Notes - Bibliography. **(12 L)**

(Total : 60 L)

Reference Books:

1. B. Sheik Ali, *History its Theory and Method,* Penguin Books, New Delhi, 1966.
2. K. Rajayyan, *History in Theory and Method,* Ratna Publications, Madurai, 2000.
3. N. Subramanian, *Historiography*, Ennes Publications, Udumalai Pettai.
4. S. Manickam, *Theory of History and Methods of Research,* Puduman Publications, Madurai, 1987.
5. J. Dharmaraj, *Historiography (Tamil),* Tensy Publications, Sivakasi, 2013.

B.A History (vocational) Tourism

V – SEMESTER

Major Elective - 2

TRAVEL AGENCY MANAGEMENT

L	C
4	4

Objectives:

The module is prescribed in the course to inform the students about the travel agency management and to develop their skill in the respective field.

Unit I:

Definition of Travel Agency and Tour Operations, differentiation, interrelationship. Origin and growth of travel agencies. An overview of the travel agents in India, local travel agents. **(12 L)**

Unit II :

How to set up travel agency:

(a) Market research, sources of funding

(b) Comparative study of various types of organisation proprietorship, partnership, private limited and limited

(c) Govt. rules for getting approval

(d) IATA rules, regulation for accreditation

(e) Documentation

(f) Office automation

(g) Practical exercise in setting up a Travel Agency **(12 L)**

Unit III:

Departmentalization, managerial responsibilities and use of technology. Sources of earning : commissions, service charges etc. Itinerary preparation, important considerations for preparing itinerary, costing, types and components of package tour. **(12 L)**

Unit IV:

Dealing with Principal Suppliers: Dealing with air travel, tourist transport and accommodation. Supplier challenges. Present business trends and future prospects problems and issues. **(12 L)**

Unit V:

Publicity and promotion: Issues related to sales, promotional issues, marketing communication, public relations. Associations and Organizations promoting travel agencies and tour operators: IATO, TAAI, ASTA,WATA, PATA, FHRAI, UFTA

(12 L)

(Total : 60 L)

Books for Refernce:

1. Travel Agency and Tour Operation, Concepts and Principls - J.M.S. Negi
2. Professional Travel Agency Management - Chunk, James, Dexter & Boberg
3. The Business of Travel Agency Operations and Management - D.L. Foster
4. Travel Agency Management-An Introductory Text, Anmol Publication New Delhi-Mohinder Chand.
5. Tourist Guide and Tour Operations, Kanishka Publication, New Delhi.

B.A History (vocational) Tourism

SEMESTER VI

Core

Social History of India HISTORY OF INDIA

L	C
5	4

Objectives:

The module is prescribed in the course to inform the students about the social movements, and economic and social change took place during 19th and 20th century

Unit - I

Social Movements: Issues of Social Reform: The 'Womens' Question Phule, Ambedkar and the Caste question Dalit. Peasant. Tribal Movements. **(15 L)**

Unit - II

Nationalist Politics, 1858 – 1947 Phases of National Movement Economic Nationalism and Cultural Nationalism Mahatma Gandhi and Mass Nationalism: Gandhian thought, techniques and movements Growth of Communal Politics Partition of India . **(15 L)**

Unit – III

Independent India: Economy and Polity Constituent Assembly and Establishment of the Republic Economic and Social Change 1950 – 1970s Planned Economy Industrialization. **(15 L)**

Unit – IV

Models of Growth Land Reform and the Structures of Dominations in Rural India Foreign Policy: Non-Alignment Panchsheel Federalism and the Linguistic States Politics Parties and Indian Politics 1950 – 1977. **(15 L)**

Unit – V

Independent India: Culture and Society Modern Indian Literature, Art and Films Scientific and Technological Developments Dalit and Backward Caste Self Assertion Origins of environmentalism Peasant and Labour Movements **(15 L)**

(Total : 75 L)

Suggested Books:

Sugata Bose and Ayesha Jalal: Modern South Asia:History, Culture, Political Economy, New Delhi, 1998

Sekhar Bandyopadhyay From Plassey to Partition Barbara D Metcalf andT.R. Metcalf A Concise History of India, Cambridge, 2002

C.A. Bayly An Illustrated History of Modern India 1600 – 1947, London 1990 Sumit Sarkar Modern India 1885 – 1947, Macmillan, 1983

Mushirul Hasan John Company to the Republic: A story of Modern India

R.P. Dutt India Today Thomas Metcalf Ideologies of the Raj

R. Jeffery, J Masseloss, P Reeves (ed) From Rebellion to the Republic Bipan Chandra: Nationalism and Colonialism

Urvashi Butalia The Other side of Silence Francine Frankel India's Political Economy 1947- 1977

B.A History (vocational) Tourism

Semester VI

Core

Cultural History of South India – II

L	C
5	4

Objectives:

The module is prescribed in the course to inform the students about the cultural history of South India and to make the students to aware of its significance.

Unit I

Perceptions of visual Past and Present, Sculpture and Painting: Silpashastric normative tradition,Classicism – Narrative and Sculptural, Mural, fresco paintings, Post Classicism – Pallava – Cola. **(15 L)**

Unit II

Medieval idiom –Mughal paintings, painters and illustrated texts, Modern – company school, Ravi Varma, Bengal School, Amrita Shregil and Progressive Artists. **(15 L)**

Unit III

Popular Culture

a) Folk Lore and Oral tradition of Kathas, narratives, legends and proverbs, Linkages ofbardic and literary traditions.

b) Festivals, fairs and fasts; Links with tirtha, pilgrimage and localities.

c) Textile and Crafts; the Culture of Food. **(15 L)**

Unit IV Communication, Patronage and Audiences

a) Court Merchant groups and communities.

b) C**(15 L)**

ulture as Communication.

Unit V Nationalism and the issue of Culture; Institutions of Cultural Practices Colonial and Post

Colonial.

(15 L)

(Total : 75 L)

Suggested Reading:

- K. T. Acharya**,** A Historical Dictionary of Indian Food , OUP.
- Banerjea J.N.: The Development of Hindu Iconography, Calcutta, 1956
- Bussagli M and Srivaramamurthy C.: 5000 Years of Indian Art, New York, n.d.

B.A History (vocational) Tourism

V – SEMESTER

Core -3

ART AND ARCHITECTURE IN INDIA (SOUTH INDIA)

L	C
5	4

Objectives:

The module is prescribed in the course to inform the students about the features of south India's architecture and how it attracts the tourists.

Unit – I:

Excavations - Arikamedu And Adichanailur - Artifacts - Seals And Pottery - Metal Art And Coins. **(15 L)**

Unit –II:

Andhra - Amaravathi- Nagarjuna Konda, Chalukya - Durga & Ladkhan Temple At Aihole, Cave Temple At Badami,Virupaksha At Pattadakal,Rashtrakuta - Ellora Temples- Hoysalas Chennakesava Temples. **(15 L)**

Unit III:

Pallavas- Mahabalipuram- Kailasanatha Temple- Pandyas Cave Temple ,Cholas Brahadeshwara,Gangaikonda Cholapuram,Dharasuram Temple- Vijayanagar - Virupaksha & Vitalaswami Temple,Hampi **(15 L)**

Unit IV:

Sculptures- Mahabalipuram- Ellora, Belur & Halabid- Bronzes of South India.

(15 L)

Unit V:

Paintings- Kanchipuram, Sittanavasal, Thaniavur- Lepakshi. Music - Carnatic- Dances- Bharathanatyam, Kuchipudia, Mohiniattam, Kathak- Bagavathamela.

(15 L)

(Total : 75 L)

Books for Reference:

1. Percyy Brown : Indian Architecture Buddhist and Hindu Architecture - Volume I and II
2. K.A. Mahalingam : A History South India.
3. T.V. Mahalingam : Early Pandya Architecture
4. C.V. Narayana Iyer : Origin and History of Saivism

B.A History (vocational) Tourism

V – SEMESTER

Core -4

ART AND ARCHITECTURE IN INDIA (NORTH INDIA)

L	C
5	4

Objectives:

The module is prescribed in the course to inform the students about the importance of art and architecture of India (North India) and to make them to aware of its significant role in tourism.

Unit-I:

Indus Valley Civilization - seals - pottery. Architecture- sculpture - painting - minor art. **(15 L)**

Unit – II:

Mauryan Architecture - Asoka's contribution - foreign influence Mauryan sculpture - Bull and Lion capitals - Buddhist Architecture - Sarnath pillar – Sanchi stupa, Chaitya at Kane - Viharas at Nasik and Ajanta **(15 L)**

Unit – III:

Evolution of Temple Architecture - Gupta period - Sanchi - Deogarh. **(15 L)**

Unit – IV:

Indo Islamic Architecture - Qutb Minar- Fatehpur sikri - Taj mahal - Redfort

(15 L)

Unit – V:

Painting - Ajantha - Miniature paintings of Mughals, Rajasthani, Pahari, Music - Hindustani, Carnatic - Dances - Kathakali Odessy, Manipuri, Kathak, Bharatnatyam, Mohini attam and Kuchipudi , Folklore dances .

(15 L)

(Total : 75 L)

Books for reference:

1. Percy brown – Indian Architecture [Hindu and Buddhists] Volume I &II
2. Basham A .L -The wonder that was India

B.A History (vocational) Tourism

VI – SEMESTER

Core: Group Project and Viva

L	C
0	7

Objectives :

The Group Project / Dissertation with Viva - Voce in B.A. Degree Course in History (Vocational) Tourism has to be guided by the Course teacher. Students (not more than 5 members in a Group) can chose a topic of their own interest related to their subject in consultation with the respective teachers under whom they are assigned to work.

Students have to submit the Project/ Dissertation at least 15 days before the commencement of their Theory Paper Examinations. Students have to write the Project / Dissertation in not less than 40 pages and not more than 50 pages adopting the techniques of Research Methodology offered during the V Semester. It has to contain 3 to 4 chapters apart from the Introduction and Conclusion. There shall be a review of the progress of the Group project / Dissertation writing every week by the teachers who guide the students so as to expedite the completion of the work.

Group Project / Dissertation

A Group consists of not more than 5 members.

B.A History (vocational) Tourism

VI – SEMESTER

Major Elective

TOURISM POLICY AND PLANNING

L	C
4	4

Objectives:

The module is prescribed in the course to inform the students about the tourism policy and planning and to develop their skill in planning.

Unit – I:

Tourism Planning – phases – needs – goals – planning process – role of government in tourism **(12 L)**

Unit – II:

Tourism Planning in India - five year plans – tourism policy Considerations and structure planning – safety and security of tourists. **(12 L)**

Unit – III:

Tourism policy formulation – public sector involvement – role of public sector and planning – legislation and regulation establishing tourism policy – Manila Declaration – Goa declaration. **(12 L)**

Unit – IV:

Origin and development of tourism policy in India – Tamilnadu. Types of planning – local, regional, national and master plan – National Action plan of 1992 – National Tourism Policy of 2002. **(12 L)**

Unit – V:

Incentives and subsidies of state and central government to promote tourism – national committee for tourism. **(12 L)**

(Total : 60 L)

Books for Reference :

Balu U. : Tourism in India – Policy and Perspective

Gunn C.M. : Tourism Planning

Hall P. : Urban and Regional Planning

Mishra S.K. : Tourism in India – Policy and Perspective

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES
B.Sc. Botany
(Choice Based Credit System)
(With effect from the academic year 2017 -2018)

III	I	17	Language	Tamil/Other Languages	6	6	0	4
	II	18	Language	English	6	6	0	4
	III	19	Core Paper V	Pteridophytes, Gymnosperms &Paleobotany	4	4	0	4
	III	20	Major Practical 3	Pteridophytes, Gymnosperms &Paleobotany	2	0	2	1
	III	21	Allied – II PaperI		4	4	0	3
	III	22	Allied Practical II		2	0	2	1
	III	23	Skill Based Core I	Mushroom Cultivation/ Organic Farming	4	4	0	4
	IV		Common	Yoga	2	2	0	2
	IV	24	Non-Major Elective I		2	2	0	2
				Subtotal	**32***	**28**	**4**	**25**
IV	I	25	Language	Tamil/Other Languages	6	6	0	4
	II	26	Language	English	6	6	0	4
	III	27	Core Paper VI	Microbiology & Techniques in Biology	4	4	0	4
	III	28	Major Practical 4	Microbiology & Techniques in Biology	2	0	2	1
	III	29	Allied – II Paper II		4	4	0	3
	III	30	Allied Practical II		2	0	2	1
	IV	31	Skill Based Core II	Floriculture/ Preservation of Fruits and Vegetables	4	4	0	4
	IV	32	Non-Major Elective II		2	2	0	2
	IV		Part IV	Common-Computers for Digital Era	2	2	0	2
	V	33	Extension Activity	NCC/NSS/YRC/YWF	-	-	-	1
				Subtotal	**32***	**28**	**4**	**26**

V	III	34	Core Paper VII	Morphology & Taxonomy of Angiosperms	5	5	0	4
	III	35	Core Paper VIII	Biochemistry & Biophysics	5	5	0	4
	III	36	Major Elective-1	Plant Biotechnology & Genetic Engineering/Environmental Biotechnology	5	5	0	4
	III	37	Major Elective - 2	Horticulture and Plant Breeding/Forestry	5	5	0	4
	III	38	Major Practical V	Morphology and Taxonomy of Angiosperms & Elective II	3+1	0	3+1	2
			Major Practical VI	Biochemistry, Biophysics and Elective I	3+1	0	3+1	2
	IV	39	Skill Based Common	Personality Development/Effective Communication/Youth Leadership	2	2	0	2
				Subtotal	30	22	**8**	22
VI	III	40	Core Paper IX	Plant Physiology	5	5	0	4
	III	41	Core Paper X	Genetics, Evolution and Biostatistics	5	5	0	4
	III	42	Major Elective 3	Plant Ecology & Phytogeography / Marine Biotechnology	5	5	0	4
	III	43	Major Practical VII	Plant Physiology& Elective III	3+1	0	3+1	2
			Major Practical VIII	Genetics, Evolution, Biostatistics	2	0	2	1
	III		Group Project		9		9	6
Subtotal					30	15	**15**	21
Grand Total					**184***	**145**	**39**	**140**

* Extra hour classes can be arranged for Common Yoga / Computers for Digital Era

MSU/2017-2018/B.Sc. Botany/Semester-III/Core Paper – 5
PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY
(4hrs/week)

Preamble: **LTPC**

4 0 0 4

Knowledge on cryptogams and phanerogams and primary information about fossil record is a prerequisite. It provides a thorough knowledge about the diversity, structural organization and reproduction of Pteridophytes and Gymnosperms. It also makes the students aware ofthe preserved vestiges of plant life of the geological past.

UNIIT I **(12L)**

Pteridophytes:

General Characteristics and Classification of Pteridophytes (Sporne 1966), *Psilotum*and *Lycopodium*: Distribution, Systematic Position, Structure, Reproduction and Life History (need not study the development of gametophyte, sex organs and sporophyte).

UNIT II **(11L)**

Adiantum*, *Marsilea: Occurrence, Systematic Position, Structure, Reproduction and Life Cycle (need not study the development of gametophytes, sex organ and sporophyte), Stelar Evolution in Pteridophytes.

UNIT III **(13L)**

Gymnosperms:

General Characteristics and Classification of Gymnosperms (David Bierhorst, 1971), ***Pinus*:**Distribution, Systematic Position, Structure, Reproduction and Life History

UNIT IV **(14L)**

Gnetum: Occurrence, Systematic Position, Structure, Reproduction and Life Cycle of (need not study the Development of Sex Organs and Sporophyte). Economic Importance of Gymnosperms.

UNIT V **(10L)**

Paleobotany:

Geological Time Scale, Methods of Fossilization; Brief Study of *Rhynia*, *Lepidodendron* and *Lyginopteris*.

REFERENCES

Arnold, C.A. 1947. An introduction to Palaeobotany. McGraw Hill Co. Ltd., New Delhi.

Chamberlain, C.A. 1986. Gymnosperms-Structure and Evolution, Publishers & Distributors.

Pandey, S.N. 1995. A Textbook of Pteridophyta.Vikas Publishing House, Ghasiabad.

Smith, G.M. 1955.Cryptogamic Botany. Vol. III. McGraw Hill Co.

Sporne, K.R. 1976. Morphology of Pteridophytes.B.I.Publishers, New Delhi.

Vashista, P.C. 1971. Botany for Degree students: Pteridophyta. S. Chand& Co., New Delhi.

Vashista, P.C. 1978. Botany for degree students: Gymnosperms. S. Chand & Co., New Delhi

PRACTICALS

1. To make suitable micro preparations of the following:
   *Lycopodium*Stem,*Adiantum*Stipe,*Marsilea*Petiole, Rhizome andSporocarp.
   *Pinus*Stem and Needle, *Gnetum* Stem andLeaf.

2. To observe and identify Specimens and Microslides.
   *Psilotum*Habit, Stem T.S, Synangium L.S;*Lycopodium*cone L.S, *Adiantum*habit,
   Pinus -Male and Female Cone (Specimen),L.S of Male and Female Cone (Slide)
   Gnetum – Male and Female Cone (Specimen); L.S. of Male cone, Female Cone & Ovule.

   Paleobotany (Slide):
   Rhynia stem
   *Lepidodendron*stem
   Lyginopteris stem.
3. To maintain a Record Notebook.

MSU/2017-18/ B. Sc Botany / Semester –III
Skill Based Subject - I (A)
MUSHROOM CULTIVATION
(4hrs/week)

Preamble: **LTPC**

4 0 0 4

Keeping the employment entrepreneurship in mind, this paper has been included.The subject enables the students to identify the edible mushrooms, to know the cultivation of Paddy Straw Mushroom and preparation of recipes. The course content also has the new practical exercises so that the students get a hands-on experience of the latest techniques that are currently in use.

UNIT I **(11hr)**

Mushrooms:

Introduction, Identification of Edible and Poisonous Mushrooms,Medicinal Mushrooms, Structure and Life cycle of Edible Mushroom-Oyster (*Pleurotus* species), Prospects of Mushroom Cultivation in Small Scale Industry.

Unit II **(13hr)**

Mushrooms Culture:

Pure culture - Preparation of Medium (PDA and Oat meal Agar Medium,) Sterilization methods, Preparation of Test Tube Slants to Store Mother Culture, Culturing of *Pleurotus*mycelium on Petri Plates, Preparation of Mother Spawn in Saline Bottle and Polypropylene Bag and their Multiplication.

Unit III **(12hr)**

Mushroom Culture Technique:

Cultivation of Mushrooms-Infrastructure, substrates (locally available), Polythene bag, Mushroom bed preparation - Factors affecting the Mushroom Bed Preparation, Spawn Running and Harvesting of Mushrooms - Button mushroom (*Agaricusbisporus*), Oyster Mushroom(*Pleurotus sp*.) and Paddy Straw Mushroom(*Volvariella*sp.)

Unit IV- **(13hr)**

Post Harvesting Technology of Mushrooms:

Farm Design and Protection of Mushrooms from Pests and Diseases.Nutritional Value – Proteins, Amino Acids, Mineral Elements, Carbohydrates, Fibre content and Vitamins, Significance of Mushrooms.

Unit V

(11hr)

Storage&Value Added Food Preparation

Short-Term Storage (Refrigeration – upto 24 hours) Long Term Storage (Canning, Pickles, Papads), Drying, Storage in Salt Solutions, Value Added Food Preparation : Types of Food Prepared from Mushroom; Soup, Cutlet, Omelette, Samosa, Pickles, Curry.

REFERENCES

Marimuthu, T. Krishnamoorthy, A.S. Sivaprakasam, K. and Jayarajan. R (1991) Oyster Mushrooms, Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore.

Swaminathan, M. (1990) Food and Nutrition.Bappco, The Bangalore Printing and Publishing Co. Ltd., No. 88, Mysore Road, Bangalore - 560018.

Tewari, PankajKapoor, S.C., (1988). Mushroom cultivation, Mittal Publications, Delhi.

Nita Bahl (1984-1988) Hand book of Mushrooms, II Edition, Vol. I & Vol. II

PRACTICALS

Demonstration:

1. Identification of edible mushrooms.
2. Cultivation of Paddy Straw Mushroom.
3. Preparation of recipes.

MSU/2017-18/ B. Sc Botany / Semester –III
Skill Based Subject - I (B)
ORGANIC FARMING
(4hrs/week)

Preamble: **LTPC**

4 0 0 4

The contents have been drawn-up to accommodate the role of manures in the improvement soil fertility,soilprofile,different kinds of soil, biofertilizerproduction technology,vermicomposting etc. in organic farming. It makes the students aware about sustainable use of biofertilizers

Unit -I **(11hr)**

Soil Science:

Brief Account of Soil Profile, Fertility of Soil – Importance of Organic Matter – Water Retentivityand Aeration of Soil.

Unit – II: **(12hr)**

Manure and Manuring:

Organic Manure, Types, Animal Wastes – Cattle Dung, Urine, Poultry Wastes, Slaughter Wastes, Piggery and Fishery Wastes.

Unit – III **(10 hr)**

Green Manure:

Plant wastes – Fallen leaves and Twigs, Humus Formation, Green Manuring, Mulching - Leaves of Trees like *Pongamia, Gliricidia ,Azadirachta,andCalotropis*, Compost making.

Unit-IV **(13hr)**

Biofertilizers:

Rhizobium-Importance, Mass Production and Application, VAM Fungi – Importance, Mass production and Applications.

Unit–V **(14hr)**

Vermicomposting:

Importance, Application and Production of Vermicompost, Preparation and importance of Panchagavyaas foliar spray.

PRACTICALS:

1. Soil Profile
2. Capillarity of Different kinds of Soil.
3. Vermicomposting
4. Preparation of Organic Manure
5. Identification of the following plants:
    a. Pongamia,
    b. Gliricidia
    c. Azadirachta and
    d. Calotropis.
2. Maintain an Observation Notebook.

REFERENCES:

Dubey, R.C. 2006, A Text Book of Biotechnology, S. Chand and Company Ltd. New Delhi.

ICAR, 1980. Hand Book of Agriculture, Indian Council of Agricultural Research, New Delhi.

John JothiPrakash, E. 2006. Outlines of Biotechnology.Emkay Publications, New Delhi.

Mark Coyne, 2004. Soil Microbiology- An Exploratory Approach.Delmar Publishers, Singapore.

Miller, C.E. and Turk, L.M. 2002.Fundamentals of Soil Science. Biotech Books, New

MSU/2017-18/ B. Sc Botany/ Semester –IV /Core paper-6
MICROBIOLOGY AND TECHNIQUES IN BIOLOGY
(4hrs/week)

Preamble: **LTPC**

4 0 04

The scientific discipline of Microbiology is one of the most critical components of modern science.The main focus of this paper is to give an idea of the world of microbesand to evaluate their role in the environmental segments to the learners. The contents have been drawn to accommodate the techniques in biology and to highlight their role in the human welfare.

UNIIT I **(13L)**

Microbiology:

Brief History and Development, Classification of Microorganisms (Whittaker's Five Kingdom Concept), **Bacteria** - Outline of Classification (Bergey'smanual), Ultra Structure, Nutritional Types and Reproduction of Bacteria, Media Preparation and Pure Culture techniques of Bacteria, Staining Technique - Gram Staining.

UNIT II **(12L)**

Viruses:

General Characteristics, Structure and Reproduction of HIV, T_4 Bacteriophages, Viroids, Virions and Mycoplasma, Transmission of Viruses and Purification of Viruses.

UNIT III **(12L)**

Microbes:

Microbes in Food Production, Spoilage, Poisoning and Preservation. Bacteria Flora in Milk, Pasteurization of Milk and Milk Products, Bacterial Pathogens and Water Pollution, Drinking Water as a Vehicle of Diseases, Purification of water.

UNIT IV **(11L)**

Instruments:

Principles, Working Mechanism and Applications ofUV Spectrometer, Centrifuge, ECG, MRI and Positron emission tomography

UNIT V **(12L)**

Electrophoresis:

Basic principles, electrophoretic mobility, factors, isoelectric focusing. Types- vertical and horizontal agarose and poly acrylamide gel electrophoresis, detection and recovery of electrophorogram. Gel documentation system. X-ray crystallography.

PRACTICALS

1. Preparation of Culture Media for Bacteria.
2. Preparation of Serial Dilution.
3. Isolation of Bacteria – Streak Plate Method
4. Identify the type of Bacteria using Gram Staining.
5. Analysis of Milk – Methylene Blue Dye Reduction Test.
6. **Spotters:**

   Ultra Structure of Bacterial Cell, T_4 Phage, HIV Virus,Autoclave, Laminar Air Flow Chamber,Hot Air Oven,Inoculation Needle, Agar slant, Spoiled Food,UV Spectrophotometer, Clinical Centrifuge, ECG, MRI, Positron emission tomography, Electrophoresis.

7. To maintain a Record Notebook.

MSU/2017-18/ B. Sc Botany / Semester –III

Skill Based Subject - I (A)

PRESERVATION OF FRUITS AND VEGETABLES

(4hrs/week)

Preamble: **LTPC**

4 0 04

The well-organized curricula shall inspire the students regardingthe principles of preservation of fruits and vegetables.The learners are expected to know the nutritive values, importance, factors affecting storage and methods of preservation of fruits and vegetables and preservation recipes.

Unit-I **(11L)**

Fruits and Vegetables:

Nutritive values, factors affecting storage, spoilage - microbial, enzymatic and insects.

Unit-II **(13L)**

Principles of Preservation:

Importance and Methods of Preservation - Refrigeration, Freezing, Canning, Drying and Dehydration, Chemical preservatives.

Unit-III **(13L)**

Preparation of Products:

Methods of preparation of Fruit Juice- Orange, Squashes- grape and Pine apple; Jam - Tomato and Mixed Fruit , Jellies- Guava.

Unit- IV **(11 L)**

Preparation of Chutney, Sauce, Pickles & Ketchup:

Preparation of Chutney- Mango, Sauce –Tomato,Pickles- Lime, Mango and Garlic, Ketchup- Tomato. **Drying of fruits**: Banana, Mango, Grapes and Fig.

Unit- V **(12 L)**

Canning of Fruits& Vegetables:

Mango and Banana; Tomato, Carrot, Bean and Mushrooms.

REFERENCES:

Kumar, N.1997. Introduction to Horticulture, Rajalakshmi Publication, Nagercoil.

C.K. Usha Rani and R. Mary Christi. 2010. Preservation of Fruits and Vegetables,SheenGrafix, Nagercoil.

GirdhariLal, G.S. Siddappa and G.L.Tandon, 1986, Preservation of Fruits and Vegetables,Indian Council of Aricultural Research, New Delhi.

Cruess W.V.1948. Commercial Fruits and Vegetables Products, McGraw Hill Book Company Inc, New York.

Alex.V and Ramani.2009. Food Chemistry, MPJ Publishers, Chennai.

V.Kumaresan. 2009.Horticulture, Saras Publication, Nagercoil.

MSU/2017-18/ B. Sc Botany / Semester –III
Skill Based Subject - I (B)
FLORICULTURE

(4hrs/week)

Preamble: **LTPC**

4 0 04

The course provides thorough knowledge about the commercial cultivation of flowers and different value added products prepared from it. It highlight the potential of these studies to become an entrepreneur.

UNIT- I : **(11L)**

Floriculture:

Importance, Cut flower production – Chrysanthemum, Tulips, Lavendula, Gerbera, Gladiolus andHelichrysum.

UNIT-II : **(13 L)**

Commercial Floriculture:

Definition, Cultivation of Calendula, Polyanthus and Marigold.

UNIT- III: **(14 L)**

Cultivation Techniques:

Cultivation of Anthurium, Orchids, Cut flower production, Package and export

UNIT–IV: **(12 L)**

Value Added Products of flowers:

Importance of flowers in Perfumery - Extraction of Rose and Jasmine oil and their products.

UNIT – V **(10 L)**

Flower arrangement:

Introduction, General Principles of Flower Arrangement, Western and Japanese, Dry flower Decorations.

REFERENCES

Kumar, N.1997. Introduction to Horticulture, Rajalakshmi Publication, Nagercoil.

Kumaresan,V. 2009. Horticulture, Saras Publication, Nagercoil.

Randhawa., G.S. 1973. Ornamental Horticulture in India.Today and Tomorrow Printers andPublishers, New Delhi.

Vishnu Swarap. 1997. Garden flowers. National Book Trust, India.

MSU/2017-2018/B.Sc. Botany/Semester-V/Core Paper – 7
MORPHOLOGY AND TAXONOMY OF ANGIOSPERMS
(5hrs/week)

Preamble: **LTPC**
5 0 0 4

This enrichthe students to have a broad knowledge about various families, local floraand classification plants based on natural system. It will equip the learners with skills to identify angiospermsand economical use of local plants.

UNIT I **(13L)**

ModificationsPhyllotaxy& Inflorescence:

Modifications:Root, stem and leaf; Phyllotaxy: Types; Inflorescence: Types; Description of floral parts;Herbarium preparation and its importance.

UNIT II **(14L)**

Principles of taxonomic hierarchy,**classification**&**Key**:

Species, Genus and Family concept; Systems of classification- (with merits and demerits) Natural- Benthem and Hooker system, Phylogenetic- Engler and PrantlSystem.Binomial nomenclature, Dichotomous key preparation.

UNIT III **(15L)**

Detailed study of the following families and their economic importance:

Annonaceae, Sterculiaceae, Rutaceae, Caesalpiniaceae, Cucurbitaceae, Apiaceae.

UNIT IV **(17L)**

Rubiaceae, Sapotaceae, Convolvulaceae, Asclepiadaceae, Oleaceae, Lamiaceae.

UNIT V **(16L)**

Euphorbiaceae, Amaranthaceae, Liliaceae, Cannaceae, Arecaceae and Poaceae.

REFERENCES:

Lawrence, G. H. M (1953) – Taxonomy of Vascular Plants, Oxford & IBH Publishes, New Delhi.

Narayanaswamy, R.V &Rao, K. N (1976) – Outlines of Botany, S. Viswanathan Printers & Publishers, Madras.

Ashok Bendre and Ashok Kumar (1984) – A Text Book of Practical Botany – Vol. II, Rastogi Publications, Shivaji Road, Meerut.

Mathews, K.M, (1987 – 90) – Flora of Tamil Nadu and Carnatic (1 – 4 Vols.)Rapinat Herbarium, Trichy – 1.

Davis P. H. and Heywood V.H. (1993) – Principles of Angiosperms Taxonomy

Vashista, P.C (1997) – Taxonomy of Angiosperms, S. Chand & Co., (P) Ltd., New Delhi.

Singh, V & Singh, D.K (1983) – Taxonomy of Angiosperms, Rastogi Publications, Meerut.

Naik, V. N. 2000. Taxonomy of Angiosperms. Tata McGraw – Hill Publishing Company Limited. New Delhi.

Singh, G. 2005. Plant Systematics – Theory and Practice.Oxford & IBH, New Delhi.

Verma, V (1974) – A Text Book of Economic Botany, Emkay Publications, New Delhi. 28

PRACTICALS:

1. Morphological identification of plant parts and their modifications.
2. Technical description of plant parts and dissection of floral parts of plants with reference to the families prescribed in the syllabus.
3. Field trips (minimum 2 days) to places under the guidance of teachers to study plants in their natural habitat and submit a report.
4. Preparation of dichotomous key.
5. Identify and comment on the useful plant parts or plants prescribed in the syllabus.
6. Preparation and submission of 10 herbarium sheets.
   To maintain a record book.

MSU/2017-2018/B.Sc. Botany/Semester-V/Core Paper – 8
BIOCHEMISTRY AND BIOPHYSICS
(5hrs/week)

Preamble: **LTPC**

5 0 0 4

This enable the studentsregarding the basic knowledge on atom, bonds, bio-molecules, enzymes and proteins; to understand the fundamentals of biochemistry and biophysics, and the structure of various bio-molecules.Know the working principle of instruments like pH meter, colorimeter and centrifuge.

UNIT 1 **(15L)**

Basic concepts of Biochemistry:

Brief account of atom, bonds – ionic, covalent and hydrogen bonds; pH meter, Colorimeter, Centrifuge, Chromatography – Principles, techniques and their application in Biological studies.

UNIT 11 **(16L)**

Biomolecules:

Carbohydrates- structure and Properties of monosaccharides – Glucose and fructose; disaccharides – Sucrose, Maltose and Lactose; polysaccharides – Starch, Cellulose, Lignin and Chitin.

UNIT 111 **(14L)**

Aminoacids:

Basic Structure, Classification, Essential and Non-essential amino acids; Proteins- Primary, Secondary, Tertiary and Quaternary structure and properties; Monomeric and oligomeric proteins (Myoglobin and Hemoglobin)

UNIT IV **(16L)**

Lipids&Enzymes:

Lipids:General characters, Types, Basic structure and properties**;**Enzymes: General classification, Nomenclature, Mechanism of enzyme action, Enzyme kinetics, Enzyme inhibition, Enzyme immobilization, Application of enzymes in industry and medicine.

UNIT V **(14L)**

Bioenergetics:

Bioenergetics of Chloroplast and Mitochondria, Structure and role of ATP in biological systems, ATP as energy rich compound.Biological energy conversion, Electromagnetic spectrum, Absorption spectrum - chlorophylls, Emission spectrum - Phosphorescence, Fluorescence.

REFERENCES:

Jain, J.L. (1998). Fundamentals of Biochemistry. S. Chand & Co., New Delhi.

Jayaraman, J. (1981). Laboratory Manual of Biochemistry. Wiley Eastern Ltd., New Delhi.

John Webster , (2004). Bioinstrumentation.Johnweily& sons.

Lehninger, A.L. (1984). Biochemistry (2nd Edition).Kalyani Publishers, Ludhiana, New Delhi.

Plummer, D.T. (1988). An Introduction to Practical Biochemistry (3rd Edn.,). Tata McGraw Hill Publishing Co., Ltd., New Delhi.

Srivastava, H.S. (1990). Elements of Biochemistry.Rastogi Publications, Meerut, India.

Arora.(2004) Biophysics.First edn.Himalaya Publishers, New Delhi.

Salil Bose, S. (1982). Elementary Biophysics.Vijaya Printers, Madura

PRACTICALS

1. Colorimetric estimation of starch in plant tissues
2. Colorimetric estimation of sugar in plant tissues
3. Colorimetric estimation of proteins
4. Verification of Beer's Law
5. Preparation of acetate buffer
6. Separation of dyes by paper chromatography
7. Determination of complimentary color

Spotters:

a. Instruments: Electrodes of pH meter, pH meter, Colorimeter, Centrifuge and Chromatogram
b. Structure of monosaccharides, disaccharides and polysaccharides prescribed in the syllabus
c. Models and charts: Absorption spectrum of chlorophyll a and chlorophyll b, Fluorescence, Phosphorescence, Lock and key model & induced fit model of enzyme action To maintain a record book.

MSU/2017-2018/B.Sc. Botany/Semester-V/Elective Paper – 1A

BIOTECHNOLOGY AND GENETIC ENGINEERING

(5hrs/week)

Preamble: **LTPC**

5 0 0 4

The syllabus helps to understand the totipotency of the cells and the tissue culture techniques, tolearn the fundamental principles in gene cloning, various methods of gene transfer, screening and the use of vectors in gene transfer technology for the desired characteristics.

UNIT1 **(15L)**

Tissue Culture:

Introduction, definition, history, scope and importance of plant tissue culture, Totipotency of cells, Tissue culture laboratory- organization and requirements, Sterilization techniques, Nutrient media- composition and preparation.

UNIT 11 **(14L)**

Types of tissue culture:

Callus culture and apical meristem culture. **Protoplast culture:** Protoplast isolation, fusion, selection of hybrids and regeneration.**Cybrids**– production and applications, **Artificial seed**: production, advantages and disadvantages.

UNIT 111 **(16L)**

Techniques of genetic engineering:

Isolation of specific genes, enzymes used in gene cloning, **Cloning Vectors** - Plasmids,Cosmids and Phagemids,cDNALibraries,*Agrobacterium* mediated gene transfer in plants,**GM plants** – *Bt*Brinjal, *Bt* Cotton, Golden rice. Bioethical issues.

UNIT 1V **(16L)**

Identification of Recombinants:

Insertional inactivation, Immunochemical Method and Colony Hybridization Technique.Selection of Recombinant using Selective Medium and reporter genes, **Blotting Techniques** – Southern, Northern and Western Blotting.

UNIT V **(14L)**

Mutagenesis& DNA transfer techniques:

Site directed mutagenesis and random mutagenesis;DNA transfer techniques: Physical method-Microinjection, Chemical method-Calcium phosphate method, Electrical method-Electroporation,Natural-Conjugation and bacterial transformation.

REFERENCES:

Bhojwani, S.S and M.K.razdan. 2004. Tissue Culture Theory and Practice.

Davis J.A. and W.S.Roznikolf (1992) Milestones in Biotechnology.Classic papers on genetic Engineering, Butterworth-Helnemann, Boston.

Glick, B Pasternak, J.J.(2007) Molecular Biotechnology ASM Press, Washington Benjamin Lewin. Genes-VIII.Oxford university press.

Glover, D.M and B.D Hames.DNA Cloning 1-4.(2006). Oxford University Press.

Guptha, P.K. 1996. Elements of Biotechnology.Rastogi and Co. Meerut,.

Hammond, J., P.McGarvey and V.Yusibov(Eds.) 2000.Plant Biotechnology. Springer verlag, 2000.

James D. Watson. Recombinant DNA (2001).Scientific American Books. USA

Kingsman S.M. and A.J.Kingsman, (1998) Genetic Engineering.An Introduction to gene analysis and exploitation in eukaryotes.Blackwell Scientific Publications, Oxford.

Satyanarayanan, U. 2005. Biotechnology, Books and allied (p) Ltd.,

PRACTICALS:

Spotters/Photographs

i. Callus culture from Carrot Explant.
ii. Protoplast Isolation.
iii. Plasmids – Ti plasmids
iv. Gene cloning in E. Coli.
v. Agrobacterium mediated gene transfer.
vi. Blotting Techniques.
vii. Colony Hybridization technique.
viii. Transgenic Plants prescribed in the syllabus.To maintain a record note book.

MSU/2017-2018/B.Sc. Botany/Semester-V/Elective Paper – 1B

ENVIRONMENTAL BIOTECHNOLOGY
(5hrs/week)

Preamble: **LTPC**

5 0 0 4

The paper presents an objective view of the application of biotechnological know-hows in tackling environmental problems. It starts with basic knowledge about molecular biology and later links to application based processes and techniques which also address the socio-economical challenges.

UNIT I **(15L)**

Environmental Spheres :

Hydrosphere, Geosphere, Biosphere and Anthrosphere. Aims and Scope of Environmental Biotechnology, **Pollution Measurement** : Biotechnological Methods, Criteria for Biomonitoringof Pollution, Molecular biology in Environmental Monitoring and Role of Biosensors in Pollution monitoring, Biotechnological methods for management of Metal Pollution.

UNIT II **(15L)**

Biofuels:

Biogas – Production of Biogas, stages of Methanogenesis, Methane production from Hydrocarbons, Uses of Biogas, Hydrogen production – Importance of Biological Production of Hydrogen, Microbial production of Hydrogen, Uses of Hydrogen Production Technology. **Petroleum Plants** – *Calotropis, Euphorbiatirucalli, Jatrophacurcas*

UNIT III **(15L)**

Sewage Treatment:

Biotechnological Methods for Sewage and Waste Water Treatment -Primary, Secondary (Aerobic – Trickling filterand Activated Sludge Process, Anaerobic – Anaerobic digestion and Anaerobic Filter) and Tertiary Treatment (Ion Exchange Method), Water Recycling, Soil Conservation and Restoration, Sustainable Agricultural Management.

UNIT IV **(15L)**

Biodegradation:

Solid Waste Treatment and Disposal, Biodegradation of Hydrocarbons, Pesticides and Herbicides. **Bioremediation:**Types of Bioremediation: *in situ* and *ex situ*, Phytoremediation, Biosensors and Bioindicators,Bioleaching,Types of Reactions in Bioremediation, Genetically Engineered Microorganisms in Bioremediation.

UNIT V **(15L)**

Global Environmental Problems:

Green House Effect and Global Warming; measures to Control Green House Effect;Ozone Depletion -Effects and Control Measures; Acid rains -– Causes, Effects and Control Measures; Remote Sensing and its applications in ecology.

References:

Chatterji, A.K. (2011). *Introduction to Environmental Biotechnology*. Prentice Hall India Pvt., Ltd., New Delhi.

Dubey, R.C. (2013). A Textbook of Biotechnology. S. Chand & Company Ltd., New Delhi.

Gupta, P.K. (1994). *Elements of Biotechnology*.Restogi Publications, Meerut.

Ignacimuthu, S. (1997).*Plant Biotechnology*.Oxford & IBM Publishing Co., New Delhi.

Kumar, H.D. (1991). *A Textbook on Biotechnology.*East west press, New Delhi.

Parihar, P. (2014). A Textbook of Biotechnology.Argobios Publications, Jodhpur

Purohit, S.S. (2003). *Agricultural Biotechnology*.Agrobios Publications, Joshpur.

Sharma, P.D. (1994). *Environmental Biology*.Rastogi Publications.

PRACTICALS:

Photographs/Model

1. Biosensor
2. Biogas Plant
3. Sewage Treatment
4. Acid Rain
5. Green House Effect

Spotters

Petro Plants

i. *Calotropis*
ii. *Euphorbia tirucalli*
iii. *Jatrophacurcas*

To maintain a record note book.

MSU/2017-2018/B.Sc. Botany/Semester-V/Elective Paper – 2A
HORTICULTURE & PLANT BREEDING
(5hrs/week)

Preamble: **LTPC**

5 0 0 4

The students will learn the methods of crop improvement and the importance of horticulture in human welfare.It enables the students to acquire knowledge on the application of induced mutations, induced polyploidy and wide hybridization for crop improvement. This fundamental course will help the students to undertake the breeding of horticultural crops.

UNIT - I **(14L)**

Horticulture:

Scope, importance and divisions, Vegetative propagation methods- cutting, layering, budding, grafting and vegetative propagules (bulb, sucker, corm).Advantages and disadvantages of vegetative propagation.

UNIT - II **(16L)**

Gardening:

Types of gardens – Formal, informal, Design and Establishment of Garden,Garden components, garden implements, lawn making, glass house, rockery, hanging baskets, water garden, terrarium, topiary and Bonsai.

UNIT - III **(15L)**

Kitchen garden:

Establishment, Organic manures and growth regulators in horticulture, Plant protection measures for horticulture, Seed Propagation methods, Preparation of Nursery beds, Transplantation – steps and Methods.

UNIT - IV **(16L)**

Plant Breeding-

Nature, Scope and Objectives, Plant introduction, selection methods (pure line and mass), Hybridization techniques, Heterosis breeding, Interspecific and intergeneric hybridization.

UNIT – V **(14L)**

Mutation breeding:

Procedure and practices, Mutagens, Polyploidy breeding and its applications.Breeding for disease resistance.

REFERENCES:

Allard, R.W. (1960). *Principles of Plant Breeding*. John Wiley & Sons, NewYork.

Bose, T.K., Maiti, R.G., Dhua, R.S. and Das, P. (1999).*Floriculture and Landscaping*.NayaPrakash, Calcutta.

Chopra, V.L. (1989). *Plant Breeding*.Oxford IBH, New Delhi.

Kumar, N. (1997). *Introduction to Horticulture*.Rajalakshmi Publication, India.

ManibhushanRao, K. (1991). *Text Book of Horticulture*.Macmillan Publications, New Delhi.

Mukherjee, D. (1972). *Gardening in India*. Oxford & IBH Publishing Co., Kolkatta, Mumbai, New Delhi.

Roy Choudhry, N. and Mishra, H.P. (2001).*Text book on Floriculture and Landscaping*.Raja Infotech Enterprise, India.

Sharma, J.R. (1994). *Principles and Practice of Plant Breeding*.Tata McGraw Hill, New Delhi.

PRACTICALS :

Demonstration

i. Vegetative methods of propagation.
    a. Cutting-Stem and Leaf cutting
    b. Layering-Simple and air layering.
    c. Grafting – Tongue grafting.
    d. Budding – T-budding.
ii. Garden components -Rockery, hanging baskets, terrarium and topiary.
iii. Garden implements-spade, water can, pruning scissors, digging fork
iv. Designing Kitchen Garden.
v. Plant Breeding: Emasculation and Bagging methods.

To maintain a record note book.

MSU/2017-2018/B.Sc. Botany/Semester-V/Elective Paper – 2B
FORESTRY
(5hrs/week)

Preamble: **LTPC**
5 0 0 4

To know about the types of forest, its degradation, agroforestry and its economic utilization. It make the students aware about conservation and sustainable use of plants for future generation.

UNIT-1 **(13L)**

Forest:

Definition, Scope and Classification ,Importance/Functions of forest, Forest as a Balanced Eco system, Types andDistribution of Forest withreference to India (Champion and Seth - Classification)

UNIT II **(17L)**

Forest Degradation:

Damage caused by Fire, Climatic Factors and Injuries by Insects, Plants, Animals and Diseases, activities of Man including Encroachment and Shifting Cultivation, Measures to Protect the Forest Damage caused by various Factors.

UNIT III **(16L)**

Forest Management and Conservation:

Regeneration,Tending Operations, Sustainable Utilization ofForest Resources, Forest Organization, Role of Remote Sensing in Forest Management.

UNIT IV **(15L)**

Agroforestry:

Objectives, Advantages and Disadvantages. Energy Plantation, Recreational Forestry, Roleof Biosphere reserves, National Parks, Sanctuaries and Botanical Gardens in Conservation of Wild life.

UNIT V **(14L)**

Forest Utilization:

Conservation, Storage and Disposal of Wood in Forest, Major and Minor Forest Products, Forest based Industries- Paper and Pulp Industry, Resin tapping and Turpentine manufacture.

REFERENCES:

Agrawal, K.C. (1987). *Environmental Biology*. Agro Botanical Publisher, India.

Arumugam, N. (1994). *Concepts of Ecology* (Environmental Biology).Saras Publications, Nagercoil, Tamilnadu.

Kumar, H.D. (1992). *Modern Concepts of Ecology* (7th Edn.).Vikas Publishing Co., New Delhi.

Odum, E.P. (1971). *Fundamentals of Ecology* (2nd Edn.). Saunders & Co., Philadelphia &Natraj Publishers, Dehradun.

Sharma, P.D. (2000). *Ecology & Environment*.Rastogi Publications, Meerut, India.

Vashishta, P.C. (1990). *Plant Ecology*. Vishal Publications, Delhi, Jalandhar.

Verma, P.S. and Agarwal, V.K. (1999).*Concept of Ecology* (Enviromental Biology). S. Chand & Co., New Delhi.

DEMONSTRATION

1. Identify and find out the uses of wood samples of common timbers.
2. Prepare maps showing forest types in India and Tamil Nadu.
3. Prepare photographs of different forest types and nature of forest degradation.
4. Study of commonly used forest products.

To maintain a record note book.

MSU/2017-2018/B.Sc. Botany/Semester-VI/Core Paper – 9

PLANT PHYSIOLOGY

(5hrs/week)

Preamble: **LTPC**

5 0 0 4

To acquaint the students to understand the various functions of the plants, mechanisms of the various activities; anabolic and catabolic The course will enable the learners to gain more information in recent findings in the field of physiology.

UNIT I **(17L)**

WaterRelationsof Plants&Transpiration:

Water Relations: Imbibition, Diffusion and Osmosis; Water Potential- Definition, Components, Absorption of Water – Mechanism and Factors affecting Water Absorption; Transpiration- Definition, Types, Significance and Mechanism of Stomatal Transpiration- steps and theories, Guttation

UNIT II **(15L)**

Ascent of Sap&Mineral nutrition:

Ascent of Sap –Definition, Path of Ascent of Sap, Mechanism- Transpiration Pull and Cohesion Theory.Mineral nutrition - Macro and Micro Nutrients-Absorption of Mineral Salts – Mechanism, Translocation of Organic Solutes - Mechanism of Phloem Transport (Munch's Mass flow hypothesis).

UNIT III **(16L)**

Photosynthesis&.Respiration:

Photosynthesis:Light and Dark Reactions - Photosynthetic Electron Transport Chain and Photophosphorylation (Cylic and Non cyclic); Carbon Assimilation - C3, C4 and CAM Pathways andits Significance**;**Respiration: Glycolysis, TCA cycle and Oxidative Phosphorylation.

UNIT IV **(13L)**

Growth and Development:

Growth Curve and phases of growth;Phytohormones**:**Physiological Effect and Practical Applications - Auxin, Gibberellic acid, Cytokinin, Ethylene and Abscisicacid;Photoperiodism and Vernalization.

UNIT V **(14L)**

Seed Dormancy:

Causes and Methods ofBreaking Dormancy; Stress Physiology - Classification– Bioticand Abiotic, Stress Factors- Response of Plants to Salt, Drought, Frost and Heat.

REFERENCES:

Devlin, R.M. (1969). Plant Physiology. Holt, Rinehart & Winston & Affiliated East West Press (P) Ltd., New Delhi.

Dulsy Fatima, R.P. et. al., (1994).*Elements of Biochemistry*.Saras Publications, Nagercoil, Tamilnadu.

Jain, V.K. (1990). *Fundamentals of Plant Physiology*. S. Chand & Co., New Delhi.

Noggle, R. and Fritz (1989).Introductory Plant Physiology.Prentice Hall of India.

Pandey, S.N. (1991). *Plant Physiology*.Vikas Publishing House (P) Ltd., New Delhi.

Periyasamy, K. (1978). *Cell IyakkaViyal*(Cell Physiology). Tamilnadu text Book Society, Chennai.

Salisbury, F.B. and Ross, C.W. (1999).*Plant Physiology*.CBS Publishers and Printers, New Delhi.

PRACTICALS

1. Water Potential by Gravimetric Method.
2. Water Potential by Falling Drop Method.
3. Osmotic Potential by Plasmolytic Method.
4. Rate of Photosynthesis in Different Concentrations of Bi-Carbonate – Bubble Method.
5. Measurement of Stomatal Index.
6. Effect of Temperature on Permeability of Plasma Membrane.
7. Separation of Chlorophyll Pigments by Ascending Paper Chromatography.

DEMONSTRATION:

1. Tissue Tension
2. Suction due to Transpiration
3. Ganong'sPhotometer
4. Fermentation
5. Arc Auxanometer
6. Clinostat
7. Phototropism

Spotters

1. Absorption Spectrum of Chlorophylls
2. Growth curve.

To maintain a record note book.

MSU/2017-2018/B.Sc. Botany/Semester-VI/Core Paper – 10

GENETICS, EVOLUTION AND BIOSTATISTICS

(5hrs/week)

Preamble: **LTPC**

5 0 0 4

To learn the pattern of inheritance, to understand the mechanism of gene action, to learn the concept of biometrics and to become aware of the importance of statistical tools and computer applications in life sciences.The students will also learn about use of Statistics in the plant sciences which will be helpful to them during research.

UNIT-I **(18L)**

Monohybrid and dihybrid cross &Polygenic inheritance:

Monohybrid and dihybridcross,testcross,back cross, Mendel's laws, Deviation from Mendelian ratio–incomplete dominance,lethalfactor,complementaryfactor,supplementaryfactor,duplicate and inhibitory. Polygenic inheritance- Inheritance of Wheat Kernel and Ear length in Maize.

UNIT-II **(18L)**

Linkage& Sex determination:

Linkage, crossing over and recombination; Sex determinationin plants;Extra nuclear inheritance - male sterility in corn; Population genetics - Hardy – Weinberg's principle.

UNIT-III **(18L)**

DNA Model:

Watson and Crick, DNA as genetic material, DNA replication, Genetic code, Gene regulation in prokaryotes, Operon Concept*, Lac* Operon.

UNIT-IV **(18L)**

Origin of life& Evolution:

Chemosynthetic theory–evidences (any five); Evolution: Evolutionary theories of Lamarck, Darwin, De Vries, Modern synthetic theory of evolution; Speciation – concept of species-Allopatric and Sympatric, Isolation mechanisms.

UNIT-V **(18L)**

Measures of central tendencies &dispersion

Collection and interpretation of data. Measures of central tendencies **-** Mean, Mode and Median. Measures of dispersion - Standard Deviation, Chi-square test.

REFERENCES:

Agarwal, V.K. (2000). *Simplified course in Genetics* (B.Sc., Zoology). S. Chand & Company Ltd., New Delhi.

Ahluwalia, K.B. (1990). *Genetics*. Wiley Eastern Ltd., Madras.

Chandrasekaran, S.N. and Parathasarathy, S.V. (1965).*Cytogenetics and Plant Breeding*. P. Varadhachari& Co., Madras.

Gupta, P.K. (2000). *Genetics*.Rastogi Publishers, Meerut.

Jain, H.K. (1999). *Genetics-Principles, Concepts & Implications*.Oxford & IBH Publishing Co., (P) Ltd., New Delhi.

Lewin, B. (1990). *Genes IV*. Oxford University Press, Oxford.

Palaniyappan, S. (1987).*Marabiyal*(Genetics - In Tamil). V.K. Publishing House, Madras.

Pandey, B.P. (2012). *Cytology, Genetics and Molecular Genetics*. Tata McGraw-Hill Education Private Ltd., New Delhi.

Genetics. D. Van Nostrand Co., Ltd. Inc., New York.

NageswaraRao, G. (1983). *Statistics for Agricultural Science*. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.

Olive, J.D. (1995). *Basic Statistics - A Primer for the Biomedical Sciences*. John Wiley and Sons, New Delhi.

Gottlieb, LD. and Jain, S.K. (1988).*Plant Evolutionary Biology*. Chapman & Hall, London.

Shukla, R.S. and Chandel, P.S. (1996).*Cytogenetics, Evolution & Plant Breeding*. S. Chand & Company Ltd., New Delhi.

Sproule, A. (1998). *Charles Darwin Scientists who have changed the world*. Orient Longmans, Hyderabad.

Verma, P.S. and Agarwal, V.K. (1999).*Concepts of Evolution*. S. Chand & Company Ltd., New Delhi.

PRACTICALS :

1. Simple genetic problems in monohybrid crosses, incomplete dominance and lethal genes.
2. Simple problems on dihybrid ratio and interaction of factors.
3. Using available data, calculate the Mean and Standard deviation.
4. Spotters:

Linkage and Crossinz over

DNA model/ Photograph

Evolution (Origin of life, Speciation).

5. To maintain a record note book.

MSU/2017-2018/B.Sc. Botany/Semester-VI/Core Paper – 11
PLANT ECOLOGY AND PHYTOGEOGRAPHY
(5hrs/week)

Preamble: **LTPC**
5 0 0 4

To enable the students to understand biotic and abiotic factors in our ecosystem, to study the need of various ecosystems and vegetation.This course will enable the students to understand how environment influence the life of different organisms and vice versa.

UNIT – I **(14L)**

Vegetation:

Biotic and abiotic factors and their influence on vegetation, a brief account of microbes, plants, animals, soil,wind, light, temperature, rainfall and fire. **Biogeochemical cycles** - Nitrogen and Carbon.

UNIT – II **(16L)**

Ecosystem:

Concept, processes and component;Types of ecosystems–Aquatic and Forest;Ecological Classification of Plants; Morphological, anatomical and physiological adaptations of plants with special reference to Hydrophytes and Xerophytes

UNIT – III **(17L)**

Autecology and Synecology:

Autecology and Synecology - Definition (Species, Population, Community);**Vegetation** – Units of vegetation- Formation, Association, Consociation; Society-development of vegetation; Migration- ecesis, colonization; Methods of study of vegetation- Quadrat and transect.

UNIT – IV **(15L)**

Biomonitoring:

Biomonitoring - Biodegradation of Xenobiotics using microbe, Types of Bioremediation-*in situ* and *ex situ*, Phytoremediation, Biosensors and Bioindicators , Bioleaching.

UNIT – V **(13L)**

Phytogeography:

Principles, continental drift and endemism. Centre of origin- paddy and tomato. Vegetationsin Tamil Nadu, Remote Sensing.

PRACTICALS:

1. Analysis of herbaceous vegetation - by using quadrate and line transect method to find out frequency, density, abundance and interpret the vegetations in terms of Raunkaier's frequency formula.
2. Morphological and anatomical adaptations of hydrophytes and xerophytes (each 2).

   Hydrophytes: *Hydrilla,Nymphaea*
   Xerophytes: *Nerium, Casuarina*

3. Maintain a Recordnote book.

REFERENCES:

Singh, J.S., Singh, S.P. and Gupta, S. (2006) Ecology Environment and Resource Conservation. Anamaya Publications, New Delhi

Wilkinson, D.M. (2007). Fundamental Processes in Ecology. An Earth System Approach. Oxford.

Daubenmier, R.F. (1970). Plants and Environment: A text book of PlantAutoecology, Wiley Eastern Private Limited

Daubenmier, R.F. (1970), Plant Communities, Wiley Eastern Private Limited

Odum, E. (2008) Ecology. Oxford and IBH Publisher.

Sharma, P.D. (2010) Ecology and Environment, (8th Ed.)Rastogi Publications, Meerut.

Kormondy, E.J. (1996). Concepts of Ecology. Prentice Hall, U.S.A.4th edition.

ALLIED BOTANY
MSU/2017-2018/B.Sc. Allied Botany/Semester I/111 Allied Paper – 1
PLANT DIVERSITY AND MEDICINAL BOTANY
(4hrs/week)

Preamble: **LTPC**

4 0 04

The course facilitates an understanding of the salient features of various plant groups. Without the study of structural and functional aspects of Green plants, fungi, bacteria, viruses and their interrelationships, the "modern biology" is not possible. In fact, applied sciences, cannot replace basic sciences. The learners are expected to know the medicinal values of few plants.

UNIT – I (12L)

Algae& Fungi:

Algae:General characters and economic importance, Distribution, Structure and Life History of *Volvox*; Fungi**:**General characters and economic importance, Distribution, Structure and Life History of *Polyporus.*

UNIT – II (12L)

Lichens& Bryophytes:

Lichens:General characters and classification. Structure and Reproduction of *Usnea*; Bryophytes: General characters, Structure, Reproduction and Life History of *Funaria*.

UNIT – III (14L)

Pteridophytes& Gymnosperms:

General characters, Structure, Reproduction and Life History of *Lycopodium*;Gymnosperm**s:**General characteristics, Structure, Reproduction and Life History of *Pinus*

UNIT – IV (12L)

Taxonomy:

Bentham and Hooker's system of classification, Critical study of the following families: Rutaceae, Asclepiadaceae, Euphorbiaceae and Poaceae.

UNIT – V (10L)

Medicinal Botany:

Study of the following plants with reference to the morphology of the useful parts and their medicinal importance -*Aloe vera, Piper nigrum, Phyllanthusamarus, Coleus amboinicus*and *Catharanthusroseus*.

REFERENCES:

Pandey, B. P. 2001. College Botany, Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S. Chand & Company Ltd, New Delhi.

Smith, G..

Smith, G.M. (1955): Cryptogamic Botany Vol. II. (2nd Edition) (Bryophytes &Pteridophytes) Tata McGraw Hill Publishing Co., New Delhi.

Dutta A.C. 2016. Botany for Degree Students.Oxford University Press.

Pandey, B. P. 2007. Botany for Degree Students: Diversity of Seed Plants and their Systematics, Structure, Development and Reproduction in Flowering Plants. S. Chand & Company Ltd, New Delhi.

Rastogi, R. R. and B. N. Mehrotra. 1993. Compendium of Indian Medicinal Plants. Vol.I & Vol. II. CSIR, Publication and Information Directorate, New Delhi.

PRACTICALS :

1. Assign the given plant to its family giving reasons.
2. Dissect out and draw the floral parts of a plant belong to the families prescribed in the syllabus .
3. Make suitable micropreparations of Lycopodium stem, Pinus needle.
4. Identify and record the medicinal values and morphology of the useful parts of the plants prescribed in the syllabus.
5. Observe and identify the following specimens: Polyporus, Funaria, Lycopodium and Pinus –male and female cone.
6. Identify the slides showing mature anther, ovule, dicot embryo, Volvox, Nostoc, Yeast, Lycopodium - cone L.S and Funaria -capsule L.S.
7. To maintain a Record Note book

MSU/2017-2018/B.Sc. Allied Botany/ Semester II/IV Allied Paper – I1
EMBRYOLOGY, PLANT ANATOMY, PHYSIOLOGY AND BIOTECHNOLOGY
(4hrs/week)

Preamble: **LTPC**

4 0 04

The course facilitates the student to know the mechanism underlining the shift from vegetative to reproductive phase and to trace the development of male and female gametophyte.It enable the students to study the structural and functional aspects of various tissue systems and organs of dicots and monocots and to understand the concepts involved in the function of plants and study the recent aspects of various physiological processes in plants, which also focuses on the use of recombinant DNA technology for crop improvement and to identify the molecular markers for selection of superior genotypes.

UNIT – I (13L)

Microsporangium&Mega sporangium:

Microsporangium:Structure and development; Megasporangium:Structure, types and development, Development of male and female gametophyte; Double fertilization;**Endosperm** – types, dicot embryo- Structure.

UNIT – II (12L)

Meristem & Tissues

Meristem: Structure and classification; Tissues**:** Simple and complex tissues, Primary structure of Dicot and Monocot stem and root, Normal secondary thickening in dicot stem.

UNIT – III (12L)

Absorption of water:

Absorption of water - diffusion, osmosis, imbibition; mechanism of absorption of water; Ascentof sap – (cohesion theory only); Transpiration – Types, Mechanism of stomatal transpiration (Starch – sugar hypothesis); Photosynthesis - Mechanism of Light and dark reaction (Calvin cycle).

UNIT – IV (11L)

Biofertilizer*:*

Biofertilizer:*Nostoc* - Morphology, Mass cultivation and use.**Yeast:**Structure, multiplication (budding and fission) and Mass culture.

UNIT – V (11L)

Tissue Culture:

Scope and importance,totipotency, Nutrient media (MS medium). Callus and Meristem Culture, Applications of plant tissue culture

1) Dissect out young embryo from *Tridax* flower bud.
2) Make suitable micro-preparations of dicot and monocot stem and root
3) Demonstrate the physiology experimental set up –Potato osmoscope, Ganong's lightscreen, Tissue tension.
4)Identify the Photograph/ Slide/ Specimen/setup - (i) *Nostoc* (ii) (ii) Yeast (iii) Callus culture, (iv) Meristem culture.
5) Maintain a record note book for external and internal evaluation.

NON-MAJOR ELECTIVES
MSU/2017-18/ B. Sc Botany / Semester –III
Non-Major Electives 1-(A)
GARDENING AND GARDEN MANAGEMENT
(2hrs/week)

Preamble: **LTPC**
2 0 02

Enables the student to gain knowledge about crop production, plant propagation, plant breeding, genetic engineering, preparation of soil biochemistry and simultaneously can work in various fields including floral design, garden centers, teaching, fruit and vegetable production, arboriculture and landscape construction.

UNIT I **(6L)**

Gardens:

Gardens: Types – Formal & informal Gardens – English Gardens, Mogul Gardens, Japanese Gardens. Principles of Ornamental Gardening.

UNIT II **(6L)**

Propagation Techniques:

Soft Wood Cutting, Simple and Air Layering, 'T' Budding, Approach Grafting, Pruning. Garden Implements – Digger, Pruning Shears, Garden Rake.

UNIT III **(6L)**

Components of Ornamental Gardens:

Hedges, Edges, Flower Beds, Arches, Rockery, Lawn and Topiary.

UNIT IV **(6L)**

Vegetable Garden & Kitchen Garden Vegetable Gardening: Types;Kitchen Garden: Establishment, Components– Perennials, Pandals, Fence, Seasonal vegetable crops in bunds, Compost Pits.

UNIT V **(6L)**

Indoor Gardening :

Indoor Gardening :Principles and Maintenance. Hanging baskets, Terrarium, Bottle Garden and Bonsai.

MSU/2017-18/ B. Sc Botany / Semester –III

Non-Major Elective1-(B)

HERBAL MEDICINE

(2hrs/week; Total 30hrs)

Preamble: **LTPC**

2 0 02

Facilitates the role, importance and contributions of ethnomedicine, ethnoecology, ethno pharmacology, etc. in our modern civilization and create an awareness of link between biodiversity and cultural diversity. It will make the students realize the importance of People-Plant relations focusing upon impact of plant conservation and opportunities for sustainable use.

UNIT: I

(6L)Systems of medicine:

Indian systems of medicine –Ayurveda, Siddha, Unani and Homeopathy. TBK (Tribal Botanical knowledge): Folk medicines, includingHome remedies. Ethno medicines of Tamil Nadu.

UNIT: II **(6L) Herbal remedies**:

Herbal remedies for common ailments like cold, fever, diabetes, cuts, diahorrea.

UNIT: III **(6L)**

Economic importance:

Study on the morphology, useful parts, uses and method of use for specific ailments of the following: rhizome (*Acorus*, Ginger), Bulb (Garlic, Onion), Root (*Hemidesmus*, *Vinca*), Bark (*Saracaindica*, *Cinnamomum*), Leaf (*Adhatoda*, *Vitex*), Flower (*Cassia*, *Clove*),Whole plant (*Phyllanthus*, *Azadirachta*).

UNIT: IV **(6L)**

Herbals:

Skin and hair care using herbals. Herbal preparation: decoction, extract, infusions, oils, shampoos, powders.

UNIT: V **(6L)**

Cultivation, harvest and post-harvest technology:

Cultivation, harvest and post-harvest technology of some medicinal plants –*Catharanthusroseus*, *Adhatodavasica*, *Acoruscalamus*

REFERENCES:

ArunaDevaraj, 2002.Herbal cosmetology.

Gala, D.R. Dhiren Gala & Sanjay Gala. 2000. Nature cure for common diseases, Navneet Publications Ltd., Mumbai.

Kirtikar K.R. and Basu, B.D. 1991.Indian Medicinal Plants Vol.1-4, Periodical Experts, New Delhi.

Saha, M.N. 1997. Fruit and Vegetable juice therapy, Jain Publishers-New Delhi.

VaidyaBhagwanDush, B. 1999. Herbal cure, Jain Publishers-New Delhi.

MSU/2017-18/ B. Sc Botany / Semester –IV
Non-Major Electives 1-(A)
FOOD AND NUTRITION
(2hrs/week)

Preamble: **LTPC**

2 0 02

Facilitates understanding of the principles of food and nutrition.It provides the student to **u**nderstand the nutritive values, importance, factors affecting storage and methods of preservation of food which make the students aware of application of different plants in various industries.

UNIT-I **(6L)**

Food:

Energy Value of Food, Major Classes of Food- Carbohydrates, Proteins, Fats and Oils, Vitamins, Minerals – Sources and Requirements. Balanced Diet - Functions and Deficiency Symptoms – Causes and Prevention.

UNIT-II **(6L)**

Plants as Source of Food:

Nutritive Value of Cereals and Millets (Rice, Wheat, Maize, Sorghum, and Ragi); Pulses (Bengal gram, Black gram, Green gram, Red gram and Peas); Nuts and Oil seeds (Ground nuts, Sesame, Coconut, Soyabeans, Sunflower); Fruits and Vegetables (Mango, Banana, Guava, Pomegranate, Grapes, Cucumber, Brinjal, Ladies finger, Tomato, Carrot).

UNIT: III **(6L)**

Food Preservation:

Importance of Preservation.Methods of Preservation. Low and High Temperatures, Uses of Oil and Spices, Use of Salt and Sugar. Preparation of Jam, Jelly, Pickles and Squashes.

UNIT: IV **(6L)**

Food Additives:

Food Additives - Definition and Types; Food Poisoning- Salmonellosis, Botulism; Food Adulteration- Harmful Effects, Simple Physical Tests for Detection of Food Adulterants.

UNIT: V **(6L)**

Food borne Infection and their Prevention:

Food borne Infection and their Prevention - Cholera, Typhoid.

MSU/2017-18/ B. Sc Botany / Semester –IV
Non-Major Electives 1-(B)
BOTANY FOR COMPETITIVE EXAMINATION
(2hrs/week)

Preamble: **LTPC**
2 0 02

Facilitates the basic principles of botany to the students which are vital for facing any competitive examinations.

UNIT I **(6L)**

Basics of the Plant Kingdom :

Basics of the Plant Kingdom – Brief Classification of Plant Kingdom ; Diagnostic features of Algae, Fungi, Bryophyta, Pteridophyta, Gymnosperms, Bacteria, Viruses; Economic importance of these Groups.

UNIT II **(6L)**

Basics of Angiosperm Taxonomy:

A brief account of Natural System of Classification (Bentham and Hooker's System) and Phylogenetic System of Classification (Engler and Prantl's System).Binomial Nomenclature. A Brief account of the following Families and their Economic importance: Fabaceae, Cucurbitaceae, Poaceae.

UNIT III **(6L)**

Medicinal Importance:

Medicinal Importance of the following Plants:*Zingiberofficinale*, *Vetiveriazizanioides*, *Ocimum sanctum*, *Azadirachtaindica*, *Solanumtrilobatum*, *Phyllanthusemblica*, *Andrographispaniculata*, *Acalyphaindica*.

UNIT IV **(6L)**

Basics in Physiology:

Basics of Absorption of Water, Transpiration, Photosynthesis, Respiration, Protein Synthesis.

UNIT V **(6L)**

Cell Organelles Genetics and Genetic Engineering:

Cell Organelles; Tissues and Tissue systems; An introduction to Genetics -Mendelism, Monohybrid cross and Dihybrid Cross; Genetic Engineering - Enzymes used in Gene Cloning experiments. An Introduction to Plant Tissue Culture;Biofertilizers.

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI

UG COURSES – AFFILIATED COLLEGE
B.Sc. Chemistry

(Choice Based Credit System)
(With effect from the academic year 2017 -2018)

1. Objectives

- To impart theoretical and practical skills that underpins the various branches of the Science of Chemistry
- To enable the students to have a thorough understanding and knowledge of different branches of Chemistry
- To make the students to develop the ability to think analytically and solve problems.
- To facilitate the students of B.Sc Chemistry to join PG courses which in turn offer them job opportunities and research pursuits.
- To apply the skills and knowledge gained through the subject to real life situations and face competitive examinations with confidence at National level.
- To create an awareness to ecofriendly microscale experiments in practical courses.

2. Eligibility for Admission

The minimum eligibility conditions for admission to the **B.Sc Chemistry** program are given below.

The candidates for admission into the first semester of the **B.Sc Chemistry** course will be required to have qualified the Higher Secondary Examination conducted by the Board of Higher Secondary Education, Government of Tamil Nadu or any other Examinations accepted by the syndicate of the Manonmaniam Sundaranar University as equivalent there to in Science subject.

3. Duration of the Course

The students shall undergo the prescribed course of study for a period of not less than three academic years (Six semesters). The semester contains 90 working days.

4. Scheme of the Course

Sem	Pt	Sub No	Subject Status	Subject Title	Con Tact Hrs/ Wk	L Hrs/ wk	T Hrs/ wk	P Hrs/ wk	Credits
III	I	17	Language	Tamil/Other Languages	6	6	0	0	4
	II	18	Language	English	6	6	0	0	4
	III	19	Core – Paper V	Organic Chemistry - II	4	4	0	0	4
	III	20	Major Practical III	Inorganic Qualitative Analysis	2	0	0	2	1
	III	21	Allied - II	Allied Chemistry – I	4	2	2	0	3
	III	22	Allied Practical II	Allied Chemistry Practical- I	2	0	0	2	1
	III	23	Skill Based- I Core	Agro Chemistry/ Food Chemistry	4	4	0	0	4
	IV	24	Non-Major Elective -I	Food Chemistry /Water Management	2	2	0	0	2
	IV	25	Common	Yoga	2	2	0	0	2
				Subtotal	**30+2**	**24+2**	**2**	**4**	**25**

IV	I	26	Language	Tamil/Other Languages	6	6	0	0	4
	II	27	Language	English	6	6	0	0	4
	III	28	Core – Paper VI	Physical Chemistry - II	4	4	0	0	4
	III	29	Major Practical IV	Inorganic Preparation and Physical Constant Determination	2	0	0	2	1
	III	30	Allied - II	Allied Chemistry - II	4	2	2	0	3
	III	31	Allied Practical II	Allied Chemistry Practical- II	2	0	0	2	1
	IV	32	Skilled Based II Core	Chemistry in Medicine/ Industrial Chemistry	4	4	0	0	4
	IV	33	Non-Major Elective - II	Dairy Chemistry / Applied Chemistry	2	2	0	0	2
	IV	34	Common	Computers for Digital Era	2	2	0	0	2
	V	35	Extension Activity	NCC/NSS/YRC/YWF	-	-		-	1
				Subtotal	**30+2**	**24+2**	**2**	**4**	**26**

V	III	36	Core – Paper VII	Organic Chemistry - III	6	6	0	0	4
	III	37	Core – Paper VIII	Physical Chemistry - III	6	6	0	0	4
	III	38	Major Elective-I	Polymer Chemistry / Bio Inorganic Chemistry	4	4	0	0	4
	III	39	Major Elective - II	Analytical Chemistry / Pharmaceutical Chemistry	4	4	0	0	4
	III	40	Major Practical V	Organic Analysis	8	0	0	8	4
	III	41	Major Practical VI	Physical Chemistry Experiments					
	IV	42	Skill Based Common	Personality Development/ Effective Communication/ Youth Leadership	2	2	0	0	2
				Subtotal	**30**	**22**	**0**	**8**	**22**
VI	III	43	Core Paper IX	Inorganic Chemistry – III	5	5	0	0	4
	III	44	Core Paper X	Organic Chemistry - IV	5	5	0	0	4
	III	45	Core Paper XI	Physical Chemistry – IV	5	5	0	0	4
	III	46	Major Elective – III	Green Chemistry/ Nano Chemistry	4	4	0	0	4
	III	47	Major Practical VII	Gravimetric Estimation & Organic Preparation	4	0	0	4	2
	III	48	Major Project	Major Project	7	0	0	7	7
Subtotal					**30**	**19**	**0**	**11**	**25**
Grand Total					**180+4**	**137+4**	**8**	**35**	**144**

5. Elective Subject

One among the two given subjects will be selected.

6. Extension Program for the Department

Apart from the curriculum, to enrich the skill development of the students following courses in their premises are conducted.

Effective Communication

Personality development

Youth development.

7. Internal Assessment

There is a separate passing minimum for the external and overall components.

Distribution of marks between External and Internal Assessment is

- For Theory 75 : 25
- For Practical 50 : 50

Pass minimum of 40% for external and overall components.

Internal Marks for **Theory** shall be allotted in the following

The average of the best two from three compulsory tests. Each test is of one hour duration	20 Marks
Assignment	05 Marks
TOTAL	**25 Marks**

Distribution of marks between External and Internal Assessment for skill based elective - 75 : 25

The average of the best two from three compulsory tests. Each test is of one hour duration	20 Marks
Assignment	05 Marks
TOTAL	**25 Marks**

Internal Marks for **Practical** shall be allotted in the following manner

Experimental Work	25 Marks
Regularity	25 Marks
TOTAL	**50 Marks**

8. Grading System

The performance of the students is indicated by the seven point scale grading system as per the UGC norms given below.

Grade	Grade Point	Percentage of Marks	Performance
O	**9.5 and above**	**95 – 100**	**Outstanding**
E	**8.5 and above**	**85 – 94**	**Excellent**
D	**7.5 and above**	**75 – 84**	**Distinction**
A	**6.0 and above**	**60 – 74**	**Very Good**
B	**5.0 and above**	**50 – 59**	**Good**
C	**4.0 and above**	**40 – 49**	**Average**
RA	**0**	**Upto 39**	**Re-Appear**

The overall performance level of the candidates will be assessed by the following formulae :

$$\text{Cumulative weighted average of marks} = \frac{\sum(\text{Marks x Credits})}{\sum \text{Credits}}$$

$$\text{Cumulative weighted average Grade Points} = \frac{\sum(\text{Grade Point x Credits})}{\sum \text{Credits}}$$

9. Question Pattern

Section	Type of Question	No. of Question	Marks
Part A	Objective Type Questions (Two questions from each unit)	5 x 2 = 10	10 x 1 = 10
Part B	Internal Choice Questions (One question from each unit)	5 x 1 = 5	5 x 5 = 25
Part C	Internal Choice Questions (One question from each unit)	5 x 1 = 5	5 x 8 = 40
	TOTAL		75 marks

PAPER-V : ORGANIC CHEMISTRY- II

L	T	P	C
4	0	0	4

Objectives

To learn about carbonyl compounds

To understand the impotance of active methylene, organometallic and organosulphur compounds

To study alicyclic compounds and tautomerism

UNIT - I ALDEHYDES AND KETONES (13 Hrs)

Structure and reactivity of carbonyl group – relative reactivities of aldehydes and ketones – mechanism of nucleophilic addition reaction (HCN, $NaHSO_3$, Grignard reagent) –mechanism of aldol condensation, crossed aldol condensation, Knoevenagal reaction. Study of the following reactions – Wolff-Kishner reduction, Wittig reaction, Meerwein Ponndorf Verley reduction.

Preparation, properties and uses of chloral, acrolein, crotonaldehyde and succinaldehyde.

UNIT-II CARBOXYLIC ACIDS & ACID DERIVATIVES (12 Hrs)

Structure of carboxylic acid and carboxylate anion – relative strengths of monocarboxylic acids – effect of substituents on acidity – Hell – Volhard – Zelinsky reaction- action of heat on hydroxy acids- preparation, properties and uses of lactic acid and citric acid–dicarboxylic acids: action of heat on dicarboxylic acids - preparation, properties and uses of oxalic acid and succinic acid

Acid anhydrides – Amides –Preparation, properties and structure of urea –Esters-mechanism of esterification and ester hydrolysis.

UNIT-III ORGANOMETALLIC COMPOUNDS AND ORGANO SULPHUR COMPOUNDS (11 Hrs)

Preparation, structure and synthetic uses of Grignard reagent-preparation and reactions of methyl lithium, diethyl zinc and tetraethyl lead-Reformatsky reaction

Preparation and properties of thioalcohols and thioethers – sulphonal-mustard gas and sulphones

UNIT –IV REACTIVE METHYLENE COMPOUNDS & TAUTOMERISM (11 Hrs)

Reactivity of methylene groups – preparation and synthetic uses of diethyl malonate and ethyl acetoacetate. Tautomerism – definition – various types, keto – enol, amido – imido, nitro – acinitro and oxime – nitrosotautomerism.

UNIT-V ALICYCLIC COMPOUNDS (13 Hrs)

Nomenclature -general methods of preparation – spectroscopic properties – chemical properties – relative stabilities of cyclo alkanes – Baeyer's strain theory –Sachse-Mohr theory – Coulson and Moffit's concept – conformations of cyclohexane and monosubstitutedcyclohexanes - largering compounds – synthesis and structure of civetone and muscone (structure elucidation not necessary).

Text Books

1. K.S. Tewari, N.K. Vishil, S.N. Mehotra – A text book of org. chem – 1st edition, Vikas Publishing House Pvt Ltd., 2001, New Delhi.
2. P.L. Soni, Text Book of Organic chemistry, Sultans chand, 1991, New Delhi,

Reference Books

1. Bahl and ArunBahl, Organic Chemistry, S. Chand and Sons, New Delhi, 2005.
2. M.K. Jain and S. C. Sharma, Modern Organic Chemistry
3.Organic Chemistry - R.T.Morrison and Boyd - Prentice Hall
4.Advanced General Organic Chemistry - SachinK.Ghosh - Books and Allied (P) Ltd
5. Organic Chemistry – Bhupinder Mehta and Manju Mehta - PHI Learning Pvt Ltd.

INORGANIC QUALITATIVE ANALYSIS

L	T	P	C
0	0	2	1

Objectives

- ❖ To enable the students to understand various procedures in salt analysis.
- ❖ To create an awareness on ecofriendly approach in salt analysis

Qualitative analysis of inorganic salt mixtures containing two acidic radicals (one should be an interfering radical) and two basic radicals

.Acidic radicals

Simple acidic radicals:

Carbonate, Nitrate, Sulphate and Chloride

Interfering acidic radicals:

Borate, Fluoride, Oxalate and Phosphate.

1. Basic radicals

Group I : Lead
Group II : Copper, Cadmium, Bismuth.
Group IV : Cobalt, Nickel, Manganese
Group V : Barium, Strontium
Group VI : Magnesium, Ammonium.

Internal – 50 marks

25 marks - Regularity
25 marks – Average of best four salt mixtures in regular class work

External -50 marks

20 marks – Record (atleast 4 salt mixtures)*

30 marks – Analysis (10 marks for each radical)

*Experiments done in the class alone should be recorded

(Students having a bonafide record only should be permitted to appear for the practical examination)

Reference books:

1. V.V. Ramanujam, Inorganic Semi Micro Qualitative Analysis, 3rd edition, The National Publishing Company, Chennai, 1974.
2. Vogel's Text Book of Inorganic Qualitative Analysis, 4th edition, ELBS, London, 1974.

ALLIED CHEMISTRY - I

Objective

To learn about atomic structure and bonding.
To learn the principles of reactions of organic compounds.
To study about photochemical reactions.
To learn about the importance of polymers and polymer science.
To study about lubricants and some cosmetics in the modern world.

Unit I – Inorganic chemistry

Atomic structure : electronic configuration - Aufbau principle - Pauli's exclusion principle- Hund's rule. Bonding : electrovalent, covalent, hydrogen bonds-orbital overlap - s-s, s-p. Hybridization and VESPR theory - CH_4, C_2H_4, C_2H_2- $BeCl_2$, BF_3, NH_3, H_2O, PCl_5, IF_5, IF_7.

Unit II - Organic chemistry – Principles of reactions

Heterolytic and homolytic cleavage - nucleophiles and electrophiles-reaction intermediates – preparation and properties of carbonium ions, carbanions and free radicals - type of reactions - substitution, addition, elimination and polymerisation reactions.

Unit III-Physical chemistry - Photochemistry

Definition-comparision between thermal and photochemical reactions-Laws of photochemistry-Beer Lambert's law-Grothus Draper law-Einstein's law-Quantum yield-low and high quantum yield-determination of quantum yield-fluorescence, phosphorescence, thermoluminescence, chemiluminescence and bioluminescence-definition with examples-photosensitisation.

Unit IV-Polymer Chemistry

Definition- Monomers, Oligomers and Polymers - Classification of polymers- natural, synthetic- linear, cross linked and network- plastics, elastomers, fibres- homopolymers and co-polymers

Thermoplastics: polyethylene, polypropylene, polystyrene, polyacrylonitrile, poly vinyl
chloride, nylon and polyester - Thermosetting Plastics : phenol formaldehyde and epoxide resin-Elastomers: natural rubber and synthetic rubber - Buna - N, Buna-S and neoprene.

Unit V-Applied Chemistry

Lubricants-classification-criteria of good lubricating oils-synthetic lubricating oils-poly glycols and poly alkene oxides-greases or semi solid lubricants-examples-solid lubricants-graphite

Prepration and uses of shampoo, nail polish, sun screens, tooth powder, tooth paste, boot polish, moth ball and chalk piece.

Reference Books

1. B. R. Puri, L. R. Sharma and K. C. Kalia, Principles of Inorganic Chemistry
2. P. L. Soni, Text Book of Inorganic Chemistry
3. K. S. Tewari and N. K. Vishnoi, A Text Book of Organic Chemistry.
4. Arun Bahl and B.S. Bahl, Advanced Organic Chemistry, S. Chand and Sons.
5. M.K. Jain and S. C. Sharma, Modern Organic Chemistry
6. K.K.Rohatgi Mukherjee, Fundamentals of photochemistry , Wiley Eastern Ltd.
7. B.R. Puri and L.R. Sharma, Principles of Physical Chemistry, Chand & Co.
8. Malcom P. Stevens, Polymer Chemistry – An Introduction
9. V.R. Gowariker, Polymer Science, Wiley Eastern, 1995.
10. Sawyer.W, Experimental cosmetics, Dover publishers, New york, 2000.

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Inorganic Quantitative Analysis

Objective:

To enable the students to acquire the quantitative skills in volumetric analysis.

Acidimetry and alkalimetry

1. Estimation of oxalic acid – Std. oxalic acid
2. Estimation of Na_2CO_3 – Std. Na_2CO_3
3. Estimation of hydrochloric acid – Std. oxalic acid

Permanganometry

4. Estimation of ferrous ammonium sulphate – Std. ferrous ammonium sulphate
5. Estimation of oxalic acid – Std. oxalic acid
6. Estimation of ferrous sulphate – Std. oxalic acid

Internal –50 marks

25 marks - Regularity

25 marks – Average of best four estimations in regular class work

External -50 marks

10 marks – Record (atleast 4 volumetric estimations)*

10 marks – Procedure

30 marks – Result

*Experiments done in the class alone should be recorded

(Students having a bonafide record only should be permitted to appear for the practical examination)

SKILL BASED COURSE - AGROCHEMISTRY

L	T	P	C
4	0	0	4

Objectives

To learn about fertilizers and pesticides

To study the origin, characterisation and testing of soils

UNIT – I Fertilizers (14 Hrs)

Classification, macronutrients -role of nitrogen, potassium and phosphorus on plant growth – manufacture of urea, muriate potash and triple superphosphate. Complex fertilizers, mixed fertilizers & biofertilizers – their composition. Micronutrients – their role in plants.

Manures : Bulky organic manures – Farm yard manure - oil cakes - blood meal – fish manures - Composting process – handling and storage

UNIT – II Pesticides (14 Hrs)

Definition - Classification of Pesticides based on the use and chemical composition – examples - general methods of application – Benefits of pesticides - Potential hazards. Safety measures -first aid.

Insecticides : Plant products – Nicotine, pyrethrin – Inorganic pesticides – borates. Organic pesticides – D.D.T. and BHC.

Fungicide : Sulphur compounds, Copper compounds, Bordeaux mixture.

Herbicides : Acaricides – Rodenticides. Attractants – Repellants.

UNIT –III Soil (10 Hrs)

Origin of soil - definition of soil - rock system - weathering of rocks and minerals- main components of soil - organic, inorganic constituents - soil formation - factors favouring soil formation.

UNIT –IV Characteristics of soil (10 Hrs)

Physical aspects - soil texture - pore space - bulk density, particle density - soil colour - surface area - soil colloids - plasticity, shrinkage - flocculation and deflocculation,soil air, soil temperature and their importance in plant growth. Acid, alkaline and saline soils – diagnosis - Methods of reclamation and after care.

UNIT –V Soil testing (12 Hrs)

Concept and objectives – soil sampling , tools, collection, processing, dispatch of soil sample. Estimation of total organic compound, available nitrogen and phosphorus in the soil sample. Determination of pH, EC, moisture content, bulk density and particle density of the soil sample.

Text books:

1. A text book of Soil Science – Daji.A, Asia Publishing House, Madras 1970.
2. Textbook of soil Chemical Analysis – Hesse,P.R.A John Murray Newyork,1971

Reference books:

1. Textbook of Soil Science - Biswas,T.D and Mukherjee,S.K.Second edition, Tata McGraw-Hill Education
2. Chemistry for Agriculture and Ecology-Y.Mido M.Satake, Discovery Publishing House.
3. Soil Fertility & Fertilisers – Samuel L.Tisdale,Werner L.Nelson, James D.Beaton, John L. Havlin. Fifth edition, Macmillan
4. Nature and properties of soils-Harry, O Buckman N Yle C. Brandy, Macmillan
5. Insecticides, Pesticides and Agro based Industries – R.C.Paliwal, K.Goel, R.K.Gupta, Small Business Publications

SKILL BASED COURSE - FOOD CHEMISTRY

L	T	P	C
4	0	0	4

Objectives:

To acquire the basic knowledge of food chemistry

UNIT - I CONSTITUTION OF FOOD (11 Hrs)

Food - definition - classification of food - energy requirements of individuals - source, classification and function of carbohydrates, proteins, lipids, vitamins and minerals - calorific values of food - rice, wheat, milk, fish, vegetables, fruits and cereals.

UNIT - II FOOD ADDITIVES AND PRESERVATIVES (13 Hrs)

Food additives: Definition - permitted food additives, characteristics and their role: antioxidants, stabilizers, flavours, sweeteners, emulsifiers, thickeners, food colourants.

Preservatives: Definition – methods of food preservation - heat, cold, deep-freezing, radiation.

UNIT - III FOOD ADULTERATIONS (12 Hrs)

Definition - adulterant, adulteration - types of adulterants - common adulterants and their determination in milk, oils, ghee, honey, chilly powder, coriander powder, turmeric powder, coffee powder, tea dust, asafoetida - food poisoning and its prevention – Prevention of Food Adulteration Act- food laboratories and their functions.

UNIT - IV QUALITY STANDARDS (11 Hrs)

Quality control - specification and standards - FA, FDA, WHO standards - ISI specifications, packing and labeling of foods - Essential Commodities Act, Consumer Protection Act - AGMARK.

UNIT - V LABORATORY WORK (13 Hrs)

1. Determination of fat, protein and carbohydrate in food stuff.
2. Analysis of fats and oils - iodine value, acid value and RM value.
3. Estimation of glucose by Bertranel method
4. Analysis of starch in foods
5. Isolation of casein from milk

Text books:

1. Sivasankar B, Food Processing and Preservation, Prentice Hall of India Pvt. Ltd, New Delhi, 2002.
2. Swaminathan M. Textbook on Food Chemistry, Printing and Publishing Co, Ltd, Bangalore 1993.

Reference books:

1. N. S. Gnanaprakasam, G. Ramamurthy, Organic Chemistry, Lab Manual, S. Viswanathan Printers and Publishers Ltd.
2. Food Science – III Edition – B. Sri Lakshmi, New Age International Publisher, 2005.
3. Fundamentals of Foods and Nutrition – Mudambi. R. Sumathi, and Rajagopal, M.V. Willey Eastern Ltd, Madras.

FOOD SCIENCE

L	T	P	C
2	0	0	2

Objectives:

To acquire the basic knowledge of food science

UNIT – I INTRODUCTION (6 Hrs)

Food : sources and classification – food as a source of energy - functions and biological importance of carbohydrates, protein, fat, vitamins and minerals - calorific value of food – energy requirements of individuals - balanced diet.

UNIT - II FOOD ADDITIVES (6 Hrs)

Definition, food colourants : natural and artificial - antioxidants, stabilizers, flavours, bleaching and maturing agents – leavening agents.

UNIT - III FOOD PRESERVATIVES (5 Hrs)

Definition - classification - methods of food preservation and processing by heat, cold, radiation, drying and deep freezing.

UNIT - IV FOOD ADULTERATION (6 Hrs)

Definition – types – detection and analysis of adulterants in foods: milk, chilli powder, coffee powder, turmeric powder, ghee, oil and pulses.

UNIT -V QUALITY STANDARDS (7 Hrs)

Quality control - specification and standards - FA, WHO standards – packing and labeling of foods, Essential Commodities Act - Consumer Protection Act - AGMARK.

Text books:

1. Sivasankar B, Food Processing and Preservation, Prentice Hall of India Pvt. Ltd, New Delhi, 2002.
2. Swaminathan M. Textbook on Food Chemistry, Printing and Publishing Co, Ltd, Bangalore 1993.

Reference books:

1. Food Science – III Edition – Sri Lakshmi B, New Age International Publisher, 2005.
2. Fundamentals of Foods and Nutrition – Mudambi. R. Sumathi, and Rajagopal, M.V. - Willey Eastern Ltd, Madras.

WATER MANAGEMENT

L	T	P	C
2	0	0	2

Objectives:

To realize the importance of quality water in day to day life

UNIT I - WATER POLLUTION (6 Hrs)

Definition-sources of water pollution-types of water pollutants: sewage and domestic wastes, industrial effluents, agricultural discharges, detergents, disease causing agents and radioactive materials. Eutrophication and its effects.

UNIT II - WATER QUALITY PARAMETERS (7 Hrs)

Physical, chemical and biological water quality parameters-water quality standards for drinking water –BIS and WHO. Determination of pH, Total hardness, DO, BOD and COD.

UNIT III - WATER PURIFICATION (6 Hrs)

Purification of water for drinking purposes: Sedimentation, filtration and disinfection-Desalination: reverse osmosis-Purification of water for industrial purposes: water softening-permutit process and ion-exchange process.

UNIT IV - WASTE WATER TREATMENT (7 Hrs)

Elementary ideas of waste water treatment: pre-treatment-primary treatment-secondary treatment: aerobic and anaerobic processes –tertiary treatment: evaporation adsorption – chemical precipitation.

UNIT V - RESTORATION AND MANAGEMENT (4 Hrs)

Importance of lakes and rivers-stresses on the Indian rivers and their effects –A restoration case study: Ganga Action Plan: objectives implementation and drawbacks. Rain water harvesting –water recycling- The water Prevention and control of Pollution Act 1974.

Text books :

1. A. K. De, Environmental Chemistry, Wiley Eastern Ltd., New Delhi.
2. B. K. Sharma, Environmental Chemistry, Goel Publishing House, Meerut.

Reference books :

1.R. K. Trivedy and P. K. Goel, Chemical and biological methods for water pollution studies, Environmental Publications, Karad, India.

2.BIS 1991, Specification for drinking water, Bureau of Indian Standards, New Delhi

3.WHO 1992, International standards for drinking water, World Health Organisation, Geneva.

PHYSICAL CHEMISTRY –II

L	T	P	C
4	0	0	4

Objectives

To learn about basic concepts and I and II law of thermodynamics

To understand chemical equilibrium and electrochemistry

To study solutions

UNIT -I THERMODYNAMICS-I (12 Hrs)

Basic concepts - system, surroundings - types of systems - extensive and intensive properties - state functions and path functions - types of processes - . Exact and inexact differentials - Zeroth law of thermodynamics. Statements of first law - definition of internal energy and enthalpy - heat capacities at constant volume (C_v) and at constant pressure (C_p), relationship between C_p and C_v - calculation of work, heat, internal energy change and enthalpy change for the expansion of an ideal gas under reversible isothermal and adiabatic conditions. Joule-Thomson effect – Joule-Thomson coefficient and its significance - derivation of the expression for Joule-Thomson coefficient - inversion temperature. Kirchoff's equation and its applications - numerical problems.

UNIT II: THERMODYNAMICS-II (12 Hrs)

Introduction to second law of thermodynamics - spontaneous processes - statement of second law of thermodynamics.

Entropy: Definition –entropy a state function - Trouton's rule. -entropy change in reversible and irreversible processes- Clausius inequality- entropy as function of T and V - entropy as a function of T and P - entropy change in isothermal transformation - entropy change accompanying change of phase-– entropy of mixing of ideal gases -physical significance of entropy.

Free energy: Work and free energy functions – definition-general conditions of equilibrium and spontaneity – -physical significance of dA and dG. Temperature and pressure dependence of G - variation of G during isothermal change -Gibbs Helmholtz equation

UNIT III: CHEMICAL EQUILIBRIUM (11 Hrs)

Reversible and irreversible reactions-nature of chemical equilibrium-Law of mass action-equilibrium constants- K_p, and K_c Thermodynamic derivations- -Relations between K_p & K_c Temperature dependence of equilibrium constant-properties of equilibrium constant –- Pressure dependence of equilibrium constant- Application of law of mass action to homogenous and Heterogenous equilibrium-Le-Chatelier principle-application of Le-Chatelier principle to homogenous equilibrium and heterogenous equilibrium –effect of inert gas on equilibrium

UNIT IV : SOLUTIONS (12 Hrs)

Kinds of solutions –- methods for expressing concentration – Molarity, molality, mole fraction, normality, mass fraction, parts per million -solutions of gases in liquid -Solubility of gases in liquids – Henry's law – statement and limitations.

Solutions of liquid in liquid– Binary liquid mixture - Ideal and non ideal solutions – Raoult's law. - deviation from ideal behavior – pressure – composition and temperature – Composition diagrams for completely miscible binary solutions-Fractional distillation –Azeotropic distillation—nature of azeotropic mixtures-partially miscible liquids—consolute temperature-critical solution temperature-system with upper CST, lower CST and upper and lower CST – Liquid crystals, Nematic,Semetic and cholestic types and their applications

UNIT-V ELECTROCHEMISTRY-I (13 Hrs)

Metallic and electrolytic conductance – Definitions of specific, equivalent and molar conductances – Relations between them – measurement of conductance and cell constant. Variation of conductance with dilution – Qualitative explanation– Strong and weak electrolytes. Migration of ions – transport number – determination by Hittorf and moving boundary methods – Kohlrausch‘s law – applications – calculation of equivalent conductance for weak electrolytes and determination of transport number. Ionic mobilities and Ionic conductances. Diffusion and ionic mobility- molar ionic conductance and viscosity- Walden rule-Applications of conductance measurements – Degree of dissociation of weak electrolytes – Determination of Ionic product of water – Determination of solubility of sparingly soluble salts – conductometric titrations- Theory of strong electrolytes – Debye – Huckel – Onsager theory-verification of Onsager equation – Wein and Debye –Falkenhagen effect.

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Text books:

1. Principles of physical chemistry - Puri, Sharma and Pathania, Millennium Edition, Vishal Publishing Co
2. Text Book of physical chemistry - P.L. Soni - Sultan Chand.

Reference books:

1. Atkins' Physical chemistry, 9th Edition, Oxford University Press.
2. Advanced Physical Chemistry - Gurdeep Raj, Goel Publishing House.
3. Physical Chemistry, G.M.Barrow, Tata McGraw Hill.
4. Thermodynamics for chemist S.Glasstor
5. Physical chemistry P.K.Sharma and L.K.Sharma.

INORGANIC PREPARATIONS & DETERMINATION OF PHYSICAL CONSTANTS

L	T	P	C
0	0	2	1

Objectives

❖ To make the students thorough in inorganic complex preparations

Inorganic preparations

1. Preparation of potash alum
2. Preparation of chrome alum
3. Preparation of Prussian blue
4. Preparation of sodium ferrioxalate
5. Preparation of tetrammine copper(II) sulphate
6. Preparation of tristhiourea copper(I)chloridedihydrate
7. Preparation of potassium trisoxalatoferrate(III)
8. Preparation of hexathiourea lead(II) nitrate

Internal – 50 marks

25 marks - Regularity

20 marks – Average of best (preparation-4) four experiments in regular class work

5 marks - Average of 2 physical constant determinations

External -50 marks

20 marks – Record (atleast four experiments preparation-3 and phy. cont. detmn.-2)*

20 marks – Procedure-5 and preparation-15)

10 marks – phy. cont. detmn

*Experiments done in the class alone should be recorded

(Students having a bonafide record only should be permitted to appear for the practical examination)

Reference books:

1. Sundaram, Krishnan, Raghavan, Practical Chemistry (Part III), S. Viswanathan Co. Pvt.,
1996.

2. Vogel's Text Book of Quantitative Chemical Analysis. 5th Edi., ELBS/Longman England,
1989.

3. O.P. Pandey, D.N Bajpai, S. Gini, Practical Chemistry, for I, II & III BSc. Students. S.Chand & Company Ltd reprint 2009.

4. V.K.Ahluwalia, Sunitha Dhingra, Adarsh Gulate College Practical Chemistry, Universities Press (India) Pvt Ltd 2008 (reprint)

ALLIED CHEMISTRY - II

L	T	P	C
2	2	0	3

Objective

To learn the chemistry of basic aromatic compounds.
To understand the nuclear particles and few nuclear reactions
To know about carbohydrates, amino acids, proteins and nucleic acid.
To study about fuels, fertilizers, cement and glass.
To know about some common diseases and the drugs used.

UNIT 1 ORGANIC CHEMISTRY (11 Hrs)

Aromatic compounds

General characteristics of aromatic compounds - aromaticity – Huckel's rule with examples- non – benzenoid aromatic compounds (definition and examples only)

Preparation, properties and structure of benzene, naphthalene and anthracene.

UNIT 2 PHYSICAL CHEMISTRY (13 Hrs)

Nuclear chemistry

Nuclear stability – n/p ratio – packing fraction – mass defect – binding energy - isotopes, isobars, isotones with examples. Separation of isotopes by diffusion method – group displacement law - radioactive series - Nuclear fission, fusion - Application of radio isotopes (radio diagnosis and therapy, C-14 dating).

UNIT 3 BIO CHEMISTRY (11 Hrs)

Carbohydrates –definition and classification – artificial synthetic sweeteners. Amino acids - classification – amphoteric nature – isoelectric point. Proteins - classification according to composition, solubility and shape - colour reactions - biological action . Nucleic acids – purines, pyrimidines, nucleocides, nucleotides – DNA – structure of DNA – RNA - different types of RNA

UNIT 4 INDUSTRIAL CHEMISTRY (13 Hrs)

Fuel gases – Water gas, Producer gas, L.P.G, Gobar gas and Natural gas. Fertilizers – N.P.K and mixed fertilizers. Soaps and detergents – an elementary idea of soaps and detergents. Cleansing action of soaps and detergents. Cement and glass: Portland cement-manufacture only. Manufacture of glass- types and uses borosilicates -photochromic and safety glass.

UNIT-5: PHARMACEUTICAL CHEMISTRY (12 Hrs)

Common diseases – infective diseases – insect borne –air borne – water borne – hereditary diseases. Definition and examples of analgesics, antipyretics, sulpha drugs, antimalarials and, antibiotics. Diabetes – causes – hyper and hypoglycemic drugs. Indian medicinal plants – tulsi, neem, keezhanelli- their importance

Text Books

1. Puri, Sharma & Kalia, Principles of Inorganic Chemistry, Milestone Publishers and Distributors, 2008.
2. P.L. Soni, Text book of Inorganic Chemistry, Sultan Chand and Sons, 2007.

Reference Books

1. Bahl and Arun Bahl, Organic Chemistry, S. Chand and Sons, New Delhi , 2005.
2. Morrison & Boyd, Organic Chemistry, VIth ed, Prentice Hall of India Pvt. Ltd., New Delhi, 1998.
3. P. L. Soni, Text book of Organic Chemistry, S. Chand and Company Ltd., New Delhi .
4. J. L. Jain, Sunjay Jain and Nitin Jain, Fundamentals of Biochemistry, S. Chand and Company Ltd.,New Delhi, 2005.
5. S. Lakshmi, Pharmaceutical Chemistry, S. Chand and Sons, New Delhi , 1995.

INORGANIC QUALITATIVE ANALYSIS

1. Inorganic simple salt containing one acidic radical (interfering radical) and one basic radical
2. Acidic radical

   Interfering acidic radicals:

   Borate, Fluoride, Oxalate and Phosphate.
3. Basic radicals

   Group I : Lead

   Group II : Copper, Cadmium

   Group III : Ferric iron

   Group IV : Cobalt, Nickel

   Group V : Barium

   Group VI : Magnesium, Ammonium.

Internal –50 marks

25 marks - Regularity

25 marks – Average of four experiments in regular class work

External -50 marks

10 marks – Record (atleast 4 experiments)*

10 marks – Procedure

30 marks – Result

*Experiments done in the class alone should be recorded

(Students having a bonafide record only should be permitted to appear for the practical examination)

CHEMISTRY IN MEDICINE

L	T	P	C
4	0	0	4

Objectives

To have knowledge of first aid and the important rules.

To know the common chemicals in medicine

To have awareness of common diseases

To learn the diagnostic tests and to know the importance of vitamins.

Unit- I: FIRST AID (12 HRS)

First Aid for accidents-important rules-first aid kit ,First aid for cuts, bruises, bleeding, fractures, burns, fainting and poisonous bites.

Common poisons-Acid poisoning-antidote, Alkali poisoning-antidote, Poisoning by disinfectant- symptoms-antidote, Alkaloid poisoning-symptoms-antidote, alcohol poisoning-symptoms-antidote, Mercury poisoning-antidote and Salicylate poisoning-antidote.

Unit-II: CHEMICALS IN MEDICINE (13 HRS)

(Preparations and chemical equations not required) Alum-properties and uses- Aluminium hydroxide gel-uses-Dried Aluminium hydroxide gel-uses-Aluminium acetate-uses-Ferrous fumarate-uses-Ferrric ammonium citrate-uses.Ferrous gluconate-uses,Ferrous sulphate.

Biological importance of sodium, potassium, calcium ,Iodine and copper.

Unit-III: CAUSES AND TREATMENT OF SOME COMMON DISEASES: (12 HRS)

Insect borne diseases – malaria and filariasis Prevention and treatment. Air borne diseases – diphtheria, whooping cough, influenza, measles, mumps, common cold, tuberculosis and leprosy- Prevention and treatment. Water borne – cholera, typhoid and diarrhoeal diseases - Prevention and treatment. Respiratory disorder – Prevention and treatment of asthma .Nervous disorder – epilepsy—Prevention and treatment - other diseases – Peptic ulcer-treatment.

Unit- IV: CLINICAL CHEMISTRY

(12 HRS)

Clinical chemistry – Composition of blood – blood grouping - determination of blood groups and matching – blood pressure – hypertension – determination.

Determination of glucose in serum – Folin and Wu's method - determination of serum cholesterol – Sackett's method – tests for cholesterol. Estimation of glucose in urine – Diagnostic test for sugar in urine- Benedict's test-Clinistix-strip test Diagnostic test for salts in urine and serum. Detection of diabetes ,detection of anaemia.

Estimation of hemoglobin(Hb concentration) – estimation of red blood cells Normal RBC count in adults.

Unit V : HEALTH CARE MEDICINES (11 HRS)

Vitamins-Classification of Vitamins-Sources- deficiency diseases of Vitamins A, D, E, K, B_1, B_2, Bc, B_6, B_{12} and C –Therapeutic uses. Treatment of ulcers and skin diseases.

Text Books

1. Practical Biochemistry – David Plummer – 2005, Tata McGraw-Hills Publishing Company.

2. Text Book of Pharmaceutical Chemistry – Jeyashree Gosh – 2003, S.Chand and Company, New Dehi.

Reference Books.

1. Medicinal Chemistry – G.R.Chatwal, 2002, Himalaya Publishing House, New Delhi.

L	T	P	C
4	0	0	4

INDUSTRIAL CHEMISTRY

Objectives:

To gain knowledge about systems of units and conversion factor

To understand utilities in chemical industries

To know the severity of corrosion and methods of preventing it

To study the industrial process of silicate industry

To acquire the knowledge about the unit process

UNIT I - UNITS AND DIMENSIONS, MATERIAL BALANCE (12 Hrs)

Fundamental and derived quantities – System of unit – significance of dimensional analysis – forces – weight – volume – pressure – work – energy – power. Basic chemical calculations: Atomic mass – Molar mass – concept of mole, gmol, comparison of liquid mixtures and gaseous mixtures, percentage of mass, volume and mol – ideal gas laws – Dalton's law, Amagat's law and Henry's law – density and pressure measurements.

Material balance without chemical reaction: Material balance equation – transient and steady state – simple material balance with and without recycle and bypass or chemical engineering operations such as evaporation, drying, filtration, extraction and crystallization.

UNIT II - FUELS AND FURNACES (13 Hrs)

Fuels – types of fuels – calorific values – ignition point – pyrometric effect – explosives range – Flue gas analysis by Orsat's method – explosives – classifications – low explosives – initiating explosives – high explosives – rocket propellants – nuclear fuels.

Furnaces – types of furnaces – Kilns – Blast furnace, reverberatory furnace – muffle furnace – electric furnace – regenerative furnace, open hearth furnace – Bessemer converter – vertical retort furnace.

UNIT III - CORROSION AND PROTECTIVE COATING (11 Hrs)

Introduction – severity of corrosion – chemical and electrochemical corrosion – mechanism – factors influencing corrosion – control of corrosion – cathodic and anodic protection.

Paints – characteristics of paint – constituents of paints - pigments – vehicles – thinners – driers – fillers – plasticizers – anti skinning agents – their function and properties.

Metallic coating – removal of surface contamination – removal of superficial corrosion products – polishing – galvanizing – tinning – electroplating.

UNIT IV - SILICATE INDUSTRY (12 Hrs)

Refractories – requirements of refractories – properties of refractories – solid refractories – fire clay refractories – magnesite refractories, dolomite bricks, graphite refractories, zirconia refractories, silicon carbide.

Abrasives – classifications – natural (diamond, corundum, emery, garnet, quartz and flint) and artificial (carborundum, alundum, boron carbide, metallic abrasives). Uses of abrasives – cement manufacture – setting and hardening of cements – gypsum – plaster of Paris – manufacture – setting and hardening – uses. White wares manufacture – types – glazing.

UNIT V - UNIT PROCESSES IN ORGANIC MANUFACTURE (12 Hrs)

Sulphonation – uses and applications of sulphonates and sulphates – sulphonating agents – sulphur trioxide – organic complexes – chemical and physical factors in sulphonation – commercial sulphonation of benzene – batch vs continuous sulphonation. Hydrolysis – hydrolyzing agents – mechanism of hydrolysis.

Oxidiation – types of oxidation reactions – oxidizing agents – permanganate and dichromate – liquid phase oxidation – vapour phase oxidation – commercial manufacture of acetic acid. Hydrogenation – catalysts for hydrogenation - hydrogenation of vegetable oils.

Reference books:

1.Industrial Chemistry, B. K. Sharma, Goel Publishing House, Meerut.

2.Industrial Chemistry, B. N. Chakrabarthy, Oxford & IBH Publishing Co. Pvt. Ltd. Calcutta.

Reference books:

1. Unit Operations I & II K. A. Gavhane, Nirali Prakashan, Pune.
2. Unit Processes in Organic Synthesis, P. H. Groggins, Tata McGraw-Hill Publishing Company limited, New Delhi.
3. Stoichiometry – B. Z. Bhatt and S. M. Vora.
4. Engineering Chemistry, Jain and Jain.

DAIRY CHEMISTRY

L	T	P	C
2	0	0	2

Objectives:

To learn the composition and properties of milk

To understand the chemical composition of milk and milk processing.

To know the chemistry of cream and butter

To study to fermented milk products

To know the condensed milk and dairy detergents

UNIT-I PROPERTIES OF MILK (5 Hrs)

Definition, Composition, Milk lipids, Milk proteins, vitamins and minerals. Factors affecting the composition of milk - adulterants, preservatives, and neutralizer - examples and their detection.

UNIT-II PROCESSING OF MILK (6 Hrs)

Destruction of microorganisms in milk – physicochemical changes during processing – boiling, pasteurization – pasteurization types – bottle pasteurization –batch pasteurization – HTST (High Temperature Short Time) – vacuum pasteurization –(UHT) Ultra High Temperature Pasteurisation.

UNIT-III MILK PRODUCTS-I (7 Hrs)

Milk Products: Cream - definition, classification – manufacturing - chemistry of creaming process - physico–chemical properties – separation of cream , estimation of fat in cream , Butter - definition, classification, composition, theory of churning, desibutter, salted butter. Ghee - major constituents, common adulterants and their detection.

UNIT-IV MILK PRODUCTS-II (6 Hrs)

Fermented milk products - fermentation of milk - definition and conditions. Ice creams - definition, composition, types, manufacture of ice - cream, stabilizers, emulsifiers, and their role, milk powder - definition, process of making milk powder.

UNIT –V CONDENSED MILK AND DAIRY DETERGENTS (6 Hrs)

Condensed milk – definition, classification and differences between condensed milk and skim – condensed milk – sanitation - pasteurization – nutritive value of milk – difference between cow milk and bauffalo milk- milk enzymes. Dairy Detergents : Definition-characteristics-classification-washing procedure (modern method) sterilization-chloramin-T and hypochlorite solution.

Text books :

1. Applied Chemistry-K.Bagavathi Sundari MJP Publishers Chennai. 2006.

2. Principles of dairy technology - Robert Jenness, Wiley, New York

Reference books :

1. Indian Dairy Products - Rangappa and Acharya, K.T. Asia Publishing House, Bombay, India.

2. Fundamentals of Dairy chemistry - Wond. F.P. Springer.

3. Outlines of Dairy Technology - Sukumar De. – Oxford University Press.

4. Applied chemistry for home science & allied science - T.Jacob, Mcmillan.

APPLIED CHEMISTRY

L	T	P	C
2	0	0	2

Objectives:

To acquire knowledge about the chemicals used in day to day life

UNIT I - SOAPS AND DETERGENTS (5 Hrs)

Soaps: Definition-classification-raw materials used in the manufacture of soap –manufacture of toilet soap.

Detergents: Definition –various types with examples- advantages of detergents over soaps – cleansing action of soap.

UNIT II- FERTILIZERS (6 Hrs)

Definition-characteristics of a good fertilizer- role of nitrogen, potassium and phosphorous in plant growth – natural fertilizers- chemical fertilizers: urea, muriate of potash and triple superphosphate - mixed fertilizers - biofertilizers – advantages of biofertilizers.

UNIT III - POLYMERS (7 Hrs)

Fibers: Classification –uses of terylene, nylon and orlon.

Resins: Natural resins- synthetic resins-type-uses of fevicol, quick fix, araldite, glyptal and Bakelite.

Plastics: classification- differences between thermoplasts and thermosets. Advantages of plastics-uses of polythene, PVC, polystyrene, Teflon and thermocole.

Rubber: Types-defects in natural rubber-vulcanization-synthetic rubbers- uses of neoprene, thiocol, butyl rubber, silicone rubber and foam rubber.

UNIT IV - CHEMICALS IN PHARMACY (7 Hrs)

Definition and therapeutic uses of the following (an elementary study only)

Antiseptics: alum, boric acid

Mouth washes: Hydrogen peroxide

Antacids: Aluminium hydroxide

Analgesics: Aspirin, paracetamol

Antibiotics: Penicillins, tetracyclines

Haematinics: Ferrous fumerate, ferrous gluconate

Laxatives: Epsom salt, milk of magnesia

Sedatives: Diazepam

UNIT V - CHEMICALS IN DAY-TO-DAY LIFE (5 Hrs)

An outline of the preparation and uses of the following articles.

Tooth powder, tooth paste, writing inks, gum paste, boot polish, talcum powder, chalk crayons, agar battis, phenyl and moth balls.

Text books:

1. B. K. Sharma, Industrial Chemistry, Goel Publishing House, Meerut.
2. Jeyashree Gosh, A text book of Pharmaceutical Chemistry, S. Chand and Company, NewDelhi.

Reference books:

1.B. N. Chakrabarty, Industrial Chemistry, Oxford and IBH Publishing Co. Pvt.Ltd., Calcutta.

ORGANIC CHEMISTRY-III

L	T	P	C
6	0	0	4

Objectives

To learn about stereochemistry

To understand aromaticity

To study dyes

UNIT - I OPTICAL ISOMERISM (20 Hrs)

Representation of molecules in saw horse, Fischer, flying-wedge and Newman formulae and their inter translations.

Symmetry elements - chirality – asymmetric molecules and molecular dissymmetry-pseudo asymmetry.

Optical rotation – specific rotation –optical purity – racemisation (through cationic and anionic and radicalintermediates), resolution of acids, bases and alcohols via diastereomeric salt formation.

Optical isomers - enantiomers – diastereomers – epimers - notation of optical isomers - Cahn-Ingold-Prelog rules, R and S notations for optical isomers with one and two asymmetric carbon atoms - erythro and threo representations - D and L representations

Optical activity in compounds without asymmetric carbon atoms namely biphenyls, allenes and spiranes. Stereo selectivity – stereo specificity – partial asymmetric synthesis.

point,dipolemoment – chemical method – dehydration and cyclisation.

UNIT -II GEOMETRICAL & CONFORMATIONAL ISOMERISM (20 Hrs)

Geometrical isomerism – nomenclature of geometrical isomers – cis – trans ,E-Z notation and syn-anti for C=C,C=N compounds. Methods to assign configurations.
Stability of geometrical isomers and heats of hydrogenation.

Conformation: Conformational nomenclature - eclipsed, staggered, gauche and anti; dihedral angle, torsion angle, energy barrier of rotation – potential energy diagram. Relative stability of conformers on the basis of steric effect, dipole-dipole interaction, H-bonding;
Conformational analysis of ethane, propane, n-butane, haloethane, 1,2-dihaloethane, 1,2-glycol and 1,2-halohydrin, cyclopentane, cyclohexane and mono substituted cyclohexanes.

UNIT - III AROMATICITY & AROMATIC SUBSTITUTION (18 Hrs)

Aromaticity – definition – Huckel's rule – consequence of aromaticity – stability, carbon-carbon bond lengths of benzene, resonance energy and participation of substitution vs addition – examples.Non-benzenoid aromatic compounds

Aromatic electrophilic substitution – general pattern of the mechanism, role of σ and π complexes, Mechanism of nitration, halogenation, sulphonation and Friedel-Crafts reaction. Activating and deactivating substituents, orientation in mono substituted benzenes, ortho/para ratio- Orientation- Korner's absolute method, dipole moment method – direct influence of substituents – rules of orientation - Aromatic Nucleophilic substitutions- unimolecular, bimolecular and benzyne mechanisms

UNIT – IV HETEROCYCLIC COMPOUNDS (18 Hrs)

Molecular orbital picture and aromatic characteristics of pyrrole,furan, thiophene and pyridine. Comparison of basicity of pyridine, piperidine and pyrrole.

Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution and mechanism of nucleophilic substitution reaction in pyridine derivatives.

Preparation and reactions of indole, quinoline and isoquinoline with special reference to Fisher indole synthesis, Skraup synthesis and Bischler-Nepieralski synthesis, mechanism of electrophilc substitution reactions of indole, quinoline and isoquinoline.

UNIT – V DYES & POLYNUCLEAR HYDROCARBONS (14 Hrs)

Dyes - theory of color and constitution - chromophore, auxochrome, classification according to application and structure - preparation and uses of azo dyes - methyl orange, triphenyl methane dyes -malachite green, indigo dyes - Indigotin, anthraquinone dyes - alizarin, phthalein dyes –Phenolphthalein-Synthesis reactions & Structure of Naphthalene & Anthracene

Text Books

1. Textbook of Organic Chemistry - P.L.Soni - Sultan Chand
2. Advanced organic Chemistry - B.S.Bahl - S. Chand

Reference Books

1. Principles of Organic Chemistry - A.K.Bansal - New Age
2. A Textbook of Organic Chemistry - A.K.Bansal - New Age
3. Organic Chemistry - I.L.Finar - Volume I & II - Addision **Welsey**
4. Organic Chemistry - R.T.Morrison and Boyd - Prentice Hall
5. Stereochemistry of Organic Compounds - D.Nasipuri - New Age
6. Stereochemistry, Conformation and Mechanisms - Kalsi New Age
7. Advanced General Organic Chemistry - Sachin K.Ghosh - Books and Allied (P) Ltd
8. Textbook of Organic Chemistry - P.S.Kalsi – Macmillan
9. Organic Chemistry – Bhupinder Mehta and Manju Mehta - PHI Learning (P) Ltd.

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Physical chemistry-III

L	T	P	C
6	0	0	4

Objectives

To learn about thermodynamics, electrochemistry and surface chemistry
To understand group theory and spectrochemistry

UNIT I: THERMODYNAMICS-III (20 Hrs)

Van't Hoff isotherm and isochore - Clapeyron equation-Clapeyron-Clausius equation-Applications of Clapeyron-Clausius equation.

Third law of thermodynamics: Nernst heat theorem- statement of III law and itsapplications. Exception to third law- experimental verification of the law-residual entropy-Evaluation of absolute entropy from heat capacity measurements.

Partial molar properties: Partial molar free energy. The concept of chemical potential – variation of chemical potential with T and P- Gibbs Duhem equation- concept of fugacity and activity- activity coefficient- standard states.

UNIT – II ELECTROCHEMISTRY –II (18 Hrs)

Galvanic cells – Reversible and Irreversible cells – EMF and its measurement – Weston Standard cell – types of reversible single electrodes – standard Hydrogen electrode – calomel electrode –Derivation of Nernst equation both for emf of cells and single electrode potentials – Nernst theory for single electrode potential –standard reduction potentials – electro chemical series –significance.Application of emf measurements – Application of Gibbs –Helmholtz equation to galvanic cells – calculation of thermodyamic quantities – pH using hydrogen, quinhydrone and glass electrodes – potentiometric titrations. Concentration cells – electrode concentration cells- electrolyte concentration cells- concentratoion cells with and without transference – LJP expression –polarization – over voltage- decomposition voltage.

UNIT - III SURFACE CHEMISTR (16 Hrs)

Adsorption - physisorption and chemisorptions - adsorption of gases by solids - adsorption isotherms - Freundlich adsorption isotherm - derivation of Langmuir adsorption isotherm, statement and explanation of BET isotherm - applications of adsorption - determination of surface area – adsorption indicators.

General characteristics of catalytic reactions – phase transfer catalysis - acid base catalysis - enzyme catalysis - mechanism and kinetics of enzyme catalyzed reactions - Michaelis-Menten equation.

UNIT - IV GROUP THEORY (16 Hrs)

Concept of symmetry in chemistry - symmetry operations and symmetry elements - rotational axis of symmetry and types of rotational axes - planes of symmetry and types of planes - improper rotational axis of symmetry - identity element - groups and their basic properties – Abelian and cyclic groups - classification of molecules into point groups - the symmetry operations of a molecule form a group – $H_2O$and NH_3point groups - group multiplication tables.

UNIT – V SPECTROSCOPY- I (20 Hrs)

Introduction - various types of molecular spectra - electronic, vibrational and rotational energy levels - Born-Oppenheimer approximation.
Rotation spectra of diatomic molecules - determination of bond length and moment of inertia from rotational spectra - numerical problems - selection rule, effect of isotopic substitution.
UV-visible spectroscopy: theory - types of transitions in molecules - selection rules for electronic spectra - factors affecting absorption maximum and intensity – applications.
IR spectroscopy : theory - stretching and bending vibrations - factors affecting vibrational frequencies - important spectral regions for the characterization of functional groups - finger print region - determination of force constant - qualitative relation of force constant to bond energies - selection rules - modes of vibrations in polyatomic molecules - vibrational modes of H_2O and CO_2 – applications - numerical problems.

Text books :

1. B.R. Puri, L.R. Sharma & M.S. Pathania, Principles of Physical Chemistry, Vishal Publishing Co., Jalandhar.
2. P.L. Soni, O.P. Dharmarha & U.N. Dash, Text book of Physical Chemistry, 22ndEdn., Sultan Chand & Sons, New Delhi

Reference books :

1. Essentials of Physical Chemistry– B.S.Bahl, Arun Bahl, G.D.Tuli, Reprint 2006,S.Chand & Company Ltd., New Delhi-110055.
2. Physical Chemistry volumes I & II- S.Pahari, 2004, New Central Book Agency,Kolkotha.
3. Physical Chemistry-G.M.Barrow, 2005, Tata McGraw Hill Publishing Company, New Delhi.
4. Physical Chemistry-G.K.Vemulapalli, 2004, Prentice Hall of India.
5. Kemp, W. Organic Spectroscopy
6. Jag Mohan Organic Spectroscopy
7. Group theory and its Chemical Applications - P.K.Bhattacharya - Himalaya publishing House.

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POLYMER CHEMISTRY

L	T	P	C
4	0	0	4

Objectives:

To know the concept of polymerization and types of polymers

To understand the characteristics of polymers

To acquire knowledge about the polymerization techniques and polymer processing

To know the chemistry of individual polymers

To have an idea about the recent advances in polymer sciences

UNIT I - INTRODUCTION TO POLYMERS (14 Hrs)

Definition - Monomer, polymer and polymerisation - classification of polymers on the basis of (i) origin - Natural, semi synthetic, synthetic,

(ii) Physical properties and applications - Rubbers, plastic, fibres

(iii) Thermal response - thermoplastics, thermosetting

(iv) Structure - Homopolymers (linear, branched, cross link or network), Copolymers (Random, Alternate, Block, Graft)

(v) Crystallinity - non-crystalline (amorphous), semi-crystalline

(vi) Mode of formation - Addition, Condensation Polymerisation (definition and examples only)

(vii) Methods of polymerization - Bulk, Solution, Suspension Polymerisation (definition and examples only)

Chemistry of polymerization: Chain polymerization, free radical, ionic, co-ordination, step polymerization, polyaddition and polycondensaion, miscellaneous ring opening and group transfer polymerizations.

UNIT II - CHARACTERISTICS OF POLYMERS (11 Hrs)

Glass transition temperature (Tg) - definition – Factors affecting Tg – relationships between Tg and molecular weight and melting point. Importance of Tg. Molecular weight of polymers. Number average, weight average (problems), sedimentation and viscosity average molecular weights. Molecular weights and degree of polymerization - chemical reaction - hydrolysis - hydrogenation - addition - substitution – cross-linking, vulcanisation and

cyclisation reactions. Polymer degradation - basic idea of thermal, photo and oxidative degradation of polymers.

UNIT III - POLYMERIZATION TECHNIQUES AND PROCESSING (11 Hrs)

Bulk, solution, suspension, emulsion, melt condensation and interfacial poly condensation polymerizations. polymer processing - calendaring - die-casting, rotational casting - compression moulding - injection moulding - blow moulding - extrusion moulding and reinforcing.

UNIT IV - CHEMISTRY OF SOME COMMERCIAL POLYMERS (12 Hrs)

Preparation, properties and uses of the following polymers. Thermoplastics, polyethylene, polypropylene, polystyrene, polyacrylonitrile, polyvinyl chloride, nylon, polyester.

Thermosetting plastics: Phenol formaldehyde resin, urea formaldehyde resin, melamine formaldehyde, epoxy resin, polycarbonate.

Elastomers: Natural rubber and synthetic rubber, Styrene and neoprene rubber.

UNIT V - ADVANCES IN POLYMER (12 Hrs)

Biopolymers - Biomedical polymers - contact lens, dental polymers, artificial heart, kidney, skin and blood cells - High temperature and fire resistant polymers - silicones - conducting polymers - (elementary idea) - polysulphur nitrile, polyphenylene, polypyrrole and polyacetylene. Polymer industry in India.

Text books:

1. V.R. Gowarikar, N.V. Viswanathan and J. Sreedhar. Polymer Science, Wiley Eastern, 1995.
2. F.N. Billmeyer, Textbook of Polymer Science, Wiley Interscience, 1971.

References books:

1.Material Science II edition, P.K. Palanisamy SCITECH Publications India Pvt., Ltd., Chennai-600001.

2.Engineering Chemistry, V Srinivasan, S.D. Uma Maheshwari, M. Meena. SCITECH Publications India Pvt., Ltd., Chennai-600001.

3. Introduction to Organic Chemistry. John McMurry Brooks/cole Cenage Learning India Private Limited. First Reprint 2008.
4. Modern Chemistry, David. W. Oxtoby, H.P. Gills, Alan Campion Brooks/cole Cenage Learning India Private Limited. First Reprint 2008.

Bioinoganic chemistry

L	T	P	C
4	0	0	4

Objectives

To study the significance of metal ions' transport and storage,

To study a few metallo enzymes,

To study electron transfer proteins,

To study oxygen transport and activation proteins,

To study the fundamentals of supramolecular chemistry

Unit I Metal ions in biology (13 Hrs)

Metal ions in biology- Essential and trace elements in biological system – biological importance and toxicity of elements such as Fe , Cu , Zn , Co , Mo , W , V , Mn , and Cr in biological system and their vital role in the active site- Ion transport mechanism in cell membrane – Na and K pumps- Ionophores.

Unit II Metallo porphyrins (13 Hrs)

Chlorophyll – photosynthetic electron transport sequence – biological electron carriers : iron-sulphur proteins-ferredoxin, rubridoxin and cytochromes , cytochromes and blue copper proteins – oxygen carriers: haemoglobin and myoglobin dioxygen binding - co-operativity in haemoglobin - the Bohr effect -, Vitamin B12 and cytochrome P450-mechanism of action

Unit III Metallo enzymes (11 Hrs)

Role of Zinc in enzyme chemistry-Zinc finger, Zinc twist and zinc cluster Structure and functions of Metallo proteins and enzymes - superoxide dismutase, carbonic anhydrase carboxypeptidase A, Catalase, LADH, and Peroxidase.

Unit IV Metals and Health **(11 Hrs)**

Application of therapeutic chelating agents- Metal-based drugs cis-platin, carboplatin, platinum anti-cancer drugs, gadolinium MRI contrast agents, Gold and arithritic agents – auranofin,solganol,myochristin, Toxicity of metals–Cd,Hg and Cr-bio metyhylation of mercury

Unit V Supramolecular chemistry **(12 Hrs)**

Concepts of supramolecular chemistry. – Host-Guest concept- Various types of non-covalent interactions. Hydrogen bonds, C-H…X interactions, Halogen bonds. $\pi - \pi$ interactions,non – bonded interactions. Various types of molecular recognition- Cations, Anions and Neutral guests – Supramolecular Devices and Sensors: Various types of supramolecular devices – an overview

Text Books:

1. Lippard, S.J. & Berg, J.M., Principles of Bioinorganic Chemistry Panima Publishing Company 1994. Cotton, F.A., Wilkinson, G., & Gaus, P.L. Basic Inorganic Chemistry 3 rd Ed.; Wiley India,
2. Huheey, J. E.; Keiter, E.A. & Keiter, R.L. Inorganic Chemistry, Principles of Structure and Reactivity 4 th Ed., Harper Collins 1993, Pearson,2006.

Reference Books:

1.Sharpe, A.G. Inorganic Chemistry, 4 th Indian Reprint (Pearson Education) 2005

2.Douglas, B. E.; McDaniel, D.H. & Alexander, J.J. Concepts and Models in Inorganic Chemistry3rd Ed., John Wiley and Sons, NY, 1994.

3. Greenwood, N.N. & Earnshaw, A. Chemistry of the Elements 2 nd Ed, Elsevier, 1997 (Ziegler Natta Catalyst and Equilibria in Grignard Solution).
4. JW Steed and JL Atwood Supramolecular Chemistry 2nd Ed. Wiley 2011
   P D Beer, P A Gale and D K Smith Supramolecular Chemistry OUP, 1999
   J-M Lehn Supramolecular Chemistry VCH, 1995
5. Lee, J.D. Concise Inorganic Chemistry 5 th Ed., John Wiley and sons 2008.
6. Powell, P. Principles of Organometallic Chemistry, Chapman and Hall, 1988.
7. Shriver, D.D., Atkins, P. and Langford, C.H., Inorganic Chemistry 2 nd Ed., Oxford University Press, 1994.
8. David E Fenton, Bio coordination chemistry, oxford science publications. 1995
9. Asim K. Das, Bioinorganic Chemistry, Books and allied (P) Ltd. 2007.

ANALYTICAL CHEMISTRY

L	T	P	C
4	0	0	4

Objective :

To know the importance of analytical chemistry and to study about the different types of analytical techniques

UNIT I - ERRORS AND DATA ANALYSIS (13 Hrs)

Definition and explanation with examples of the terms – mean, median, mode, range, deviation, mean deviation, relative mean deviation, standard deviation, coefficient of variation and variance – accuracy and precision – types of errors – random and systematic errors – methods of detection and elimination of systematic errors – student's t-test – confidence levels – Q-test for rejection of result – curve fitting – method of least squares – significant figures and computational rules.

UNIT II - WATER ANALYSIS (12 Hrs)

Sampling and preservation of water samples – physical examination of water : color, odour, turbidity, taste and electrical conductivity – chemical characterisation : pH, acidity, alkalinity, TDS, total, temporary, permanent, calcium and magnesium hardness, chloride, fluoride, BOD, COD, detergents and pesticides – residual chlorine and chlorine demand – Bacteriological examination : total and faecal coliforms.

UNIT III - FUEL ANALYSIS (12 Hrs)

Solid fuels : coal – classification – proximate analysis : moisture content, ash content, volatile matter and fixed carbon – ultimate analysis : carbon, hydrogen, nitrogen, sulphur and oxygen – heating values – grading of coal – comparison of coal and coke – liquid fuels : flash point, aniline point, octane number and carbon residues – gaseous fuels : producer gas and water gas – calorific values.

UNIT IV - ELECTROANALYTICAL TECHNIQUES (11 Hrs)

Electrogravimetry : principle, instrumentation and applications. Coulometry : constant current coulometry – coulometric titrations – applications – potentiostatic coulometry – Polarography : principle – experimental assembly – working – advantages and disadvantages of DME – applications to qualitative and quantitative analysis. Amperometric titrations : theory – apparatus – general procedures – applications – advantages.

UNIT V - SPECTROANALYTICAL AND THERMOANALYTICAL METHODS (12 Hrs)

Spectroanalytical methods : principle, instrumentation and applications of colorimetry, spectrophotometry and fluorimetry – light scattering techniques: nephelometry and turbidimetry.

Thermo analytical methods : principle, instrumentation and applications of TGA and DTA – characteristic features of TGA and DTA curves – factors affecting TGA and DTA curves – simultaneous DTA - TGA curves – thermometric titrations.

Text books:

1) D.A.Skoog, D.M.West and Holler, *Analytical Chemistry : An introduction*, 6th Ed., Saunders College Publising.
2) Gary D. Christian, *Analytical Chemistr*y, 6th Ed., John Wiley & Sons.

Reference books:

1) S.M.Khopkar, Environmental Pollution Analysis, 1st Ed., Wiley Eastern Ltd.,
2) APHA, *Standard Methods for Estimation of Water and Waste water*, 19th Ed., American Public Health Association.
3) O.P.Vermani and A.K. Narula, *Applied Chemistry*, 2nd Ed., New Age International Publishers.
4) A.K.Shaha, *Combustion Engineering and Fuel Technology*, Oxford & IBH Publising Company.
5) D.A.Skoog, Holler and Nieman, *Principles of Instrumental Analysis,* 5th Ed., Saunders College publishing.
6) Hobart H.Willard, Lynne L.Merritt, John A.Dean and Frank A. Settle, *Instrumental Methods of Analysis*, 7th Ed., CBS Publishers & Distributors Pvt. Ltd.,

PHARMACEUTICAL CHEMISTRY

L	T	P	C
4	0	0	4

Objectives

i. To understand the concepts and terminologies of pharmaceutical chemistry
ii. To know the mechanism of action and metabolism of drugs
iii. To study the functions of various drugs
iv. To know the important diseases and their treatment
v. To study the common diseases and important disorders of human beings and the drugs used in the treatment.

UNIT-I IMPORTANT TERMINOLOGIES, CLASSIFICATION AND ASSAY (12 Hrs)

Important terminologies - pharmacology, molecular pharmacology, pharmacophore , metabolites, antimetabolites, virus, bacteria, fungi, actinomycetes, mutation, pharmacognosy, pharmacotherapeutics, toxicology, chemotherapy – classification of drugs – nomenclature of drugs – nonproprietary names – sources of drugs – assay of drugs (biological, chemical, immunological)

UNIT-II MECHANISMS, METABOLISMS AND MEDICINAL PLANTS (12 Hrs)

Mechanism of drug action – absorption, drug delivery, drug excretion –Metabolism of drugs –chemical pathways of drug metabolism – phase – I (oxidative, reductive and hydrolytic reactions) and phase - II (conjugate reactions). Physiological effects of different functional groups in drugs –biological role of Na, K, Ca, Cu, Zn and iodine.

Indian medicinal plants – Tulsi, neem, Keezhanelli, adathode, thoothuvalai

UNIT- III DRUGS AND FUNCTIONS (13 Hrs)

Analgesics- narcotic analgesics- analgesic action, uses and structure activity of morphine. Non-narcotic analgesics –aspirin and paracetamol. Anaesthetics- local anaesthetics –procaine- General anaesthetics- chloroform and halothane. Antibiotics – Therapeutical values of penicillin, tetracyclines, chloramphenicol and streptomycin. Sulpha drugs – sulphanilide, sulphadiazine and cotrimoxazole. Antiseptics and disinfectants – phenols, chloramines and organicmercurials. Antidepressants – barbiturates – mechanism of action and uses.Antipsychotic drugs – piperazine and benzamides.

UNIT-IV DISEASES AND TREATMENT (12 Hrs)

Composition of blood – blood grouping and matching – Rh factor. Blood pressure – causes, control and treatment- antihypertension drugs- antianginal agents cardiovascular drugs, cardiacglycosides, vasodilators (one example for each). Aneaemia – causes and control – antianemic drugs. Diabetes – causes and control – hypoglycemic drugs – insulin – oral hypoglycemic drugs (tolubutamide and chlorpropamide). Cancer- causes and treatment – cobalt therapy - antineoplastic drugs (chlorambucil, methotrexate, plant products and hormones).

UNIT- V COMMON DISEASES AND HEALTH CARE MEDICINES (11 Hrs)

Common diseases – causes and treatment of insect borne diseases (Malaria and Filariasis), Airborne diseases (Diptheria, Whooping cough, Influenza, common cold, TB) and Water borne diseases (Cholera, Typhoid and Dysentery). Digestive disorder – Jaundice. Respiratory disorder –Asthma . Nervous system disorder – epilepsy. Other diseases – Leprosy.

Health care medicines – Sources and deficiency diseases of Vitamins A, B complex, C , D, E and K.

Reference books:

1. A text book of pharmaceutical chemistry, Jayashree ghosh, S. Chand, 2003.
2. Pharmaceutical Chemistry by S. Lakshmi, Sultan Chand & Sons, 3rd edition (2004).

Reference books:

1.Medicinal Chemistry, Ashutosh kar, New Age International, 1992

2.Pharmaceutical chemistry – G.R. Chatwal

3. Pharmacology and Pharmatherapeutics – R.S. Satoskar and S.D. Bhandarkar.
4. Drugs , G.L.D. Krupadanam, D.V. Prasad, K.V.Rao, K.L.N.Reddy and C.Sudhakar,Tata McGraw- Hill Publishing Company,New Delhi.
5. Medicinal chemistry, G.R.Chatwal, Himalaya Publishing House, New Delhi (2002)

INORGANIC CHEMISTRY – III

L	T	P	C
5	0	0	4

Objectives

To study the theories in coordination chemistry

To study the chemistry of metal carbonyls

To understand the role of metal ions in biological systems

To study the basic principles of photoinorganic chemistry

UNIT - I COORDINATION CHEMISTRY-I (15 Hrs)

Introduction: IUPAC nomenclature, Ligands- monodentate, bidentate, and polydentate ligands; coordination sphere; coordination number; nomenclature of mononuclear and dinuclear complexes. Structural and stereoisomerism in tetrahedral, square planar and octahedral complexes.Valance Bond theory – applications of valance bond theory to tetrahedral, square planar and octahedral complexes- Merits and limitations of VB theory.

UNIT – II COORDINATION CHEMISTRY II (16 Hrs)

Crystal field theory - splitting of d-orbitals in octahedral and tetrahedral complexes - factors affecting the magnitude of crystal field splitting - effects of crystal field splitting - spectrochemical series - applications of CFT - magnetic properties and spectra of transition metal complexes - crystal field stabilization energy and their uses - limitations of CFT - effective atomic number rule - stability of complexes - step-wise and overall stability constants - factors affecting the stability of complexes - determination of stability constants.

UNIT – III CO-ORDINATION CHEMISTRY III (14 Hrs)

Labile and inert complexes - ligand substitution reactions in octahadral complexes: aquation, base hydrolysis and anation reactions - substitution reactions in square planner complexes - Trans effect - theories of trans effect - mechanism of substitution reactions - redox reactions: inner-sphere and outer-sphere electron transfer reactions.

UNIT - IV ORGANOMETALLIC CHEMISTRY (14 Hrs)

Introduction–History, Nomenclature of organometallic compounds, EAN rule and 18 electron rule. Structure and nature of M-L bond in metal carbonyls - metal nitrosyls. preparation of organo metallic compounds of Mg, Zn, Li, Cu, P, B, Ti, Fe and Co

Wilkinson's catalyst and alkene hydrogenation, hydroformylation, Mansanto acetic acid process, Ziegler – Natta catalyst and polymerization of olefins.

UNIT - V Inorganic photochemistry (16 Hrs)

Electronic transitions in metal complexes : selection rules - metal-centered and charge-transfer transitions - properties of excited states - bimolecular quenching and energy transfer - photochemical pathways : substitutional, reduction-oxidation and isomerisation processes - photosubsitution reactions of Cr(III) complexes - Adamson's rules - photoredox reactions of Co(III) complexes - photoismerisation in Pt(II) complexes. Photochemical conversion and storage of solar energy : photolytic cleavage of water into H_2 and O_2 - photoelectrochemical devices : photogalvanic cells and semiconductor based photovoltaic cells.

Text books :

1. J.D. Lee, *Concise Inorganic Chemistry* 5th Ed., Blackwell Science Ltd.,
2. James E. Huheey, Elien A. Keiter and Richard L. Keiter, *Inorganic Chemistry : Principles Structure and Reactivity,* 4th Ed., Harper College Publisher.

Reference books :

1.F. Albert Cotton, Geoffrey Wilkinson, Carlos A. Marilo and Manfred Bochman, *Advanced Inorganic Chemistry*, 6th Ed., Wiley Interscience Publication.

2.Fred Basolo and Ralph G. Pearson, *Mechanisms of Inorganic Reactions : A study of metal complexes in solution,* 2nd Ed., John wiley and sons, Inc.,

3. David E. Fenton, *Biocoordination Chemistry,* Ist Ed., Oxford Science Publications.
4. Ivano Bertini, Harry B Gray, Stephen J Lippard, Joan Selverstone Valentine, *Bioinorganic Chemistry,* 1st Ed., Viva Books Pvt. Ltd.,
5. J.K. Rohatgi - Mukherjee, *Fundamentals of Photochemistry* - Wiley Eastern Revised Ed.,
6. *Journal of Chemical Education,* Vol.60, No.10, October 1983.
7. A.W. Adamson and P.D. Fleischauer, (Editors) *Concepts of Inorganic photochemistry,* John wiley and sons, New York, 1975.

ORGANIC CHEMISTRY - IV

L	T	P	C
5	0	0	4

Objectives

To learn about natural products

To understand chemistry of aromatic compounds

To study spectroscopy

UNIT-I CARBOHYDARATES (16 Hrs)

Classification-Monosaccharides- constitution of glucose and fructose. Reactions of glucose and fructose – Osazone formation, Mutarotation and its mechanism, cyclic structure, pyronose and furanose forms. Epimerisation-Chain lengthening and shortening of aldoses. Interconversions of aldoses and ketoses.

Disaccharides- sucrose- reactions and structure.

Polysaccharides – starch and cellulose (elucidation of structure not necessary).

UNIT-II PHENOLS, AROMATIC ALDEHYDES, KETONES AND ACIDS (16 Hrs)

Phenols

Acidic character of phenols- effect of substituents on acidity of phenols - Mechanisms of Kolbe's reaction and Riemer-Tiemen reaction. Preparation of cresols, catechol, resorcinol, quinol and euginol.

Aldehydes and ketones

Preparation and uses of cinnamaldehyde. Coumarin, vanillin, Michler's ketone, p-benzoquinone-Quinone mono oxime tautomerism. Mechanism of Cannizaro reaction, benzoin condensation, Perkin reaction, Claisen reaction, Knovenagel reaction,Gattermann aldehyde synthesis and Houben –Hoesch synthesis.

Aromatic acids

Ortho effect, preparation of mandelic acid, cinnamic acid and anthranilic acid. Preparation and uses of benzene-1,2- dicarboxylic acid, benzene-1,3- dicarboxylic acid and 1,4- dicarboxylic acid.

UNIT III REARRANGEMENTS (14 Hrs)

Rearrangement to electron-deficient carbon – 1,2 shift (Wagner-Meerwein rearrangement, pinacol rearrangement,Wolff rearrangement in Arndt-Eistert synthesis, benzil-benzilic acid rearrangement).

Aromatic rearrangements from oxygen to ring carbon (Fries rearrangement, Claisen rearrangement and benzidine rearrangement).

Rearrangement to electron-deficient nitrogen (Beckmann rearrangement, Schmidt rearrangement, Hofmann rearrangement, Curtius rearrangement).

Rearrangement to electron-deficient oxygen (Baeyer-Villiger oxidation, hydroperoxide rearrangement,cumene hydroperoxide-phenol rearrangement), Dakin reaction.

UNIT IV TERPENOIDS AND ALKALOIDS (14 Hrs)

Terpenes and terpenoids - classification - isoprene rule.

Elucidation of structure and synthesis of citral , limonene, menthol, α-terpineol and camphor.

Alkaloids: Introduction, classification and general methods for the determination of structure.

Structural elucidation and synthesis of conine,piperine and nicotine

UNIT-V ORGANIC SPECTROSCOPY (15 Hrs)

UV spectroscopy - chromophore – auxochrome – blue shift, red shift – hypochromic shift, hyperchromic shift – applications for studying functional groups,cis-trans isomerism and nature of double bonds- Woodward-Fischer rules as applied to conjugated enes and alpha and beta unsaturated ketones.

IR spectroscopy–characteristics of IR absorption frequencies – intermolecular and intramolecular hydrogen bonding – functional group detection.

NMR Spectroscopy - interpretation of NMR spectra of simple organic compounds such as acetone, anisole, benzaldehyde, isobutene, mesitylene, 1-chloropropane, ethyl methyl ketone, benzyl alcohol, and propionic acid.

Text Books

1. K.S. Tewari, N.K. Vishil, S.N. Mehotra – A text book of org. chem – 1st edition, Vikas Publishing House Pvt Ltd., 2001, New Delhi.

2. P.L. Soni, Text Book of Organic chemistry, Sultans Chand, 1991, New Delhi,

Reference Books

1. Bahl and Arun Bahl, Organic Chemistry, S. Chand and Sons, New Delhi, 2005.

2. Gurdeep Chatwal, Reaction mechanisms and reagents in organic chemistry

3. O. P. Agarwal, Chemistry of Organic Natural Products, Vol 1 and 2, Goel Pub. House,2002.

4. Gurdeep Chatwal, Chemistry of Organic Natural Products, Vol 1 and 2, Goel Pub. House,2002

5. Y.R. Sharma, O.P. Vig, Elementary organic absorption spectroscopy – 1st edition, Goel Pulishers, 1997, Meerut

6. R. T. Morrison and R. N. Boyd, Organic Chemistry, 6th Edition, PHI Limited, New Delhi, 1992.

7. Jerry March, Advanced Organic Chemistry, 4th Edition, John Wiley and Sons, New York,1992.

8. S. H. Pine, Organic Chemistry, 5th Edition, McGraw Hill International Edition, Chemistry Series, New York, 1987.

MSU / 2017-18 / UG-Colleges / Part-III (B.Sc. Chemistry) /Semester -VI / Core -11

Physical chemistry –IV

L	T	P	C
5	0	0	4

Objectives

To learn about basic concepts in spectroscopy

To understand chemical equilibrium and phase equilibrium

To study nano chemistry

UNIT - I SPECTROSCOPY -II (16 Hrs)

Raman spectroscopy: Principle - Rayleigh and Raman scattering - Stokes and Anti-stokes lines - differences between IR and Raman spectroscopy - mutual exclusion principle – selection rule - applications.

NMR spectroscopy: Theory of NMR, modes of nuclear spin-relaxation process - shielding effect, hyperfine splitting, coupling constants, - chemical shift - factors affecting chemical shift - internal standard, δ and τ scale - applications of NMR and limitations of NMR.

ESR spectroscopy: principle - energy level splitting - presentation of ESR spectrum for methyl and benzene radicals, deuterium - applications

Mass spectroscopy: basic principles of mass spectrum - molecular peak - base peak - isotopic peak - meta stable peak - types of fragmentation - factors influencing the fragmentation - Mc-Lefferty rearrangement - applications

UNIT – II CHEMICAL KINETICS (15 Hrs)

Rate of reaction-Measuring rates of reaction-expressing reaction rates- factors influencing rate-rate constant-Rate laws, Stoichiometry, order and molecularity of reactions- First order, second order, third order and zero order reactions and example. Characteristics of I,II,III and Zero order reactions. Determination of order of reactions-expression for rate constant of first and second order reaction-derivation. Effect of temperature on rate constant. The activation energy - determination of Arrhenius frequency factor and energy of activation-The collision theory of reaction rates and its limitation. Lindemann theory of unimolecular reactions-The theory of Absolute reaction rates. Comparison of the collision theory with the Absolute reaction rate theory.

UNIT – III IONIC EQUILIBRIA (16 Hrs)

The Ostwald's dilution law-experimental verification-limitations-acids and bases-Lewis concept-dissociation of weak acids and weak bases-dissociation of water-pH scale-common ion effect- its applications-buffer solution-different types-calculation of pH value of buffer solution. Hydrolysis of salts - salts of weak acids & strong base, salts of weak base and strong acids, salts of weak acid and weak base - determination of degree of hydrolysis. Acid-base indicators- acid-base titration and use of indicators. Solubility product - Application of solubility product principle

UNIT-IV PHASE EQUILIBRIA (14 Hrs)

Phase rule - phase, component, degree of freedom - thermodynamic derivation of phase rule, One-component system: Phase diagrams of Water and sulphur systems.

Two component system: (i) Simple eutectic: Lead-silver system and potassium iodide-water system. (ii) Formation of compound with congruent melting point: Magnesium – zinc system and ferric chloride – water system. Distribution Law-Statement and thermodynamic derivation-association of the solute in one of the solvents- dissociation of the solute in one of the solvents-applications of the distribution law-solvent extraction.

UNIT - V NANOCHEMISTRY (14 Hrs)

Definition - size dependent properties: magnetic, electrical and optical properties – quantum dots – metal oxides and metal nano particles - ceramic nano particles

Synthesis of nanomaterials - bottom-up and top-down approaches - thin film deposition - catalytic assisted growth - chemical vapour deposition - sol gel method - chemical reduction

Fullerenes - carbon nanotubes - single walled and multi walled nano tubes – structures - carbon nanofibre – nanocomposites.

Applications of nanoscience and nanotechnology.

Text books :

1. Principles of Physical Chemistry - B.R. Puri and Sharma - Shobanlal Nagin Chand & Co.,
2. Text Book of Physical Chemistry - P.L. Soni - Sultan Chand.

Reference books :

1. Elements of physical chemistry - Glasstone and Lewis - Macmillan.
2. Physical chemistry - G.W. Castellan - Narosa publishing house.
3. Universal General Chemistry, C.N.R. Rao, Macmillan.
4. Nano: The Essentials Understanding Nano Science and Nanotechnology. T. Pradeep -. Tata Mc Graw-Hill Publishing Company Ltd. New Dehli.
5. Introduction to Nano technology, Charles P Poole Jr. & Frank J Owens, Wiley Interscience
6. Kemp, W. Organic Spectroscopy
7. Jag Mohan Organic Spectroscopy
8. Chemical Kinetics-K. J. Laidler, Tata McGraw Hill Publishing Company, NewDelhi

MSU / 2017-18 / UG-Colleges / Part-III (B.Sc. Chemistry) /Semester-VI / Major Elective -III

GREEN CHEMISTRY

L	T	P	C
4	0	0	4

Objectives

To introduce the basics and need for Green Chemistry

To understand the principles and designing a green synthesis of selected compounds

To make the students familiar with the usage of green solvents and green catalysts in chemical reactions.

To learn the principles of the microwave and ultrasound assisted reactions.

UNIT- I Introduction to green chemistry (13 Hrs)

Definition – need for green chemistry – scope of green chemistry.

Concept of atom economy – yield – mass intensity and atom economy.

Calculation of atom economy, mass intensity, mass productivity and carbon efficiency.

Different types of reactions and atom economy - addition, substitution, elimination and rearrangements.

Concept of selectivity – enantioselectivity, chemoselectivity, regioselectivity and diasterioselectivity.

UNIT- II Green solvent (13 Hrs)

Super critical fluids – Introduction – extraction of super critical fluids – solvents of super critical fluid– advantages and applications.

Carbondioxide as a super critical fluid – features of technique for using super critical carbondioxide - advantages and applications.

Chemical reactions in supercritical water and Near – Critical Water (NCW)- Region.

Extracting natural products, dry cleaning, supercritical polymerization, hydrogenation and hydroformylation

lonic liquid as green solvent : Introduction – synthesis of ionic liquids - acidic ionic liquid and neutral ionic liquids – applications in organic synthesis.

Green reagents : Dimethyl carbonate and Polymer supported reagents.

UNIT- III Green catalyst (11 Hrs)

Catalysis over view : acid catalyst - basic catalyst – oxidation catalyst – polymer supported catalyst- photosensitized super acid catalyst and Tetra Amido Macrocylic Ligand (TAML) catalyst.

Biocatalyst : microbial oxidation, microbial reduction, enzyme catalyzed hydrolytic process, per fluorinated catalyst and modified biocatalyst.

Development of mesoporous supports by liquid crystal templating – neutral templating methods- heterogeneous catalyst – solid supported catalyst.

UNIT- IV Green synthesis (13 Hrs)

Green synthesis of the following compounds -Adipic acid, Catechol, Benzoyl bromide, Acetaldehyde, Citral, Ibruprofen and Paracetamol

Microwave assisted reactions in water – Hoffmann Elimination, Hydrolysis of benzyl chloride and methyl benzoate – oxidation of toluene and alcohols

Microwave assisted reactions in organic solvents – Esterification, Fries rearrangement, Clasien Rearrangement, Diels-Alder Reaction and Decarboxylation. Ultra sound assisted reactions – Esterification, Saponification, alkylation , oxidation, reduction, coupling reactions and Cannizaro reactions.

UNIT -V Green reactions invloving basic principle of green chemistry. (10 Hrs)

Twleve principle of green chemistry – choice of starting materials – biomimitic, multifunctional reagents – materials reagents.

Combinatorial green chemistry – green chemistry in sustainable developments.

Importance of Green chemistry in day to day life, versatile bleaching agents and analgeric drugs.

Text Books

1. V.K.Ahluwallia &M.R Kidwai "New Trends in Green Chemistry", Anamalaya Publishers (2005)

2. P.T.Anaster &J.K.Warnerr " Oxford Green Chemistry,Theory and Practical",University Press(1998)

Reference Books

1. A.S. Matlack,'' Introduction to Green Chemistry"-Marcel Deckkar (2001)

2. V.K.Ahhluwallia,"GreenChemistryEnvironnmentallyBenign Reaction"Ane Books Pvt.Ltd. New Delhi (2009)

3 Rashmi Sannghi &MM Srivastava, "Green Chemistry Environment Friendly Alternatives." Narosa Publishing House Pvt Ltd, New Delhi (2009)

NANO CHEMISTRY

L	T	P	C
4	0	0	4

Objectives

To give an insight into the basics of nanochemistry.

To understand the difference between bulk material and nanomaterial and learn the synthesis, application and fabrication of nanostructure.

To study the importance of nanocatalyst, nanocomposites and fibers.

To make the students familiar with the characterization and applications of nanomaterials.

UNIT- I Introduction to Nano chemistry. (12 Hrs)

Definition: nanoscience – nanotechnology – nanochemistry – significance of nanoscale - factors responsible for special properties of nanomaterials.

Nanomaterials: Different types of nanomaterials and structures- quantum wells – quantum wires – quantum dots – nanoclusters – nanocrystals – nanowires and nanotubes.

Feynman's Prophecy– manufacturing of nanomateris - top-down and bottom-up approaches.

UNIT-II Synthesis of nano particles. (13 Hrs)

Introduction – orientation of nanoparticles – synthesis of nanoparticles.

Physical methods: laser ablation, physical vapour deposition (PVD) and solvated metal atom dispersion (SMAD).

Chemical methods: thermolysis, sonochemical method, reduction methods, phase-transfer processes and biosynthesis of nanoparticles.

Synthesis of nanosized semiconductors: precipitation methods and thermal decomposition of complex precursors.

Synthesis of ceramics: physical methods, gas condensation method, laser method, chemical methods and sol-gel synthesis.

UNIT –III Nanocatalyst and carbon based nanomaterials `(12 Hrs)

Inroduction – fundamentals of catalysis – adsorption of a molecule on a catalyst surface, adsorption theory- Langmuir adsorption isotherm.

Surface reactions – synthesis – synthesis requirements, example of a conventional synthetic technique, non traditional methods for preparing nanocatalyst.

Characterization of nanocatalyst : overview - bulk characterization technique and surface characterization technique

Carbon nanomaterials : structure and properties of graphite, diamond and fullerenes.

UNIT-IV Nanocomposites and fibers. (12 Hrs)

Introduction - Background - types of composite materials - The nano perspective.

Physical and chemical properties of materials – mechanical properties, thermal properties, electronic properties and chemical properties.

Natural nanocomposities - Skin of the sea cucumber and hard natural nanocomposites.

Carbon fibers and nanotubes – Types of fibers, Whiskers and nanotubes – synthesis of fibers and nanotubes - chemical modification and applications of carbon nanotube.

Metal and Ceramic nanocomposites - Metal nanocomposites, inorganic nanofibers and concrete.

Clay nanocomposite materials -polypropylene clay nanocomposite , mont morillonite clay nanocomposite and halloysite nanotube claycomposites.

UNIT-V Characterization and applications of nanomaterials. (11 Hrs)

Types of characterization methods – Electron probe method- Scanning electron microscopy – Transmission electron microscopy,

Spectroscopyic Methods, - UV – Visible adsorption and emission spectroscopy, Infra Red and Raman spectroscopy and X-ray diffraction methods.

Current applications: sunscreens and cosmetics – nano medicine, drug delivery and cancer drugs – food and drinks, textiles, chemical industry and electronic devices.

Short term applications - paints – fuel cells – displays – batteries – fuel additives and catalysts.

Long term applications- composites – lubricants – magnetic materials – medical implants – machinable ceramics – water purification and military battle suits.

Text Books

1. Geoffrey A. Ozin and Andre C. Arsenault, “Nanochemistry: A chemical approach to nanomaterials”, RSC publishing, (2005), U.K.
2. Hari Singh Nalwa, “Nanostructured Materials and Nanotechnology”, Academic Press, New York,(2002).

Reference Books

1.C.N.R. Rao, A. Muller and A.K. Cheetham, “The Chemistry of Nanomaterials, Volume I & II”, Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim, (2004).

2.Kenneth J. Klabunde, “Nanoscale Materials in Chemistry”, Wiley-Interscience”, New York,(2001).

3. Gabor L.Hornyak, Harry F. Tibbals, Joydeep Dutta and John J Moore . “Inroduction to Nanoscience and Nanotechnology” CRC Press ,Taylor and Francis group London Newyork.

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES
B.Sc Computer Scienc

(Choice Based Credit System)
(with effect from the academic year 2017-2018 onwards

Sem	Part I/ II/ III/ IV/V	Sub No	Subject Status	Subject Title	Contact Hrs / week	L Hrs/ week	T Hrs/ week	P Hrs/ week	C Cre-dits
III	III	15	Core	Java Programming	4	4	0	0	4
	III	16	Core	Computer Architecture	5	4	1	0	4
	III	17	Core	Data Structures	4	4	0	0	4
	III	18	Major Practical - III	Java Programming	4	0	0	4	2
	III	19	Allied -III	Web Technology	3	3	0	0	3
	III	20	Allied Practical - III	Web Design using HTML	4	0	0	4	2
	III	21	Skill Based I Core	Programming with PHP & MySQL	4	4	0	0	4
	IV	22	Non-Major Elective	1. Fundamentals of Internet 2. Basic Programming Design	2	2	0	0	2
	IV		Common - Yoga		2	2	0	0	2
				Subtotal (Excluding Yoga)	**30**	**21**	**1**	**8**	**25**

IV	III	23	Core	Visual Basic	4	4	0	0	4
	III	24	Core	Information Security	4	4	0	0	4
	III	25	Core	Relational Database Management System	5	4	1	0	4
	III	26	Major Practical - IV	Visual Basic	4	0	0	4	2
	III	27	Allied -IV	E-Commerce	3	3	0	0	3
	III	28	Allied Practical - IV	PYTHON	4	0	0	4	2
	III	29	Skill Based II Core	Android Programming	4	4	0	0	4
	IV	30	Non-Major Elective	1. HTML 2. Programming in C	2	2	0	0	2
	IV		Skill Based Common	Computers for Digital Era	2	2	0	*	2
	V		Extension Activity	NCC, NSS, YRC, YWF	0	0	0	0	1
				Subtotal(Excluding Computers for Digital Era)	**30**	**21**	**1**	**8**	**26**

V	III	31	Core	Software Engineering and Testing	4	4	0	0	4
	III	32	Core	Data communication and Computer Network	4	4	0	0	4
	III	33	Core	Dot NET Technologies	4	4	0	0	4
	III	34	Major Practical - V	Dot NET	4	0	0	4	2
	III	35	Major Practical - VI	Data Structures	4	0	0	4	2
			Mini Project		4	0	0	4	3
	III	36	Major Elective - II	1. Mobile Computing 2. Multimedia Applications 3. Cloud Computing	4	4	0		4
	III		Skill Based Common	Personality Development /Effective Communication / Youth Leadership	2	2	0	*	2
				Subtotal	**30**	**21**	**0**	**9**	**25**

	III	37	Core	Operating Systems	5	4	1	0	4
VI	III	38	Core	Computer Graphics and Visualization	4	4	0	0	4
	III	39	Core	Data Warehousing and Data Mining	4	4	0	0	4
	III	40	Major Practical - VII	Computer Graphics	4	0	0	4	2
	III	41	Major Practical - VIII	Oracle	4	0	0	4	2
	III	42	Major Practical - IX	Android Programming	4	0	0	4	2
	III	43	Major Elective - III	1. Internet of Things 2. Big Data Analytics 3. Neural Networks	4	4	0	0	4
				Subtotal	**30**	**20**	**1**	**13**	**22**
								Total	140**

- * 10 hours of practical
- **L**-Lecture **T**-Tutorial **P-**Practicals

Distribution of marks between External and Internal Assessment is

For Theory 75 : 25

For Practical 50 : 50

Internal Marks for Practical shall be allotted in the following manner

Continuous Assessment – 25 marks "N" number of practicals be conducted based on the practicals prescribed in the syllabus and the marks should be distributed equally for each practical.

Test - 25 marks Two tests should be conducted and average of tests be taken.

Calculation of marks: Sum of marks awarded to number of practicals + the average marks of two tests

Total **- 50 marks**

JAVA PROGRAMMING

L T P C

4 0 0 4

Objective: To understand the basic programming constructs of Java Language and to explore the features of Java by applying to solve problems

UNIT I

Data Types, Variables and Arrays: Primary types – Integers – Floating point types – Characters – Booleans – A Closer Look at Literals – Variables – Type Conversion and Casting – Automatic type Promotion in Expressions - One Dimensional Arrays– Multi Dimensional Arrays. **Introducing Classes:** Class Fundamentals – Declaring objects- Assigning object Reference variables- Introducing Methods- Constructors-Garbage collection – Finalize() Method. (12L)

UNIT II

A Closer Look at Methods and classes: Overloading Methods-Using objects as parameters- Argument passing –Returning objects- Recursion-Introducing Access control – understanding static – Introducing final – Nested and Inner classes- String class- Using command line arguments. **Inheritance:** Inheritance Basics –Using super- creating Multilevel Hierarchy -Method overriding.

(12L)

UNIT III

Packages and interfaces: Packages –Access Protection – Importing packages-Interfaces. **Exception Handling**: Introduction- Exception Types – Uncaught Exceptions- Using try and catch – Multiple catch clauses –Nested try statements- throw – throws-finally. **Multithreaded programming** : Java Thread Model –Main Thread –Creating a Thread –Creating Multiple Threads

(12L)

UNIT IV

The Applet class: Applet Basics – Applet Architecture –Applet Skeleton- Applet Display method –Requesting Repainting – HTML APPLET tag- Passing Parameters to Applet. **Event Handling**: Event Handling Mechanisms –Delegation Event Model –Event classes(The Action Event ,Item Event , Key Event, Mouse Event) – Sources of Events - Event Listener Interfaces(Action Listener, Item Listener, Key Listener, Mouse Listener). (12L)

UNIT V

Introducing the AWT: AWT Classes – Window fundamentals – working with Frame Windows –working with Graphics– Working with color – Working with Fonts. **Using AWT Controls**: Controls Fundamentals – Labels – Using Buttons –Applying check Boxes – Check Box group – Choice Controls – Using a Text field – Using a Text Area – Understanding Layout Managers [Flow Layout Only] – Menu Bars and Menus. (12L)

Text Book:

Java, The Complete Reference 8/e , Herbert Schildt, TMH

Reference Book:

1. Programming with Java –C.Muthu
2. Java Programming A Practical Approach, C.Xavier, TMH
3. Programming in Java, Sachin Malhotra, Saurabh Choudhary, OXFORD University Press
4. Programming with Java a primer 3/E E.BALAGURUSWAMY
5. Core Java, Mahesh P. Matha, PHI Learning Private Limited

COMPUTER ARCHITECTURE

L T P C
4 1 0 4

Objective: To gain knowledge about the architecture of computer and to understand the concepts of CPU, ALU Design, I/O Instruction format and different processors.

UNIT I

Basic Computer Organisation And Design : Instruction codes - Computer Registers - Computer Instructions - Timing and Control - Instruction Cycle - Control Memory-Address Sequencing

(12L)

UNIT II

Central Processing Unit : General Register Organization – Stack Organization – Instruction Formats – Addressing Modes – Data transfer and manipulation – Program Control.

(12L)

UNIT III

Computer Arithmetic : Hardware Implementation and Algorithm for Addition, Subtraction, Multiplication, Division-Booth Multiplication Algorithm-Floating Point Arithmetic.

UNIT IV

Input Output Organization : Input – Output Interface – Asynchronous data transfer – Modes of transfer – Priority Interrupt – Direct Memory Access (DMA).

(12L)

Unit V

Memory Organisation: Memory Hierarchy - Main memory - Auxillary memory - Associative memory - Cache memory - Virtual memory.

(12L

Text Book:

Computer system Architecture - by Morris Mano, Third Edition. P.H.I Private Limited.

Reference Books:

1. Computer System Architecture P.V.S. Rao PHI
2. Nirmala Sharma, ”Computer Architecture”, First Edition,2009,University Science Press
3. Nicholos Carter, ”Computer Architecture” ,2006, TMH Publication.

DATA STRUCTURES

L T P C
4 0 0 4

Objective:

- To understand the concepts of basic data structures such as stack, Queues and Linked list.
- To have general understanding of the network structures through trees and graph.
- To make the students to understand the basic algorithms for sorting.

Unit I

Basic Concepts:- Algorithm specification – Data Abstraction – Performance Analysis. **Arrays and Structures:-** Arrays: Abstract data type – Polynomials – Sparse Matrices – Representation of Multidimensional Arrays.

(12L)

Unit II

Stacks and Queues:- Stacks – Queues – Evaluation of Expressions. **Linked Lists**:- Singly Linked Lists and Chains – Linked Stacks and Queues – Polynomials: Polynomial Representation – Adding Polynomials. Sparse Matrices: Sparse Matrix Representation. – Doubly Linked Lists.

(12L)

Unit III

Trees:- Introduction – Binary Trees – Binary Tree Traversals: Inorder Traversal – Preorder Traversal – Postorder Traversal. Heaps – Binary Search Trees Forests: Transforming a Forest into a Binary Tree.

(12L)

Unit IV

Graphs: - The Graph Abstract Data Type-Elementary Graph Operations – Minimum Cost Spanning Trees: Kruskal's Algorithm – Prim's Algorithm. – Shortest Paths and Transitive Closure: Single Source/ All Destination: Nonnegative Edge Costs - All Pairs Shortest Paths.

(12L)

Unit V

Sorting:- Motivation – Insertion Sort – Quick Sort – Merge Sort: Recursive Merge Sort. – Heap Sort – External Sorting: Introduction – k-way Merging..**Hashing**:- Static Hashing: Hash Tables.

(12L)

Text Book:

Fundamentals of Data Structures in C by Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed – Second Edition – Universities Press (India) Private Limited.

Reference Books:

1. Data Structures Using C, Second Edition by Reema Thareja – Oxford University Press
2. Data Structures by Dr N Jeya Prakash – Anuradha Publications

JAVA PRACTICAL LIST

L	T	P	C
0	0	4	2

Objective: To develop skills in implementing algorithms through the programming Language JAVA and to explore the features of JAVA by applying sample problems.

Each exercise should be completed within two hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Define a class called Student with the attributes name, reg_number and marks obtained in four subjects(m1,m2,m3,m4).Write a suitable constructor and methods to find the total mark obtained by the student and display the details of the student.
2. Write a Java program to find the area of a square, rectangle and triangle by
   (i) Overloading Constructor
   (ii) Overloading Method.
3. Write a java program to add two complex numbers.
   [Use passing object as argument and return object].
4. Define a class called Student_super with data members name, roll number and age. Write a suitable constructor and a method output () to display the details. Derive another class Student from Student_super with data members height and weight. Write a constructor and a method output () to display the details which overrides the super class method output().[Apply method Overriding concept].
5. Write a java program to create an interface called Demo, which contains a double type constant, and a method called area () with one double type argument. Implement the interface to find the area of a circle.
6. Write a java program to create a thread using Thread class.
7. Write a java program to Design a calculator to perform only addition and division. It must contains three Buttons with labels +, / and =, and a TextField to get input and display the result.
8. Create an applet with four Checkboxes with labels MARUTI-800, ZEN, ALTO and ESTEEM and a Text area object. The program must display the details of the car while clicking a particular Checkbox.
9. Write a Java program, which creates a window with a check box group with boxes for the colors, Violet, Indigo, Yellow, Orange, Red, Blue, and Green. When the button is selected the background color must change accordingly.
10. Write a Java program to throw the following exception,
    1) Negative Array Size
    2) Array Index out of Bounds

Allied - Web Technology

L	T	P	C
3	0	0	3

Objective: To impart knowledge about the web technologies and their applications and to understand the basics of web designing.

Unit I

Introduction: Internet Services and Accessibility-Uses of the Internet-Protocols-Web concepts-The client/server model at the web-Retrieving data from the web. **Internet Protocols**: Introduction – Internet protocols-transmission control protocols-User Datagram protocols - Host Names. (9L)

Unit II

HTML: Introduction-SGML-DTD-DTD Elements- attributes-outline of an HTML document-Head section-Body section: Headers – Paragraphs – Text formatting – Linking – Internal linking – Embedding images – Lists – Tables – Frames – Other Special tags - HTML forms. (9L)

Unit III

JavaScript: Introduction- need of a scripting language - language elements : Identifiers – Expressions – JavaScript keywords – Operators – Statements – functions. (9L)

Unit IV

Objects of JavaScript: Window object – Document object – Forms object – Text boxes and text areas – Buttons , Radio buttons and Check boxes – Select object - other objects: Date object – Math Object – String Object – Arrays – worked examples. (9L)

Unit V

Dynamic HTML: Introduction- cascading style sheets: Coding CSS – Properties of tags – Property values – Other style properties – Inline Style Sheets –Embedded Style Sheets – External Style sheets – Grouping – Inheritance – Class as Selector – ID as Selector – Contextual Selectors – Pseudo Classes and Pseudo-elements – Positioning – Backgrounds – Element Dimensions. (9L)

Text Book:

Web Technology A Developer's Perspective, N.P.Gopalan, J. Akilandeswari ,PHI

Reference Books:

1. Web Technology and Design, C.Xavier, New Age International Publishers
2. Web Technologies TCP/IP Architecture and Java Programming Second Edition, Achyut S. Godbole & Atul Kahate, Tata McGraw Hill
3. Web Technology, S. Padma Priya, SCITECH Publications (India)Pvt. Ltd

Allied

Practical List – Web Design using HTML

L T P C

0 0 4 2

Objective: To highlight the basic concepts of HTML and help the student to equip with the programming skills in implementing and developing web based applications

Each exercise should be completed within two hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Create a website using internal links and images.
2. Design a calendar using table tag.
3. Create a HTML document to display a list of five flowers and link each one to another document displaying brief description of the flower, Add pictures wherever possible.
4. Write an HTML code to display a list of 5 cars in a frame, Link each one to a brief description in second frame. The left frame should display the list and the right frame should display the paragraph about the frame.
5. Create a simple HTML Form covering major form elements.
6. Embed Audio and Video in an HTML page.
7. Rotate an element using CSS.
8. Build a simple quiz.

Skill Based 1 Core

Programming with PHP & MySQL

L T P C
4 0 0 4

OBJECTIVES:

- To understand the concepts of open sources.
- To learn and use open source database management system MySQL
- To create dynamic web pages and websites.
- To connect web pages with database.

UNIT-I

Introduction: Introduction- Open source PHP – PHP history- features-variables- statements operators conditional statements-if-switch-nesting conditions-merging forms with conditional statements-loops-while-do-for – loop iteration with break and continue. (12L)

UNIT – II

Arrays and Functions: Arrays: Creating an array- modifying array-processing array-grouping form with arrays- using array functions- creating user defined functions- using files- sessions-cookies- executing external programs- Creating sample applications using PHP.

(12L)

UNIT –III

File Handling Opening files using fopen - looping over a files content with feof- reading text from a file using fgets - closing a file- reading character with fgetc- reading whole file with file_get contents reading a fle into into an array with file-checking if a file exists-fscanf-parse_ini_file- Getting file information with stat-fseek- copying files with copy- deleting files-writing to a file-reading and writing binary files –locking files

(12L)

UNIT-IV

MySQL: Effectiveness of MySQL -MySQL Tools-Prerequisites for MySQL connection-Databases and tables- MySQL data types-Creating and manipulating tables-Insertion-updation and deletion of rows in tables -Retrieving data- Sorting and filtering retrieved data -Advanced data filteringData manipulation functions-Aggregate functions -Grouping data- Sub queries- Joining Tables- Set operators-Full text searching.

(12L)

UNIT-V

PHP with MySQL: Working MySQL with PHP-database connectivity- usage of MYSQLcommands in PHPprocessing result sets of queries- handling errors-debugging and diagnostic functionsvalidating user input through Database layer and Application layer- formatting query output with Character- Numeric- Date and time –sample database applications. (12L)

Text Books:

1. VIKRAM VASWANI- “PHP and MySQL”- Tata McGraw-Hill- 2005

2. BEN FORTA - ”MySQL Crash course “ SAMS- 2006. 3

. Steven Holzner , The Complete reference PHP, Tata McGraw Hill,2008

Books for Reference:

• Tim Converse- Joyce Park and Clark Morgan- ”PHP 5 and MySQL” -Wiley India reprint - 2008.

• Robert Sheldon- Geoff Moes- ”Beginning MySQL”-Wrox- 2005

Non-Major Elective -1
Fundamentals of Internet

L T P C
2 0 0 2

OBJECTIVES:

To: study the basic concepts of Internet and understand the services provided by the Internet.

Unit I

The Internet: Introduction – From Computers to the Internet - Advantages of the Internet – Major Internet Services – Hardware and Software in the Internet Age. **Evolution and Growth of the Internet:** Birth of the Internet – Current Networking Technologies – Next Generation Networking..

(5L)

Unit II

Getting Online: Types of Internet Accounts – Selecting Internet Service Providers – **Electronic Mail:** Advantages of E-mails – E-mail addresses – Mail transfer protocols – Working of E-mail system. **World Wide Web:** Architecture of the World Wide Web – Types of websites – Uniform Resource Locator – Domain Name System – Web Pages and Web Links – Visiting Web Pages – Using Internet Explorer – Searching the Web – Google and Yahoo Search Engines.

(7L)

Unit III

Hosting and Promoting Websites: Structure of Websites – Web Development tools – Microsoft Front Page –Adobe Dreamweaver – Visual Studio. NET – Hosting Websites – Getting a Domain /name – Visitor Analysis and Statistics – Website Promoting methods. (6L)

Unit IV

Electronic Commerce: E-Business and E-Commerce – Types of business in the internet – M-Commerce - Marketing Strategies on the Web – Making Payments in Virtual Stores – Shopping in Virtual Stores –Cookies and E-Commerce – Major issues of E-commerce and M-Commerce – Future of E-commerce. (6L)

Unit V

Blogs and Social Networking: Blogs – Uses of Blogs – Blogs System Components – Steps for Blogging – Building a Blog site – Social Networking – Etiquette in networking sites. **Internet Security:** Importance of Internet Security – Internet Threats – Identity theft and Cybersquatting – Hacking – Spamming and Spoofing – Phishing and Pharming – Denial of Service – spyware – Viruses and worms- Security solutions – Firewalls and Intrusion Prevention Systems –Internet Security Precautions- The Information Technology Act. (6L)

Text Book:

The Internet A User's Guide Second Edition by K.L. James – PHI Learning Private Limited .

Reference Books:

1. Internet, World Wide Web, How to program, 4th Edition, Paul Deital, Harvey M Deitel, Pearson
2. Learning Internet & Email, 4th Revised Rdition, Ramesh Bangia, Khanna Book Publishing Co Pvt Ltd.
3. Internet & Ecommerce, C. Nellai Kannan, NELS Publications

Non-Major Elective 2
Basic Programming Design

L T P C
2 0 0 2

OBJECTIVES:

To: study the basic concepts of Programming and understand the structures of programming constructs.

Unit I

Computer Program: Introduction – Developing a program – Algorithm – Flowchart – Decision Tables. (6L)

Unit II

Program Testing and Debugging – Program Documentation – Program Paradigms: Unstructured programming, Structured programming and Object Oriented Programming – Characteristics of a Good Programming. (6L)

Unit III

Computer Languages: Evolution Programming Languages – Classification of Programming Languages – Generation of Programming Languages – Features of Good Programming language. (6L)

Unit IV

Computer Software: Software Definition – Relationship between Software and Hardware - Software Categories : System Software and Application Software – Terminology Software Firmware, Liveware, Freeware, Public Domain Software, Shareware, Commercial Software and Proprietary Software. (6L)

Unit V

Evolution of Internet - Internet Basics: Basic Internet Terms – Getting connected to Internet - Internet Applications – E-mail – Searching the Web – Internet and Viruses. (6L)

Text Book:

Introduction to Computer Science, ITL Education Solutions Limited, 2/e, Pearson

Reference Books:

1. Fundamentals of Computers, V.Rajaram, 5th Edition, PHI
2. Introduction to Computers, Peter Norton, 7/e, TMH.

VISUAL BASIC

L T P C
4 0 0 4

Objective: Visual Basic Programming introduces event-driven Windows programming, data types, operators, objects and properties, menus, procedures, control structures, and database file processing

Unit I

Getting started with Visual Basic 6.0: Introduction to Visual Basic - Visual Basic 6.0 Programming Environment – Working with Forms – Developing an Application – Variables, Data types and Modules – Procedures and Control Structures – Arrays in Visual Basic – Additional Examples. **Working with Controls**: Introduction – Creating and using Controls – Working with Control Arrays.

(12L)

Unit II

Menus, Mouse Events and Dialog Boxes: Introduction – Mouse Events – Dialog Boxes - additional Examples. **Graphics, MDI, and Flex Grid**: Introduction – Graphics for Applications – Multiple Document Interface(MDI) – Using the Flex Grid Control. (12L)

Unit III

ODBC using Data Access Objects and Remote Data Objects: Open Database Connectivity (ODBC) – Remote Data Objects. (12L)

Unit IV

Object Linking and Embedding: Introduction - OLE Fundamentals – Using OLE Container Controls – Using OLE Automation Objects - OLE Drag and Drop - Additional Examples. **Objects and Classes**: Introduction to Objects – Working with Objects – Classes and Class Modules.

(12L)

Unit V

Working with ActiveX Data Objects: An Overview of ADO and OLE DB – ADO Object Model - Additional Examples. **Files and File System Controls**: Introduction – File System Controls – Accessing Files.

(12L)

Text Book:

Visual Basic 6.0 Programming – Content Development Group – Tata McGraw-Hill Publishing Company Limited, New Delhi.

Reference Books:

1. VISUAL BASIC 6 in Record Time by Steve Brown, BPB Publications.

2. VISUAL BASIC 6 from the Ground UP – GARY CORNELL – Tata McGraw Hill.

INFORMATION SECURITY

L T P C
4 0 0 4

Objective: Information security focuses on the overview of information security, the tools and techniques used to secure information and the procedures and practices that must be followed by organizations ti ensure information security.

Unit I

Basics of information security: Introduction – Information – Need for information security – What is an information security breach – What needs to be secured?- Who needs to be concerned on information security. Aspects of information security – Goals of information security – Establishing a Security Equation.

Information Security Threats: Introduction – What is a threat – Threats and Vulnerabilities – Threats, vulnerabilities and counter measures.- Types of threats (12L)

Unit II

Viruses: Introduction – Who creates a virus and why?- How does a virus spread. Types of viruses – Boot sector virus – file virus. Prevention from virus attacks – Impact of a virus attack – Security measures to prevent virus attacks. Antivirus Software – Types of Antivirus software – Deploying Antivirus software. Virus detection and recovery – Virus detection – Recovery from virus attack.

Backups: Introduction – Need for making backups – Types of backups – Backup media – Qualities of a good backup. Backup Strategy – What should be backed up – How frequently and what types of backups should be made – which backup medium should be used – For how long should backups be maintained – who is responsible for making a backup. Backup solutions - Backup solutions used in Linux - Backup solutions used in Windows 2000. (12L)

Unit III

Countermeasures for Information Security Breach: Cryptography – What is cryptography – Need for cryptography – Types of cryptography – Algorithms used in Cryptography – Authentication models used in cryptography – Implementation of cryptography. Biometrics – Biometrics Authentication process – Biometrics Authentication methods – Areas where Biometrics is used.

Risk Management: Introduction –What is Risk management – Need for risk management - Benefits of risk management – Important roles in risk management – The risk management process. Risk Assessment –Identifying the assets at risk – Assessing the value of assets – identifying the threats to the assets – identifying the vulnerabilities in an organization. Risk Analysis – Analyze the probability of threat occurrence – Analyze the impact of threat occurrence – Determine the levels of risk of each asset – Prepare for a Risk analysis report. Risk Mitigation – Devise an implementation plan and prioritize Assets – Identify security controls – Conduct cost benefit analysis – challenges in Risk management.

(12L)

Unit IV

Security Policies: Introduction – What is security policy – need for security policy – people who are affected by security policies – Role of management in implementing security Policies- Components of a security policy – security policies and Trust. Security Policy Life Cycle –Prerequisites for creating a Security policy – Design and Creation – Implementation – Compliance – Monitor and Review. Key Security Policies- Acceptable use policy –P:assword policy – Remote Access policy – Virus prevention and Protection policy.

Intrusion Detection: Introduction – What is intrusion – How intrusion happens – who can intrude –types of intrusions. Intrusion Detection Systems – Models on which IDS are based – types of IDS. Honeypots – types of honeypots – uses of honey pots. Firewalls-types of firewalls.

(12L)

Unit V

Security Audit: Introduction – Objectives of security audit – when is a security audit required. Auditor – Qualification of an auditor – role of an auditor – responsibilities of an auditor. Conducting Security Audits – Auditing strategies – Phases of a security audit – types of security audits. **Sample Security Policy**: Introduction – Security policy – Roles and responsibilities – policy documentation – security policy compliance – Standards and guidelines for the use of Company Resources and Network facilities V 1.0 - Standards and guidelines for email usage V 1.0 - Standards and guidelines for internet usage V 1.0. Sample Risk Analysis (12L)

Text Book:

Information security, An overview. PHI, 2004.

Reference Books:

1. Information Security: Principles and Practice 2nd Edition, Mark Stamp , Wiley Publications.
2. Information Security: The Complete Reference 2nd Edition, Mark Rhodes & Ousley, Mcgraw Hill.

Relational Database Management System

L T P C

4 0 0 4

OBJECTIVES:

- To learn the fundamental data models and conceptualize and depict a database system using ER diagram
- To make a study of SQL and relational database design using Oracle

UNIT I

Introduction: Database - system applications-Purpose of Database Systems - View of Data- Database languages -Relational Databases - Database Design - Data Storage and Querying - Transaction Management - Database Architecture - Data Mining and Information Retrieval-Specialty Databases - Database Users and Administrators. (12L)

UNIT II

Introduction to the Relational Model and Introduction to SQL: Structure of Relational Databases -Database Schema-Keys-Schema Diagrams- Relational Query Languages-Relational Operations- Overview of the SQL Query Language -SQL Data Definition-Basic Structure of SQL Queries (12L)

UNIT III

SQL operations and Intermediate SQL : Additional Basic Operations-Set Operations-Null values-Aggregate functions- Nested Sub queries- Views - Integrity Constraints - SQL Data Types and Schemas (12L)

UNIT IV

Entity-relationship(E-R) Modeling – Enhanced Entity-Relationship(EER) Model – Data Normalization (12L)

UNIT V

Implementation using Oracle: Creating Table-Modifying Table-Creating SEQUENCE-PL/SQL- Stored procedures and Functions (12L)

Text Book:

1.Database System Concepts – Abraham Silberschatz, Henry F.Horth and S.Sudarashan, McGraw-Hill International Sixth Edition.

2. Essentials of Database Management Systems – Alexis Leon, Mathews Leon (Chapter 4,5,8 – IV unit)
3. Oracle8i Jose A.Ramalho BPB Publications

Reference Books:

1. Database Management Systems, R.Panneerselvam, PHI Learning Private Limited
2. Database Management Systems, Ramakrishnan and Gehrke, Mc Graw Hill Publications
3. Relational Database Management Systems,P. Simon Navis, Ave Maria Publications
4. RDBMS Concepts and Database Designing, Dr. R.C. Goyal –Ebook url http://www.vssut.ac.in/lecture_notes/lecture1423726199.pdf
5. Fundamentals of Database Systems, Ramez Elmasri, Fourth Edition, Pearson Addison Wesley- EBook URL: http://www.uoitc.edu.iq/images/documents/informatics-institute/Competitive_exam/Database_Systems.pdf
6. An Introduction Relational Database Theory, Hugh Darwen, EBook URL: http://www.zums.ac.ir/files/research/site/ebooks/it-programming/an-introduction-to-relational-database-theory.pdf

VISUAL BASIC Lab

L	T	P	C
0	0	4	3

Objective: To highlight the basic concepts of HTML and help the student to equip with the programming skills in implementing and developing web based applications

Each exercise should be completed within three hours.
It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Design an Analog Clock.
2. Design a Desktop Calculator.
3. Design Mixing of Colors using basic Colors.
4. Create an application to format the text inside the text box.
5. Create an application using File controls and use two option buttons to show and hide a picture in the Picture box.
6. Create an Editor with File and Edit Menus using Menu Editor Tool.
7. Create a MDI Application with tile and cascade child forms.
8. Create a mailing address database in access `and view the records using Data Control.

Allied
E-Commerce

L T P C
3 0 0 3

Objective: To impart knowledge about the web technologies and their applications and to understand the basics of web designing.

Unit I

History of E-Commerce : Electronic Commerce - Emergence of the Internet – Emergence of the World Wide Web –Advantages of E– commerce – Disadvantages of E-Commerce - Qnline Extension of a BAM Model – Transition to E-Commerce in India - The Internet and India.
(8L)

Unit II

Business Models for E-Commerce : Social Networking and Facebook – Business Model – E-business Models Based on the Relationship of Transaction Parties – E-business Models Based on the Relationship of Transaction Types. (9L)

Unit III

e-Marketing - Google – Traditional Marketing – The Browsing Behaviour Model – Online Marketing – E-advertising – Internet Marketing Trends –E-branding – Marketing strategies.

(9L)

Unit IV

e-Security : Information System Security – Security on the Internet – E-business Risk Management Issues – Information Security Environments in India. (9L)

Unit V

e-Payment Systems : E-banking at ICICI Bank – Main Concerns in Internet Banking - Digital Payment Requirements –Classification of New Payment Systems - Digital Signature – Online Financial Services in India. (10L)

TEXT BOOK:

1. P.T.Joseph , S . J, E-Commerce – An Indian Perspective, PHI Learning Pvt Ltd.,2013

Reference Books:

1 . CSV Murthy, E-Commerce – Concepts Models Strategies, Himalaya Publishing House.

2. Bharat Bhasker, Electronic Commerce Framework, Technologies and application, Tata Mcgraw Hill.

Allied

Practical List – PYTHON

L T P C

0 0 4 2

Objective: Learn to program in Python and understand programming paradigms brought in by Python Expressions.

Each exercise should be completed within two hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.

2. Write a menu-driven program, using user-defined functions to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
3. WAP to display the first n terms of Fibonacci series.
4. WAP to find factorial of the given number.
5. WAP to find sum of the following series for n terms: 1 – 2/2! + 3/3! - - - - - n/n!
6. WAP to calculate the sum of two compatible matrices.
7. WAP to calculate the product of two compatible matrices.
8. Explore String functions.
9. Creating a CSV File based on user input.
10. Reading a CSV File already created and display the contents

Reference Books:

1. T. Budd, Exploring Python, TMH, 1st Ed, 2011
2. Python Tutorial/Documentation www.python.or 2010
3. Allen Downey, Jeffrey Elkner, Chris Meyers , How to think like a computer scientist : learning with Python , Freely available online.2012
4. http://docs.python.org/3/tutorial/index.html
5. http://interactivepython.org/courselib/static/pythonds
6. http://www.ibiblio.org/g2swap/byteofpython/read/

Skill Based II Core

Android Programming

L T P C
4 0 0 4

OBJECTIVES:

To learn the fundamentals of Android Programming using the Android SDK.

UNIT I

Getting Started with Android Programming: What is Android – Android versions – Features of Android –Android Architecture –Android devices in the market –The Android Market. Obtaining the required tools – Android Studio – Android SDK – Creating Android Virtual Devices – The Android Developer Community – Launching the first Android Application. **Using Android Studio for Android Development** - Exploring the IDE – Using Code completion – Debugging your application – Publishing your application. (12L)

UNIT II

Activities, Fragments and Intents : Understanding Activities - Applying Styles and Themes to an activity – Hiding the Activity title – Displaying a Dialog Window – Displaying a Progress Dialog. Linking Activities using Intents – Returning results from an intent – Passing data using an Intent Object. Fragments – Adding Fragments dynamically - Life cycle of a fragment – Interactions between fragments – Understanding the Intent object – Using intent filters. Displaying notifications. (12L)

UNIT III

Getting to know the Android User Interface : Understanding the components of a screen – View and viewgroups – Frame Layout – Linear Layout (Horizontal and Vertical) – Table layout – Relative layout – Frame layout – Scroll view. Adapting to Display Orientation – Anchoring views – Managing changes to screen orientation – Persisting State information during changes in configuration – Detecting orientation changes – Controllong the orientation of the Activity. Utilizing the Action Bar – Adding Action items to the Action Bar – Creating the user interface Programmatically – Listening for user Notifications. (12L)

UNIT IV

Designing your User Interface with Views: Using Basic views –Textview view – Button, ImageButton, EditText, CheckBox, ToggleButton, RadioButton, and RadioGroup Views –ProgressBar View, AutoCompleteTextView View. Using Picker Views – TimePicker view – DatePicker View. Using List views to display long lists – ListView View – Using the Spinner view. Understanding Specified fragments – Using a list fragment – Using a Dialog fragment – Using a preference fragment. (12L)

UNIT V

Displaying Pictures and Menus with views: Using ImageViews to Display pictures – ImageView view – ImageSwitcher – GridView. Using Menus with Views – Creating the Helper Methods – Options Menu – Context Menu – Using WebView. **Data Persistence:** Saving and Loading User Preferences – Accessing preferences using an activity – Programmatically Retrieving and Modifying the Preferences Values. Persisting Data to Files – Saving ti Internal Storage – Saving to External Storage – Choosing the best storage option. Creating and using Databases – Creating the DBAdapter Helper Class – Using the database programmatically. (12L)

Text Book:

Beginning Android Programming with Android Studio, J.F. DiMarzio, Wrox Publications

Reference Books:

1. Beginning Android Programming with Android Studio, Roger Deutsch
2. Android Programming: Mastering Course for Beginners - Quick Start to Develop Your Own App (Android studio, Android Development, App Development. Updated to Android 6 Platform, Mitchell Schuler

Non-Major Elective 3
HTML

L T P C
2 0 0 2

OBJECTIVES:

- To study the basic concepts of Web design using HTML.
- To learn the various tags used in HTML
- To make use of Dynamic HTML

Unit 1:

Introduction to HTML: Designing a Home page – History of HTML – HTML generations- HTML Documents-Anchor tag –Hyper links –Sample HTML documents. (6L)

Unit 2:

Head and Body section: Header Section –Title-Prologue-Links-Colorful web page –Comments lines Designing the body: Heading printing –Aligning the headings-Horizontal rule- paragraph-Tab settings-Image and pictures-Embedding PNG format Images (6L)

Unit 3:

Ordered and unordered lists: List-Unordered lists- headings in a list – ordered lists- Nested lists. Table handling: Tables- table creation in HTML- Width of the Tables and cells-Cells spanning multiple rows/Columns- Coloring cells – Column specification (6L)

Unit 4:

Frames: Frame set - Definition – Frame definition –Nested Frames Web Page Design Project : Frameset Definition – Animals – Birds – Fish Forms: Action attributes –Method attributes –Enctype attribute – Drop down list- sample forms (6L)

Unit 5:

DHTML and Style sheets: Defining styles –Elements of styles- Linking a style sheet to an HTML document –Inline styles –Internal & External style sheets –Multiple styles (6L)

Text Book:

World Wide Web Design with HTML, C. Xavier, TMH, 2001

Reference Book:

1. Internet & World Wide Web, H.M.Deital, P.J.Deital & A.B.Goldberg, Pearson Education
2. Fundamentals of information technology, Mathew‘s lenon and Alxis leon, Vijay Nicole private limited, Chennai.

Non-Major Elective - 4

Programming in C

L	T	P	C
2	0	0	2

OBJECTIVES:

To obtain knowledge about the structure of the programming language C and to develop the program writing and logical thinking skill.

Unit I

C Declarations:- Introduction – Character Set – C tokens – Keywords and Identifiers – Identifiers – Constants – Variables – Data types – Declaration of Variables – initializing variables – dynamic initialization – type modifiers – type conversion – constant and volatile variables. **Operators and Expressions:-** Introduction – Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operator – Bitwise Operators – Special Operators – Arithmetic Expressions – Evaluation of Expressions – Operator Precedence. (6L)

Unit II

Input and Output in C: Introduction – Formatted Functions – Flags, widths and Precision with Format String – Unformatted Functions – Commonly used Library functions. **Decision Statements :** Introduction – Simple IF statement – The IF…Else Statement – Nesting of IF…Else Statements – The ELSE IF ladder – The Break Statement – The Continue Statement – The Goto Statement – The Switch Statement. (6L)

Unit III

Loop Control:- Introduction –The WHILE Statement – The DO Statement – The FOR statement – Nested FOR Loops. **Arrays :-** Introduction – One-dimensional arrays – Declaration of One-dimensional arrays – Initialization of One-dimensional arrays – Array terminology -Two-dimensional arrays – Initialization of Two-dimensional arrays. (6L)

Unit IV

Strings and Standard functions:- Introduction – Declaring and Initializing String Variables – Display of strings in different formats – String Standard functions – String Conversion Functions. (6L)

Unit V

Functions:- Introduction – Basics of a function - Function definition – The Return statement Types of functions – Call by Value and Reference – Function as an argument – Function with operators – function and decision statements – function and loop statements – functions with arrays.

(6L)

Text Book:

Programming in C – 3th Edition by Ashok Kamthane – Pearson Education

Reference Book:

1. Computer Basics and C Programming by V. Rajaraman – PHI Learning Private Limited
2. Programming with C, Third Edition, Byron S Gottfried, Tata McGraw Hill Education Private Limited.

Software Engineering and Testing

L T P C

4 0 0 4

OBJECTIVES:

- To understand the concepts of analysis, design and implementation of a software product.
- To have general understanding about object-oriented software engineering.
- To make students to get experience and be ready for the large scale projects in IT Industry.

Unit I

Introduction:- Evolution – From an Art form on Engineering Discipline: Evolution of an Art into an Engineering Discipline. – Software Development of Projects: Program versus Product – Emergence of Software Engineering: Early Computer Programming – High Level Language Programming – Control Flow-based Design – Data Structure Oriented Design – Object Oriented Design. **Software Life Cycle Models:-** A few Basic Concepts – Waterfall Model and its Extension: Classical Waterfall Model – Iterative Waterfall Model – Prototyping Model – Evolutionary Model. – Rapid Application Development (RAD): Working of RAD. –Spiral Model.

(12L)

Unit II

Software Project Management:- Responsibilities of a Software Project Manager – Project Planning- Project Estimation Techniques-Risk Management. **Requirements Analysis and Specification:-** Requirements Gathering and Analysis – Software Requirements Specifications (SRS):Users of SRS Document – Characteristics of a Good SRS Document – Important Categories of Customer Requirements – Functional Requirements – How to Identify the Functional Requirements? – Organisation of the SRS Document. (12L)

Unit III

Software Design:- Overview of the Design Process: Outcome of the Design Process – Classification of Design Activities. – How to Characterize a good Software Design? **Function-Oriented Software Design:-** Overview of SA/SD Methodology – Structured Analysis – Developing the DFD Model of a System: Context Diagram – Structured Design – Detailed Design.

(12L)

Unit IV

User Interface Design:- Characteristics of a good User Interface - Basic Concepts – Types of User Interfaces – Fundamentals of Components based GUI Development: Window System. **Coding and Testing:-** Coding – Software Documentation – Testing: Basic Concepts and Terminologies – Testing Activities. – Unit Testing – Black-box Testing: Equivalence Class Partitioning – Boundary Value Analysis. – White-box Testing. (12L)

Unit V

Software Reliability and Quality Management:- Software Reliability: Hardware versus Software Reliability. – Software Quality – Software Quality Management System – ISO 9000: What is ISO 9000 Certification? – ISO 9000 for Software Industry – Shortcomings of ISO 9000 Certification. – SEI Capability Maturity Model: Level 1 to Level 5. **Software Maintenance:-** Characteristics of Software Maintenance: Characteristics of Software Evolution – Software Reverse Engineering.

(12L)

Text Book:

Fundamentals of Software Engineering Fourth Edition by Rajib Mall – PHI Learning Private Limited 2015.

Reference Books:

1. Software Engineering 2nd Edition by K L James PHI.
2. Software Engineering 9th Edition by Ian Sommerville - Pearson Education Asia.

Data communication and Computer Network

L T P C

4 0 0 4

OBJECTIVES:

• To understand the concepts of data communication.

• To get through understanding of different topologies.

• To study the function of different layers.

• To get familiarized with different protocols and network components.

Unit I

Introduction - Data communication – Networks-the Internet –Protocols and Standards –**Network Models** –Layered tasks –OSI model- layers in OSI model-TCP/IP protocol Suit-Addressing.

(12L)

Unit II

Physical layer – Analog and digital – Transmission Impairment –Data rate limits-Performance- Transmission mode -**BandWidth Utilization**- Multiplexing - **Transmission media** – Guided and Unguided media.

(12L)

Unit III

Switching – Circuit Switched Network-Datagram Network – Virtual Circuit Network. **Using telephone and cable networks –** Telephone Network- Dial-Up Modem–Digital Subscriber IIne – Cable TV Network and Cable TV for Data transfer.

(12L)

Unit IV

Data Link Layer : Error Detection and Correction- Introduction- Checksum. **Data link control**-Framing-Flow and Error Control-Protocols-Noiseless Channels-Noisy Channels. **Wired LANs**-IEEE standards-Standard Ethernet- Changes in the Standard – Fast Ethernet-Gigabit Ethernet.

(12L)

Unit V

Wireless LANs: IEEE 802.11-Blue tooth. **Connecting LANs :** Connecting devices, Backbone networks. **Wireless WANs**: Cellular Telephony, Satellite Networks. **Network Layer**- IPv4 Address-IPv6 Address-Internetworking. **Transport Layer**-Process to Process delivery –UDP-TCP. **Application Layer-** Name space-DNS. (12L)

Text Book

Data Communication and Networking –"BEHROUZ A FOROUZAN ",The McGraw- Hill- 4 thed.

References

1.Data Communication and Computer Networks – " Prakash C.Gupta

2.Computer Networks Protocols,Standards and Interfaces- " Uyless Black

3. Data Communications and Computer Networks – Brijendra Singh

Dot NET Technologies

L T P C

4 0 0 4

OBJECTIVES:

- To highlight the features of ASP.NET and apply it to develop various applications.
- To understand the concepts of .Net framework as a whole and the technologies that constitutes the frame work.
- To make the students to get experience and be ready for the large scale projects in IT industry.

Unit I

The .NET Platform and the Web: The Web Client/Server Model – Components of ASP.NET and the .NET Framework – Overview of Internet Information Server – Overview of ASP.NET – The .NET Common Language Runtime and Class Library – Managed Components in .NET – Web Services – Language Independence in the .NET Framework – COM+ Component Services and .NET – Direction and plans for .NET. **The VB.NET:** What is VB.NET? – First VB application – Variables, Constants and Operators – Modularizing Code – Functions and Subroutines – Controlling Program Flow – Handling Errors and Exceptions – Object Oriented Programming – Multithread Programming.

(12L)

Unit II

Working with ASP.NET: The features of ASP.NET – The Anatomy of ASP.NET Pages –Introducing Web Forms – VS.NET Web Applications and other IDE Basics – Separating Content and Code – the Code-Behind Feature – Application Configuration – Using HTML Forms – Using Web Controls – Web Controls for displaying and formatting data –Web Controls for creating buttons – Web control for inputting text – Web controls for selecting choices – Web controls for creating lists – Miscellaneous Basic Controls – Creating a simple ASP.NET Application – ASP.NET Page Directives – ASP.NET Rich Controls – Validation Controls – Data List Controls – User Controls - Saving state with the StateBag Object – ASP.NET Intrinsic Objects. (12L)

Unit III

Using the .NET Framework Class Library: Common Features of the .NET Framework Class Library – Using Data Collections – Handling File Input/output and Directories – Watching the File System for Changes – Using the Windows Event Log – Working with Active Directory Services – Using Message Queues – Communicating with Servers on the Internet – Manipulating XML Data – Sending Internet E-mail. (12L)

Unit IV

Building .NET Managed Components for COM+: The concept of Managed Code Execution – The Common Language Runtime – COM+ Component Services – Using VB.NET to develop Managed Components – Serviced Components – Building VB.NET Serviced Components. **Building Web Services:** The need for Web Services – Overview of Web Services – Web Service Description Language - Web Service Wire Formats – Web Services Discovery – Creating a simple Web Service – Calling Web Services with Proxy Classes – Creating a Client for a Web Service – Managing State in Web Services – Using Transactions in Web Services.

(12L)

Unit V

Accessing Data with ADO.NET: Overview of Data Access on the Web – ADO.NET: The next generation of Data-Access Technology – ADO.NET Programming Objects and Architecture – Displaying Database Data – Programming with the DataList and DataGrid Controls – Working with the DataSet and DataTable Objects – Maintaining Data Integrity with the DataRelation Class – Using Manual Database Transactions – Working with Typed DataSet Objects. **Securing .NET Applications:** Windows Security – IIS Authentication and Authorization Security – A crash course in Cryptography – Implementing Data Encryption – ASD.NET Authentication Security.

(12L)

Text Book

ASP.NET and VB.NET Web Programming –by Matt J. Crouch, Pearson.

Reference Books

1. Upgrading Microsoft Visual Basic 6.0 to .NET - by d Robinson, Michael Bond, Robert Ian Oliver, WP Publishers.

2. Visual Basic.NET - by Shirish Chavan, Pearson

Dot NET Practical Listing

L T P C

0 0 4 2

Objective: Learn to program in Dot Net and to develop web pages using ASP.NET

Each exercise should be completed within two hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Build a homepage for XYZ Corporation using Web Controls.
2. Create a login page using user control in a web form.
3. Create a simple multiple choice questionnaire. Submit the answers and display the score.
4. Develop a project to input data through a web form to a database and retrieve the data. Use the calendar control to input date.
5. Develop a project to input data through a web form to a database and validate the data. Use the Required Field Validator and RangeValidator Controls.
6. Check whether a given word or phrase is a palindrome using Web Service.
7. Create an online photo gallery using DataList and DataGrid Controls.
8. Develop code to send email from ASP.NET

DATA STRUCTURE PRACTICAL LIST

L T P C

0 0 4 2

Objective: To develop skills in implementing data structure algorithms

Each exercise should be completed within two hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Search an element in a list using Binary Search.
2. Implementation of Stack- Push and Pop.
3. Implementation of Queue – Enqueue and Dequeue
4. Implementation of Binary Tree Traversals using recursion.
   a) Pre-order b) In-order c) Post-Order

5. Implementation of Breadth First Search algorithm.
6. Implementation of Depth First Search algorithm.
7. Implementation of Merge Sort
8. Implementation of Quick Sor

Mini Project

WEB PROGRAMMING WITH PHP AND MYSQL Practical Listing

L T P C

0 0 4 2

Objective:

To develop applications in PHP using various concepts like arrays, udf's, Sessions and make the students to understand and to establish the connectivity between PHP and MySQL and develop programs to add records, retrieve records and delete records from a table.

Each exercise should be completed within two hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Create a simple webpage using PHP.

2. Design a form to create an email. Store the data in a database. Validate all the input fields. Database connectivity in PHP with MySQL.

3. Create a mysql database table tbllogin with fields user name and Password. Perform all database operations like select, insert, delete, update on the table tbllogin

4. Develop a **CRUD** application, which stands for **C**reate, **R**ead, **U**pdate, **D**elete.
   A quick example of a CRUD application would be a database of employees for a company. From the control panel, an admin would be about to add a new employee (`create`), view a list of employees (`read`), change an employee's salary (`update`) or remove a fired employee from the system (`delete`).
5. Create a table with two columns namely the name of the player and number of wickets. Create a Chart to display the data.

Major Elective 1

Mobile Computing

L T P C

4 0 0 4

OBJECTIVES:

- To highlight the features of Mobile Communication.
- To understand the concepts of Mobile Protocols
- To learn about package and deploying Applications.

Unit I

Basics of Communication Technologies: Components of a Wireless Communication System – Architecture of a Mobile Telecommunication System – Wireless Local Area Networks – Bluetooth Technology. **Introduction to Mobile Computing and Wireless Networking:** What is Mobile Computing ? Mobile Computing vs. Wireless Networking – Characteristics of Mobile Computing – Structure of Mobile Computing Application-Cellular Mobile Communication –Global System for Mobile Communications (GSM) – General Packet Radio Service (GPRS) – Universal Mobile Telecommunications System (UMTS). (12L)

Unit II

MAC Protocols: Properties required of MAC Protocols – Wireless MAC Protocols : Some Issues- A taxonomy of MAC Protocols –Fixed Assignment schemes – Random Assignment Schemes –Reservation based Schemes. **Mobile Internet Protocol:** Mobile IP – Packet Delivery – Overview of Mobile IP – Desirable features of Mobile IP- Key mechanism used in Mobile IP – Route Optimization – Dynamic Host Configuration Protocol. (12L)

Unit III

Mobile Transport Layer: Overview of TCP/IP – Terminologies of TCP/IP – Architecture of TCP/IP – An overview of the operation of TCP – Application Layer Protocols of TCP – TCP in Mobile Networks. **Mobile Databases** : Issues in Transaction Processing – Transaction Processing Environment –Data dissemination – Transaction Processing in Mobile Environment – Data Replication – Mobile Transaction Models – Rollback Process – Two-Phase Commit Protocol – Query Processing – Recovery. (12L)

Unit IV

Wireless Sensor Networks: WSN vs. MANET – Applications – Architecture of the Sensor Node – Challenges in the design of an effective WSN – Characteristics of Sensor Networks –WSN Routing Protocols –Target Coverage –Clustered Wireless Sensor Networks. **Operating Systems for Mobile Computing:** Special Constraints and requirements of Mobile O/S- A survey of Commercial Mobile Operating Systems – A Comparative study of Mobile OSs.

(12L)

Unit V

Mobile Application Development and Protocols: Mobile Devices as Web Clients – WAP – J2ME – Android Application Development. **Mobile Commerce:** Applications of M-Commerce – Business-to-Business(B2B) Applications –Structure of Mobile Commerce –Pros and Cons of M-Commerce – Mobile Payment Systems. (12L)

Text Book

Fundamentals of Mobile Computing –by Prasant Kumar Pattnaik, Rajib Mall,, PHI.

Reference Books

1. Wireless and Mobile Communication, T.G. Palanivelu & R. Nakkeeran,PHI Learning Private Limited,2009
2. Wireless and Cellular Telecommunications, Third Edition William C.Y. Lee, McGraw Hill
3. Mobile Computing Technology, Applications and Service Creation, Asoke K. Talukder & Roopa R. Yavagal,TMH Publication
4. Wireless Communications and Networking made simple, Prof. Satish Jain, Vineeta Pillai, BPB Publications

Major Elective - 2
Multimedia Applications

L	T	P	C
4	0	0	4

OBJECTIVES:

- To have general understanding about Multimedia.
- To make the students understand the elements of multimedia
- To learn multimedia and internet

Unit I

Introduction: Objectives – History of Multimedia – Its market – Content copyright – Resources for multimedia developers – Types of produces – Evaluation – Hardware Architecture – OS and Software – Multimedia Architecture – Software library – Drivers. (12L)

Unit II

Text and Graphics : Elements of Text – Text Data files – Using text in Multimedia Application – Hypertext – Elements of Graphics – Images and color – Graphics files and Application formats – Creating images for multimedia use –Using graphics in Application. (12L)

Unit III

Digital Audio and Video : Characteristics of sound and Digital audio – Digital Audio systems – MIDI – Audio file formats – Using Audio in Multimedia Applications – Audio for content – Background as video – Characteristics of digital video – digital video data sizing 0 Video capture and playback systems – computer animation.

(12L)

Unit IV

Product design and Authoring tools: Building blocks – classes of products – Content organizational strategies – story boarding – Multimedia tool selection – Tool feature – categories of Authoring tools – selecting the right authoring paradigm. (12L)

Unit V

Multimedia and Internet : Internet – HTML and web authoring – Multimedia considerations for Internet – Design considerations for web pages.

(12L)

Text Book :

Multimedia Technology and Applications – David Hillman-Galgotia Publications pvt. Ltd, 1998.

Reference Books :

1. Multimedia making it work by Tay Vaughan TMH, 1997
2. Computer Graphics Multimedia and Animation - Malay K. Pakhira PHI , New Delhi - Second edition
3. Principles of Multimedia - Ranjan Parekh - TMGH, New Delhi - Twelfth Reprint,
4. Computer Graphics and Multimedia - Anirban Mukhapathyay, Aruop Chattopadhyay - Vikas Publishing Ltd - Second Edition

Major Elective - 3

Cloud Computing

L	T	P	C
4	0	0	4

OBJECTIVES:

- Understand core concepts of cloud computing
- Learn the fundamental concepts about data centers to understand the tradeoffs in power, efficiency and cost.
- Understand use of cloud storage in storage systems.

UNIT I:

Introduction Cloud Computing Introduction, From, Collaboration to cloud, Working of Cloud Computing, Pros and Cons, Benefits, Developing Cloud Computing Services, Cloud Service Development, Discovering Cloud Services.

(12L)

UNIT II:

Cloud Computing For Everyone Centralizing Email Communications, Cloud Computing for Community, Collaborating on Schedules, Collaborating on Group Projects and Events, Cloud Computing for Corporation, Mapping Schedules Managing Projects, Presenting on Road.

(12L)

UNIT III:

Using Cloud Services Collaborating on Calendars, Schedules and Task Management, Exploring on Line Scheduling and Planning, Collaborating on Event Management, Collaborating on Contact Management, Collaborating on Project Management, Collaborating on Word Processing, Spreadsheets, and Databases.

(12L)

UNIT IV:

Outside The Cloud Evaluating Web Mail Services, Evaluating Instant Messaging, Evaluating Web Conference Tools, Creating Groups on Social Networks, Evaluating on Line Groupware, Collaborating via Blogs and Wikis.

(12L)

UNIT V:

Storing And Sharing Understanding Cloud Storage, Evaluating on Line File Storage, Exploring on Line Book Marking Services, Exploring on Line Photo Editing Applications, Exploring Photo Sharing Communities, Controlling it with Web Based Desktops.

(12L)

TEXT BOOK:

Cloud Computing, Michael Miller, Pearson Education, New Delhi, 2009.

REFERENCE BOOK:

1. Cloud Computing, V. K. Pachghare, PHI Learning Pvt Ltd, 2016
2. Cloud Computing, Anthony T.Velte, Toby J.Velte, Pobert Elsenpeter, TMH, 2010.
3. Cloud Computing Bible, Barrie Sosinsky, Wiley Publishing, Inc.

Operating Systems

L T P C

4 0 0 4

OBJECTIVES:

- To acquire the fundamental knowledge of the operating system architecture and components and to know the various operations performed by the operating system.
- Understand the basic working process of an operating system.
- Understand the importance of process and scheduling.
- Understand the issues in synchronization and memory management.

Unit I

Introduction: What Operating system do – Computer System Organization – Computer System Architecture – Operating System Structures- Operating System Operation. **System Structures:** Operating System Services – System Calls – System Programs – Operating System Design and Implementation- Operation System Generation- System Boot.

(12L)

Unit II

Process Concept: Process Concept- Process Scheduling –Operation on Processes- Inter Process Communication- Example of IPC System – Communication in Client – Server system. **Process Scheduling :** Basic concept-Scheduling criteria-Scheduling algorithm-Thread scheduling-Multiple Processor Scheduling-Real Time CPU Scheduling-Operating system example- Algorithm evaluation. (12L)

Unit III

Synchronization: Background - The Critical section problem-Peterson's solution - Semaphores – Classic problems of Synchronization. **DeadLocks:** System models-Deadlock Characterization-Methods for handling deadlock - Deadlock Prevention-Deadlock Avoidance-Deadlock detection - Recovery from deadlock.

(12L)

Unit IV

Memory Management: Background – Swapping - Contiguous Memory allocation – Segmentation – paging. **Virtual Memory Management :** Background - Demand paging - Copy and Write-page replacement-Allocation of Frames - Thrashing.

(12L)

Unit V

File System : File Concept-Access Method-Directory and Structure--File Sharing-Protection**. Implementing File System:** File System Structure - File System implementation-Directory implementation-Allocation Methods - Free Space Management**. Mass Storage Structure:** Overview of Mass Storage Structure-Disk Structure - Disk Scheduling - Disk Management.

(12L)

Text Book:

Operating System Concepts – Abraham Silberscartz, Peter Baer Galvin, and Greg Gange.

Addision Wesley Publishing Company – Ninth Edition.

Reference Books:

1. Operating System: Internal and Design Principles – Fifth Edition, William Stalling ,PHI Learning Private Limited.
2. Understanding Operating Systes: Ida M.Flynn ,Ann MclverMcHoes.

Computer Graphics and Visualization

L T P C

4 0 0 4

OBJECTIVES:

To develop skills and knowledge about computer graphics and Visualization and to understand 2D, 3D transformations.

Unit I

Overview of Graphics System: Video Display Devices – Input Devices - Hard Copy Devices – Graphics Software. **Output Primitives**: Points and Lines –Line drawing algorithms – DDA algorithm- Bresenham's line algorithm- Circle drawing algorithms: properties of circles – Midpointcircle algorithm – Filled Area primitives.

(12L)

Unit II

Attributes of Output Primitives: Line attributes – Curve attributes – Character attributes. **Two-Dimensional Geometric Transformation**: Basic Transformations – Matrix Representations and homogenous coordinates – Composite and other Transformations. (12L)

Unit III

Two-Dimensional Viewing: The viewing pipeline, Viewing co-ordinate reference frame – Window to view port co-ordinate transformation – Two-dimensional viewing function. **Clipping Operations**: Point clipping – Line clipping (only Cohen-Sutherland line clipping) – Polygon Clipping (only Sutherland-Hodgeman polygon clipping).

(12L)

Unit IV

Interactive Input Methods: Input of graphical data – Input functions – Three dimensional display methods. **Three Dimensional Geormetric and Modeling Transformations**: Translation - Rotation - Scaling

(12L)

Unit V

Three Dimensional Viewing: Viewing Pipeline, Projections. **Visible-surface deduction methods**: Back-face deduction – Depth buffer method- A-Buffer Method – Scanline Method.

(12L)

Text Book:

Computer Graphics C version, Second Edition, Donald Hearn, M.Pauline Baker, Pearson Publications.

Reference Books

1. Express Learning - Computer Graphics and Multimedia-ITL Education Solution Ltd.
2. Computer Graphics-A programming Approach 2/e-Steven Harrington-Mc Graw Hill Education Private Limited.

3. Computer Graphics, Multimedia and Animation - Malay K. Pakhira - PHI

Data Warehousing and Data Mining

L T P C

4 0 0 4

OBJECTIVES:

- to understand and implement classical models and algorithms in data warehousing and data mining
- to analyze the data, identify the problems, and choose the relevant models and algorithms to apply.
- to assess the strengths and weaknesses of various methods and algorithms and to analyze their behavior.

Unit I

DATA WAREHOUSING: Data warehousing Components –Building a Data warehouse –- Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata. (12L)

Unit II

BUSINESS ANALYSIS: Reporting and Query tools and Applications – Tool Categories – The Need for Applications – Cognos Impromptu – Online Analytical Processing (OLAP) – Need – Multidimensional Data Model – OLAP Guidelines – Multidimensional versus Multirelational OLAP – Categories of Tools – OLAP Tools and the Internet. . (12L)

Unit III

DATA MINING: Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns – Classification of Data Mining Systems – Data Mining Task Primitives – Integration of a Data Mining System with a Data Warehouse – Issues –Data Preprocessing

(12L)

Unit IV

ASSOCIATION RULE MINING AND CLASSIFICATION: Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining various Kinds of Association Rules – Correlation Analysis – Constraint Based Association Mining – Classification and Prediction - Basic Concepts - Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction. .

(12L)

Unit V

CLUSTERING AND TRENDS IN DATA MINING: Cluster Analysis - Types of Data – Categorization of Major Clustering Methods – K-means– Partitioning Methods – Hierarchical Methods - Density-Based Methods –Grid Based Methods – Model-Based Clustering Methods – Clustering High Dimensional Data - Constraint – Based Cluster Analysis – Outlier Analysis – Data Mining Applications. (12L)

Text Book:

1. Alex Berson and Stephen.J.Smith, “Data Warehousing, Data Mining and OLAP”, Tata McGraw Hill, Thirteen 2008
2. Jiawei Han, Micheline Kamber,” Data Mining Concepts and Techniques”, Third Edition Elsevir 2012

Reference Books

1. **Introduction to Data Mining**, *by* **Pang-Ning Tan**, **Michael Steinbach, and Vipin Kumar**, **Pearson Education 2007.**
2. Insight into Data Mining Theory and Practice – K.p. Soman, Shyam Diwakar, V.Ajay, Prentice Hall of India – 2008.
3. G.K. Gupta Introduction to Data Mining with Case studies, PHI Third Edition, 2015.

Computer Graphics and Multimedia Lab Listing

L T P C

0 0 4 2

Objective:

1. To acquire skills in programming computer graphics
2. To acquire skills in multimedia concepts

Each exercise should be completed within two hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Write a program to draw a line using DDA algorithm
2. Write a program to draw a circle using Bresenham's algorithm.
3. Write a program to draw a line using Bresenham's algorithm.
4. Write a program to scale an image.
5. Write a program to rotate an image.
6. Write a program to translate an image.
7. Write a program for bouncing a ball and moving with sound effect.
8. Write a program to display as many balls in the frame in random position.
9. Write a program to display an image as tiled and cascaded according to the user's option.
10. Write a program so that it should first display the image as the size of applet then it should be reduced and again it should reduced and so on and finally the image should disappear.

Oracle Lab Listing

L	T	P	C
0	0	4	2

Objective:

1. To acquire skills in SQL statements with various constructs
2. To acquire skills in PL/SQL Programming

Each exercise should be completed within two hours.
It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Create an employee database with tables department, employee details, address, pay details and project details. Alter the tables and add constraints relevant to the fields in the tables. Insert records into all the tables.
2. Create queries to retrieve relevant information from a table.
3. Create a table from the existing tables.
4. Develop queries to retrieve information from more than one table.
5. Develop summary queries to retrieve relevant information from the tables.
6. Write a PL/SQL program to print multiplication table
7. Write a PL/SQL program to check whether given string is palindrome or not
8. Write a PL/SQL program to find factorial of numbers using function and procedure.

Android Programming Lab Listing

L T P C

0 0 4 2

Objective:

1. To acquire skills in Android Studio
2. To acquire skills in mobile Programming

Each exercise should be completed within two hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Develop an application that uses GUI components, Font and Colors.
2. Develop an application that uses Layout Managers and event listeners.
3. Develop a native calculator application.
4. Write an application that draws basic graphical primitives on the screen.
5. Develop a Android Application that creates Alarm Clock

Major Elective - 4

INTERNET OF THINGS

L	T	P	C
4	0	0	4

OBJECTIVES:

- Learn how the Internet of Things (IOT) has the potential to alleviate some of the world's most significant problems
- To learn IOT technology and architecture.

UNIT I

M2M to IoT-The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, A use case example, Differing Characteristics. (12L)

UNIT II

M2M to IoT – A Market Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. **M2M to IoT-An Architectural Overview**– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.

(12L)

UNIT III

M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service (XaaS), M2M and IoT Analytics, Knowledge Management.

(12L)

UNIT IV

IoT Architecture-State of the Art – Introduction, State of the art, **Architecture Reference Model-** Introduction, Reference Model and architecture, IoT reference Model.

(12L)

UNIT V

IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. **Real-World Design Constraints-** Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remote control.

(12L)

TEXT BOOK

Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, **"From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence",** 1st Edition, Academic Press, 2014.

REFERENCE BOOKS

1. Vijay Madisetti and Arshdeep Bahga, **"Internet of Things (A Hands-on-Approach)",** 1stEdition, VPT, 2014.

2. Francis da Costa, **"Rethinking the Internet of Things: A Scalable Approach to Connecting Everything",** 1st Edition, Apress Publications, 2013.

Major Elective 5

BIG DATA ANALYTICS

L T P C

4 0 0 4

OBJECTIVES:

- Learn about Big Data.
- To explore novel statistical, algorithmic, and implementation challenges that emerge in processing, storing, and extracting knowledge from Big Data.

UNIT I

What Is Big Data and Why Is It Important? - A Flood of Mythic "Start-Up" Proportions - Big Data Is More Than Merely Big - Why Now? - A Convergence of Key Trends - Relatively Speaking - A Wider Variety of Data - The Expanding Universe of Unstructured Data.

Industry Examples of Big Data: Digital Marketing and the Non-line World - Don't Abdicate Relationships - Is IT Losing Control of Web Analytics? - Database Marketers, Pioneers of Big Data - Big Data and the New School of Marketing - Consumers Have Changed. So Must Marketers. - The Right Approach: Cross-Channel Lifecycle Marketing - Social and Affiliate Marketing - Empowering Marketing with Social Intelligence (12L)

UNIT II

Fraud and Big Data - Risk and Big Data - Credit Risk Management - Big Data and Algorithmic Trading - Crunching Through Complex Interrelated Data - Intraday Risk Analytics, a Constant Flow of Big Data - Calculating Risk in Marketing - Other Industries Benefit from Financial Services' Risk Experience - Big Data and Advances in Health Care - "Disruptive Analytics" - A Holistic Value Proposition - BI Is Not Data Science - Pioneering New Frontiers in Medicine - Advertising and Big Data: From Papyrus to Seeing Somebody - Big Data Feeds the Modern-Day Donald Draper - Reach, Resonance, and Reaction - The Need to Act Quickly (Real-Time When Possible) -Measurement Can Be Tricky - Content Delivery Matters Too - Optimization and Marketing Mixed Modeling - Beard's Take on the Three Big Data Vs in Advertising - Using Consumer Products as a Doorway. (12L)

UNIT III

Big Data Technology : The Elephant in the Room: Hadoop's Parallel World - Old vs. New Approaches - Data Discovery: Work the Way People's Minds Work - Open-Source Technology for Big Data Analytics - The Cloud and Big Data - Predictive Analytics Moves into the Limelight - Software as a Service BI - Mobile Business Intelligence is Going Mainstream - Ease of Mobile Application Deployment - Crowdsourcing Analytics - Inter- and Trans-Firewall Analytics - R&D Approach Helps Adopt New Technology - Adding Big Data Technology into the Mix - Big Data Technology Terms - Data Size 101.

(12L)

UNIT IV

Information Management : The Big Data Foundation - Big Data Computing Platforms (or Computing Platforms That Handle the Big Data Analytics Tsunami) - Big Data Computation - More on Big Data Storage - Big Data Computational Limitations - Big Data Emerging Technologies.

Business Analytics : The Last Mile in Data Analysis - Geospatial Intelligence Will Make Your Life Better - Listening: Is It Signal or Noise? - Consumption of Analytics - From Creation to Consumption - Visualizing: How to Make It Consumable? - Organizations Are Using Data Visualization as a Way to Take Immediate Action - Moving from Sampling to Using All the Data - Thinking Outside the Box - 360° Modeling - Need for Speed - Let's Get Scrappy - What Technology Is Available? - Moving from Beyond the Tools to Analytic Applications. (12L)

UNIT V

The People Part of the Equation : Rise of the Data Scientist - Learning over Knowing - Agility - Scale and Convergence - Multidisciplinary Talent - Innovation - Cost Effectiveness -Using Deep Math, Science, and Computer Science - The 90/10 Rule and Critical Thinking - Analytic Talent and Executive Buy-in - Developing Decision Sciences Talent - Holistic View of Analytics - Creating Talent for Decision Sciences - Creating a Culture That Nurtures Decision Sciences Talent - Setting Up the Right Organizational Structure for Institutionalizing Analytics.

Data Privacy and Ethics : The Privacy Landscape -The Great Data Grab Isn't New - Preferences, Personalization, and Relationships - Rights and Responsibility - Playing in a Global Sandbox - Conscientious and Conscious Responsibility - Privacy May Be the Wrong Focus - Can Data Be Anonymized? - Balancing for Counterintelligence – Now What? (12L)

TEXT BOOK

Michael Minelli, Michele Chamboss, Ambiga Dhiraj , "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for today's businesses" John Wiley , 2014.

REFERENCE BOOKS

1. Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data, EMC Education Services.

2. Bill Franks, Taming The Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics, Wiley, 2012.
3. Arvind Sathi, Big Data Analytics: Disruptive Technologies for Changing the Game, MC Press, 2012.

Major Elective 6

NEURAL NETWORKS

L T P C

4 0 0 4

OBJECTIVES:

- Basic neuron models: McCulloch-Pitts model and the generalized one, distance or similarity based neuron model, radial basis function model, etc.
- Basic neural network models: multilayer perceptron, distance or similarity based neural networks, associative memory and self-organizing feature map, radial basis function based multilayer perceptron, neural network decision trees, etc.
- Basic learning algorithms: the delta learning rule, the back propagation algorithm, self-organization learning
- Applications: pattern recognition, function approximation, information visualization, etc.

UNIT I

Introduction to Neural networks: Neural processing- Neural networks- an overview – the raise of neuro computing – introduction to artificial neural networks : introduction- artificial neural networks – historical development of neural networks – biological neural networks – comparison between the brain and the computer – artificial and biological neural networks – basic building blocks of artificial neural networks – artificial neural network terminologies.

(12L)

UNIT II

Fundamental models of artificial neural networks: McCulloch-Pits neuron Model-Learning rules. Perceptron networks: Introduction –single layer perceptron –brief introduction to multi layer perceptron networks. (12L)

UNIT III

Feedback networks: Introduction- discrete Hopfield net-continuous Hopfield net-relation between BAM and Hopfield nets. Feed forward networks: introduction-back propagation networks.

(12L)

UNIT IV

Kohonen self - organizing feature maps - counter propagation network: introduction-Full counter propagation network-Forward only propagation network. (12L)

UNIT V

Applications of Neural Networks: Applications of neural networks in Arts-Bioinformatics - Knowledge Extraction – Forecasting - Bankruptcy forecasting-Healthcare-Intrusion - Detection.

(12L)

TEXT BOOK

Introduction to Neural Networks using MATLAB 6.0., S N Sivanandam S Sumathi S N Deepa Tata McGraw Hill, 2006.

REFERENCE BOOKS

1.Artificial neural Networks B.Yegnanarayana, Prentice Hall India, 2005.

2.Neural Networks Alogorithms, Applications and programming Techniques, James A Freeman David M Skapura, Pearson Education.

3.Neural Networks for Pattern Recognition, Christopher M. Bishop, Indian Edition, OXFORD University Press.

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI-12, TAMILNADU

B.Sc .Electronics (2017-2018 onwards)

Sl.No	Category of Subjects	Contact Hrs/week	Credits
	SEMESTER I		
1.	Language-Tamil/Other	6	4
2.	Language-English	6	4
3.	Core-Basic Electronic Devices	5	4
4.	Major Practical I-Basic Electronic Devices Lab	4	2
5.	Allied I-Basic Electronics	3	3
6.	Allied Practical I-Basic Electronics Lab	4	2
7.	Common-Environmental studies	2	2
	Subtotal	**30**	**21**
	SEMESTER II		
8.	Language-Tamil/Other	6	4
9.	Language-English	6	4
10.	Core-Digital Electronics	5	4
11.	Major Practical II-Digital Electronics Lab	4	2
12.	Allied II-Introduction to Digital Electronics	3	3
13.	Allied Practical II-Digital Electronic Circuits Lab	4	2
14.	Common-Value Based Education	2	2
	Subtotal	**30**	**21**
	SEMESTER III		
15.	Core- Applied Electronics	4	4
16.	Core- Electronic Measurement and Circuit Theory	5	4
17.	Major Practical III-Circuits Lab	4	2
18.	Major Practical IV- Measurements Lab	4	2
19.	Allied III-Electronic Devices	3	3
20.	Allied Practical III-Electronic Devices Lab	4	2
21.	Skill Based Core-Consumer Electronic Appliances	4	4
22.	Non- Major Elective (Select any one) 1.Electronic Troubleshooting 2.Computer Hardware	2	2
23.	Common-Yoga	2	2
	Subtotal	**32**	**25**

SEMESTER IV			
24.	Core-Linear Integrated Circuits	4	4
25.	Core-Computer Networks	5	4
26.	Major Practical V-Linear Integrated Circuits Lab	4	2
27.	Major Practical VI- Electronic Circuits Lab	4	2
28.	Allied IV-Digital Circuits	3	3
29.	Allied Practical IV-Digital Circuits Lab	4	2
30.	Skill Based Core-Maintenance and Troubleshooting of Audio-Video Equipment	4	4
31.	Non- Major Elective 1.Radio and Television (Select any one) 2.Radar and Navigation	2	2
32.	Extension Activitiy –NCC,NSS,YRC,YWF,PE-	0	1
33.	Common-Computers for Digital Era	2	2
	Subtotal	**32**	**26**
SEMESTER V			
34.	Core-Microprocessor and Microcontroller	4	4
35.	Core-Medical Electronics	4	4
36.	Core-Mathematics for Electronics	4	4
37.	Core-Computer hardware and Maintenance	4	4
38.	Major Practical VII- Microprocessors and Microcontrollers Lab	4	2
39.	Major Elective 1.Television Engineering (Select any one) 2. Mobile Communication	4	4
40.	Skill Based Common- Personality Development/Effective Communication/Youth Leadership	2	2
41.	Mini Project	4	6
	Subtotal	**30**	**30**
SEMESTER VI			
42.	Core-Power Electronics	4	4
43.	Core-Semiconductor Fabrication Technology	4	4
44.	Core-Robotics and Automation	4	4
45.	Core- Communication Systems	4	4
46.	Major Practical IX-Power Electronics and System Design Lab	4	2
47.	Major Elective 1.PCB Design (Select any one) 2.Embedded System and RTOS	4	4
48.	Major Project	6	7
	Subtotal	**30**	**29**
	Total		**152**

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI
B.Sc ELECTRONICS (CBCS)

(2017-2018 onwards)

I SEMESTER

I Semester-Core subject: 1

BASIC ELECTRONIC DEVICES

LTPC
3 2 0 4

Preamble: To equip the students with basic components in electronics and to understand the principles of operation of fundamental electronic devices. Prerequisite needed is background of the basic science at school level.Students on completion of this course will have good knowledge about the basic devices, its operation, Characteristics in detail.

UNIT I

PASSIVE DEVICES

Types of resistor – color code –Construction of various types of resistors (carbon composition.carbon film, wire-wound etc.) – power ratings- Capacitors (ceramic, mica polystrene, electrolytic etc.) – fixed and variable capacitors – Inductors, types.

(12L)

UNIT II

ATOMIC STRUCTURE

Atomic structure Bohr atom model – energy levels -energy bands –important energy band in solids- classification of solids and energy bands – forbidden Energy gap – intrinsic and extrinsic semiconductors P type and N type semiconductors– majority and minority carriers

(13L)

UNIT III

PN JUNCTION

PN junction- Biasing a PN junction – forward and reverse biasing – PN junction diode: Characteristics -static and dynamic resistance - Diode Rectifiers, clippers and clampers - Zener diode –Characteristics-voltage regulation using zener diode.

(12L)

UNIT IV

TRANSISTORS

Bipolar transistor– Common Base, Common Emitter & Common Collector configurations and their characteristics – load line – operating point – cut off and saturation regions – transistor biasing methods -Transistor as switch,Amplifier– UJT – SCR.

(11L)

UNIT V

F.E.T

FET Constructional features-working Principle, features and characteristics – JFET and MOSFET and their characteristics – enhancement and depletion type – LED, LDR and photodiode.

(12L)

(Total: 60L)

TEXT BOOK:

1. V.K.Mehta, "Principles of Electronics", S.Chand & Co
2. B.L.Theraja, "Basic solid state Electronics", S.Chand & Co

I Semester-Core Practical

BASIC ELECTRONIC DEVICES LAB

LTPC
0 0 4 2

1. Characteristics of PN Junction diode
2. Characteristics of Zener diode
3. Transistor Characteristics – Common base
4. Transistor Characteristics – Common emitter
5. Transistor Characteristics – Common collector
6. Measurement of stability factor of self biasing method
7. Measurement of stability factor of fixed biasing method
8. FET Characteristics
9. Photoconductivity of LDR
10. Characteristics of Photo diode
11. Characteristics of SCR
12. Characteristics of Photo transistor.

I Semester-Allied Theory

Allied Electronics for other major students

BASIC ELECTRONICS

LTPC
3 0 0 3

Preamble: To acquire the knowledge about passive components and various electronic devices and their characteristics.prerequisite for this course is basic science.On completion students will have thorough knowledge of basic semiconductor devices.

UNIT I

SEMICONDUCTOR BASICS

Introduction to semiconductor materials, intrinsic & extrinsic semiconductors. P type semiconductor, N type semiconductor p-n junction diode

(9L)

UNIT II

DIODE CIRCUITS

Clipper circuits, clamping circuits. Half wave rectifier, Center tapped and bridge full wave rectifiers, DC power supply: Block diagram of a power supply, Zener diode as voltage regulator.

(9L)

UNIT III

THE BJT

Basic transistor action, Transistor configurations: Common Base (CB), Common Emitter (CE) and Common Collector (CC) configuration, UJT: construction, working.

(9L)

UNIT IV

FEEDBACK AMPLIFIERS

Concept of feedback, negative and positive feedback, Positive feedback: Barkhausen criteria for oscillations, Study of Hartley, Colpitts oscillator and Crystal oscillator.

(9L)

UNIT V

JUNCTION FIELD EFFECT TRANSISTOR (JFET)

Construction of JFET, Metal Oxide Field Effect Transistor (MOSFET): Basic Construction of MOSFET and working, enhancement and depletion modes.

(9L)
(Total: 45L)

TEXT BOOK:

Basic and Applied Electronics-T.K Bandyopadhyay, Books and Allied Pvt Ltd (2002)

BOOKS FOR REFERENCE:

1. V.K.Mehta, "Principles of Electronics", S.Chand & Co
2. B.L.Theraja, "Basic solid state Electronics", S.Chand &Co
3. R. L. Boylestad, L. Nashelsky, Electronic Devices and Circuit Theory, Pearson Education (2006).
4. N Bhargava, D C Kulshreshtha and S C Gupta, Basic Electronics and linear Circuits, Tata McGraw-Hill (2007)
5. J. Millman and C. Halkias, Integrated Electronics, Tata McGraw Hill (2001).
6. David A. Bell, Electronic Devices & Circuits, Oxford University Press, Fifth Edition
7. Mottershed, Electronic Devices, PHI Publication, 1st Edition.

I semester Allied Practical

Allied Practical for other major students

BASIC ELECTRONICS LAB

LTPC
0 0 4 2

1. Characteristics of PN diode
2. Characteristics of Zener diode
3. Transistor Characteristics – Common base
4. Transistor Characteristics – Common emitter
5. Transistor Characteristics – Common collector
6. Measurement of stability factor of self biasing method
7. Measurement of stability factor of fixed biasing method
8. FET Characteristics
9. Photoconductivity of LDR
10. Characteristics of Photo diode
11. Characteristics of SCR
12. Characteristics of Photo transistor

II SEMESTER

II Semester-Core subject: 1

DIGITAL ELECTRONICS

LTPC
3 2 0 4

Preamble: The design of the subject is to impart the knowledge about code conversion, Boolean algebra, logic gates, combinational and sequential logic, and converters. Prerequisite for this course is Basic arithematic.Upon Completion of the course, the student will be able to Convert one Number system to another number system, Construct truth tables for logic gates, Simplify Boolean expression.

UNIT I

NUMBER SYSTEM AND CODES:

Decimal, Binary, Octal and Hexadecimal number systems, base conversions. Representation of signed and unsigned numbers, BCD code. Binary, octal and hexadecimal.

(12L)

UNIT II

DIGITAL LOGIC FAMILIES:

Fan-in, Fan out, Noise Margin, Power Dissipation, Figure of merit, Speed power product, comparison of TTL and CMOS families.

Truth Tables of OR, AND, NOT, NOR, NAND, EXOR, Universal Gates, Basic postulates and fundamental theorems of Boolean algebra. Demorgan's Theorem. Karnaugh Maps: Two variable K-Map

(12L)

UNIT III

ARITHMETIC CIRCUITS:

Binary Addition. Half and Full Adder. Half and Full Subtractor, Binary Adder/Subtractor. Multiplexers, De-multiplexers, Decoders, Encoders. Parity checker – parity generators – code converters - Magnitude Comparator.

(12L)

UNIT IV

LATCHES:

Latches, Flip-flops - SR, JK and Master-Slave -Edge triggering – Level Triggering Asynchronous Ripple or serial counter – Asynchronous Up/Down counter - Synchronous counters – Synchronous Up/Down counters – Programmable counters – Modulo–n counter, Registers – shift registers - Universal shift registers – Shift register counters – Ring counters.

(12L)

UNIT V

MEMORY DEVICES

Classification of memories – ROM - PROM – EPROM – EEPROM – EAPROM, RAM– Static RAM Cell- Programmable Logic Devices – Programmable Logic Array (PLA) - Programmable Array Logic (PAL) – Field Programmable Gate Arrays (FPGA) .

(12L)

(Total: 60L)

BOOKS FOR STUDY:

1. Digital Principles & Applications – Albert Paul Malvino & Leach
2. Digital Fundamentals – Thomas L. Floyd – Prentice Hall
3. Digital Electronics-an introduction to Theory and Practice - William H.Gothmann Prentice Hall
4. Digital Practice using Integrated Circuits – R. P. Jain and Anand
5. Fundamentals of Digital Circuits, Anand Kumar, 2nd Edn, 2009, PHI Learning Pvt. Ltd.
6. Digital Circuits and systems, Venugopal, 2011, Tata McGraw Hill.
7. Digital Systems: Principles & Applications, R.J.Tocci, N.S.Widmer, 2001, PHI Learning.
8. Digital Principles, R. L. Tokheim, Schaum's Outline Series, Tata McGraw- Hill (1994)

II Semester-Core Practical

DIGITAL ELECTRONICS LAB

LTPC
0 0 4 2

1. Study of AND, OR, NOT, NAND, NOR and XOR gates using IC
2. Designing of all the logic gates using NAND gate IC
3. Designing of all the logic gates using NOR gate IC
4. Verification of Demorgan's theorems
5. Construction of gates using discrete components
6. Code conversion
7. Half adder and Full adder
8. Half subtractor and Full subtractor
9. Multiplexer and De-Multiplexer
10. Encoder and Decoder
11. Study of Flip flops
12. Shift register
13. Ripple counter

II Semester-Allied Theory 2

Allied Electronics for other major students

INTRODUCTION TO DIGITAL ELECTRONICS

LTPC
3 0 0 3

Preamble: The objective of the paper is to facilitate the student with the knowledge of Digital Logic Systems and Circuits, thereby enabling the student to obtain the platform for studying Digital Systems and Computer Architecture. Prerequisite is knowledge of basic mathematics.

Upon completion of the course student is expected to develop an understanding of simple digital systems and develop the logic behind the organization of various computer components.

UNIT I

NUMBER SYSTEM AND CODES:

Decimal, Binary, Octal and Hexadecimal number systems, base conversions. BCD code. Binary, octal and hexadecimal arithmetic.

(9L)

UNIT II

DIGITAL LOGIC FAMILIES,

Truth Tables of OR, AND, NOT, NOR, NAND, EXOR, gates, Universal Gates, Basic postulates and fundamental theorems of Boolean algebra. Demorgan's Theorem.

(9L)

UNIT III

ARITHMETIC CIRCUITS:

Binary Addition. Half and Full Adder. Multiplexers, De-multiplexers, Decoders, Encoders, code converters

(9L)

UNIT IV

FLIP FLOPS

S-R Flip flop, J-K Flip flop, Counters (synchronous and asynchronous, ring and modulo- n counter Registers – shift registers.

(9L)

UNIT V

MEMORY DEVICES

Classification of memories – ROM PROM – EPROM – EEPROM – EAPROM, RAM – Static RAM Cell- Bipolar RAM cell – MOSFET RAM cell – Dynamic RAM cell Programmable Logic Devices – Programmable Logic Array (PLA) - Programmable Array Logic (PAL) – Field Programmable Gate Arrays (FPGA)

(9L)

(Total: 45L)

BOOKS FOR STUDY:

1. Digital Principles & Applications – Albert Paul Malvino & Leach
2. Digital Fundamentals – Thomas L. Floyd – Prentice Hall
3. Digital Electronics-an introduction to Theory and Practice - William H.Gothmann Prentice Hall
4. Digital Practice using Integrated Circuits – R. P. Jain and Anand
5. Fundamentals of Digital Circuits, Anand Kumar, 2nd Edn, 2009, PHI Learning Pvt. Ltd.
6. Digital Circuits and systems, Venugopal, 2011, Tata McGraw Hill.
7. Digital Systems: Principles & Applications, R.J.Tocci, N.S.Widmer, 2001, PHI Learning.
8. Digital Principles, R. L. Tokheim, Schaum's Outline Series, Tata McGraw- Hill (1994)

II semester Allied Practical

Allied Practical for other major students

DIGITAL ELECTRONIC CIRCUITS LAB

LTPC
0 0 4 2

1. Study of AND, OR, NOT, NAND, NOR and XOR gates using IC
2. Designing of all the logic gates using NAND gate IC
3. Designing of all the logic gates using NOR gate IC
4. Verification of Demorgan's theorems
5. Construction of gates using discrete components
6. Code conversion
7. Half adder and Full adder
8. Half subtractor and Full subtractor
9. Multiplexer and De-Multiplexer
10. Encoder and Decoder
11. Study of Flip flops
12. Shift register
13. Ripple counter

SEMESTER III

III Semester-Core subject: 1

APPLIED ELECTRONICS

LTPC
4 0 0 4

Preamble: The objective of this paper is to study the classification and operation of rectifiers and filter circuits amplifiers, oscillators, this paper enables the students to become an electronic technician and circuit designer. Prerequisites of this paper is Background knowledge of basic electronics.Upon completion of the subject, the student should be able to design and troubleshoot amplifiers, oscillators, power supply and filters.

UNIT I

RECTIFIERS

Rectifiers- half wave rectifier, full wave rectifier, bridge rectifier, Inductor- Capacitor-L type filters-ripple factor-Voltage regulator(series type)-current limit over load production-introduction to IC fixed and variable IC 723,78XX,79XX-voltage regulators.

Transformers-Working principle of transformers-Transformer construction-Core type transformer.

(12L)

UNIT II

AMPLIFIERS

Amplifiers-general principle of operation-classification of amplifiers-classification of distortion (amplitudes, frequency, phase)-RC coupled amplifier-gain-frequency response-input and output impedance -multistage amplifiers-transformer couple amplifiers-frequency response.

(12L)

UNIT III

POWER AMPLIFIERS

Introduction-classification power amplifier-class A power amplifier-class A push pull amplifier- class B power amplifier- class B push pull amplifier- class C power amplifier-class C push pull amplifier-power dissipation output power-distortion.

(12L)

UNIT IV

FEEDBACK AMPLIFIERS

Feed back-basic concepts-characteristics-effect of negative feed back- on gain-stability- distortion-band width- analysis of voltage and current feed back amplifier circuits.

(12L)

UNIT V

OSCILLATORS

Classification of oscillators-use of positive feed back – barkhausen criterion for oscillation- colpitts oscillator-Hartley oscillator-wein bridge oscillator- phase shift oscillator-crystal oscillator-frequency stability of oscillators-multivibrators.

(12L)

(Total: 60L)

BOOKS FOR STUDY:

1. Electronic devices and circuits-Millman & Halkias.
2. Electronic devices and applications and Integrated circuits-Mathu.
3. Basic Electronics-B.L.Theraja.
4. Electronic devices and circuits- G.K.Mithal,Khanna publishers.
5. Electronic devices and circuits – Allen mottershead.
6. Problems and solutions of electronic devices and circuits-Experience teachers (CBS publication, New Delhi).
7. Electrical Technology-B.L Theraja A.K Theraja
8. Basic electrical Engg -P.S Dhogal TMH

III Semester-Core subject: 2

ELECTRONIC MEASUREMENTS AND CIRCUIT THEORY

LTPC
4 1 0 4

Preamble: The objective of this paper is to introduce the basic concepts related to the operation of Electrical and Electronic Measuring Instruments.To understand basic electronic instrument terminology and to understand the proper application of electronic instruments.
To apply circuit theorems to simplify and to find solutions to electrical circuits. To Build up strong problem solving skills by effectively formulate a circuit problem into a mathematical problem using circuit laws and theorems. Prerequisites of this paper is Background knowledge of basic electricity and science.Upon completion of the subject, the student should be able to understand various instruments and their working,and will have basic problem solving skills through organizing available information and applying circuit laws.

UNIT I

MEASUREMENTS

Measurements, errors in measurements- measurement standard, Classification and characteristics of Transducers, AC/DC Bridge measurements and their applications.

(12L)

UNIT II

MEASURING INSTRUMENTS

PMMC – DC ammeter – DC voltmeter - Voltmeter sensitivity - Ohm meter – VOM or Multimeter – Calibration Digital Voltmeters and Multimeters, AC Voltmeter-Vector Voltmeter- CRO-Block Diagram – single beam – dual trace – Sampling Oscilloscope.

(12L)

UNIT III

DC CIRCUITS

Ohms Law-power Energy-resistors in series, parallel- Kirchoff's Laws and their applications – Branch and loop currents- mesh and node analysis- Simple Problems.

(12L)

UNIT IV

AC CIRCUITS

Fundamental ideas of AC circuits - impedance of RL, RC, RLC circuits-Resonance in AC circuits- series and parallel,-Simple Problems.

(12L)

UNIT V

NETWORKS

Network graph of a network- concept of tree- branches and chords dual networks- Network theorems: Superposition, Thevenin, Norton, Maximum Power transfer Theorem Simple Problems.

(12L)
(Total: 60L)

BOOKS FOR STUDY:

1. C.S.Rangan "Instrumentation Devices and Systems" Tata McGraw Hill, 1998.
2. Copper "Electronic Instrumentation and Measurement Techniques" PHI
3. A.J. Bouwels "Digital Instrumentation", McGraw Hill, 1986
4. C.Barney "Intelligent Instrumentation" Prentice Hall of India, 1985
5. Oliver and Cage "Electronic Measurements and Instrumentation" McGraw HILL, 1975
6. Deobelin "Measurements Systems" McGraw HILL, 1990
7. Electronic circuits – Edminister (Schaum outline series – TMH)
8. Circuits and networks, Analysis and synthesis – A.Sudakar & S.P. Shyammohan (TMH).
9. Networks, analysis and synthesis – Umesh sinha.
10. Electronic circuits Theory – Dr.M.Arumugam & Dr.N.Prem Kumaran (Khanna Publishers)

III Semester-Core Practical

CIRCUITS LAB

LTPC
0 0 4 2

1. To familiarize with basic electronic components (R, C, L, diodes, transistors), Digital Multimeter, Function Generator and Oscilloscope.
2. Resistors and capacitors in series and parallel
3. Verification of Ohm's Law
4. Measurement of Amplitude, Frequency & Phase difference using Oscilloscope.
5. Verification of Kirchoff's laws.
6. Verification of Thevenin's theorem
7. Verification of Norton's theorem.
8. Verification of Superposition Theorem.
9. Verification of Reciprocity Theorem.
10. Verification of Millmans theorem.
11. Verification of Maximum Power Transfer Theorem.
12. Transient Response
13. Series resonance.
14. Parallel Resonance.

III Semester-Core Practical

MEASUREMENTS LAB

LTPC
0 0 4 2

1. Wheatstone bridge
2. Kelvin double bridge
3. Maxwell bridge
4. Hay bridge
5. Schering bridge
6. LVDT
7. Displacement meter using strain gauge
8. Transducer Applications and Measurement
9. Extension of range of PMMC meter
10. Current Measurement using sensors
11. Measurement of displacement, rotary displacement using magnetic pickup.
12. Measurement of load using strain gauge based load cell.
13. Measurement of flow rate by anemometer
14. Measurement of temperature by RTD.
15. Measurement of temperature by thermocouple

III Semester-Allied Theory 1

Allied Electronics for other major students

ELECTRONIC DEVICES

LTPC
3 0 0 3

Preamble: To acquire the knowledge about passive components and various electronic devices and their characteristics.prerequisite for this course is basic science.On completion students will have thorough knowledge of basic semiconductor devices.

UNIT I

BASIC COMPONENTS

Basic components used in Electronics -Resistor, capacitor, inductor and their different types - Diodes - Light Emitting diode (LED), Photo diode - Zener diode, LDR

(9L)

UNIT II

POWER SUPPLIES

Need of a power supply - Types of power supplies - Different types of unregulated and regulated power supplies - IC Regulated power supply - switched mode power supply.

(9L)

UNIT III

AMPLIFIERS-

Transistor amplifier circuit - Types of Amplifiers - Single stage transistor amplifier - Feedback in amplifiers - Advantages of Negative feed back amplifiers.

(9L)

UNIT IV

OSCILLATORS

Oscillators Application, Classification, Sinusoidal Oscillator- Barhausen criteria - Hartley and colpitt's oscillators - Crystal oscillators

(9L)

UNIT V

ELECTRICAL ELEMENTS

Electrical elements -Potential difference- Electric current-Electromotive force-Ohms law- Kirchoff's law- Kirchoff's current law- resistance in series circuits, parallel circuits and Concept of voltage source and current source

(9L)

(Total: 45L)

TEXT BOOK:

1. Principles of Electronics - V.K. Mehta - S.Chand Publication, New Delhi
2. Basic and Applied Electronics-T.K Bandyopadhyay, Books and Allied Pvt Ltd (2002)
3. Electronic devices and circuits - G.J.Mithal, Khana publishers, New Delhi
4. Basic Electronics - B.L. Theraja - S.Chand publication, New Delhi

BOOK FOR REFERENCE:

1. Electronic devices and circuits - B.Sasikala, S.Poornachandra Scitech publication India Pvt. Ltd., Chennai.
2. Electronic devices and Application and integrated circuits - Mathur kulashethra & Chandra Umesh publication, New Delhi.
3. Hand book of Electronics - Gupta & Kumar, Pragathi prakashan, Delhi.

III Semester-Allied Practical

Allied Practical for other major students

ELECTRONIC DEVICES LAB

LTPC
0 0 4 2

1. Characteristics of PN diode
2. Characteristics of Zener diode
3. Transistor Characteristics – Common base
4. Transistor Characteristics – Common emitter
5. Transistor Characteristics – Common collector
6. Measurement of stability factor of self biasing method
7. Measurement of stability factor of fixed biasing method
8. FET Characteristics
9. Photoconductivity of LDR
10. Characteristics of Photo diode
11. Characteristics of SCR
12. Characteristics of Photo transistor

III Semester-Skill based

CONSUMER ELECTRONIC APPLIANCES

LTPC
4 0 0 4

Preamble: To equip the students with basic knowledge in various electronic devices used in everyday life and to understand the principles of operation of the electronic household or office devices, its care and Maintenance. Prerequisite needed is background of the basic science and electricity at school level.Students on completion of this course will have good knowledge about the basic everyday household electronic devices, its operation, Characteristics in detail.

UNIT I

MICROWAVE OVENS

Microwaves - Properties and generation Magnetrons,Waveguides- Microwave oven block diagram - LCD timer with alarm – Single chip controllers – Types of Microwave Ovens-Microwave cooking-Features and parts of Microwave oven-Wiring and Safety instructions – Microwave cookware-Operating problem and solutions- Care and Cleaning.

(12L)

UNIT II

WASHING MACHINES

Electronic controller for washing machines - Washing machine hardware –Washing cycle-Hardware and software development - Types of washing machines - Fuzzy logic washing machines - Features of washing machines.

(10L)

UNIT III

AIR CONDITIONERS AND REFRIGERATORS

Air Conditioning - Components of air conditioning systems - All water air conditioning systems - All air conditioning systems –Remote control buttons-Combination systems-Unitary and central air conditioning systems - Split air conditioners-Refrigeration-Refrigerants-Refrigeration systems-Domestic Refrigerators.

(12L)

UNIT IV

HOME / OFFICE DIGITAL DEVICES

Facsimile machine –Basic fax machine operations-Group 3 fax machines- Xerographic copier,Process-Extension to dynamic copier - Calculators - Structure of a calculator - Internal Organization of a calculators - Servicing electronic calculators - Digital clocks - Block diagram of a digital clock.LSI digital clock.

(12L)

UNIT V

DIGITAL ACCESS SERVICES

Data services-Advantages od digital-Digital exchanges-The BORSCHT functions-Local distribution networks-Data services-Message switching-Message switching and circuit switching-Packet switching- Packet and message switching-Packet format-LAN,MAN and WAN-ISDN-The Internet- Online ticket reservation - Functions and networks – Barcode- Barcode Scanner and decoder - Electronic Fund Transfer - Automated Teller Machines (ATMs) - Set-Top boxes - Digital cable TV - Video on demand.

(14L)

(Total: 60L)

TEXT BOOK:

1. Consumer Electronic - S.P. Bali, Pearson Education, New Delhi, 2005.

III Semester-: Non Major Elective
Non Major Elective for other major students
(Select any one course 1 or 2)

1. ELECTRONIC TROUBLESHOOTING

LTPC
2 0 0 2

Preamble: To equip the students with basic knowledge in troubleshooting various electronic devices used in measurement and industry and to understand the principles of testing these devices, its care and Maintenance. Prerequisite needed is background of the basic science and knowledge of measuring devices. Students on completion of this course will have good knowledge about the maintenance of electronic measurement devices, its operation, testing and troubleshooting in detail.

UNIT I

RELIABILITY OF ELECTRONIC EQUIPMENT

Failures-Causes of Failures-Maintenance-Advantages of proper Maintenance, Maintenance policy-Preventive Maintenance, Corrective Maintenance-Basic Procedure of Service and Maintenance

(6L)

UNIT II

PREPARATIONS AND PRECAUTIONS BEFORE TROUBLE SHOOTING

Troubleshooting Procedure-Fault Location-Fault Repair-Repair Verification-Perform Root cause Analysis-Fault Finding Aids-Service Manual-Test and Measurement Equipment-Multimeters-C.R.O, Function Generators.

(6L)

UNIT III

TROUBLESHOOTING TECHNIQUES

Functional Area Approach-Split Half Technique-Input to Output Technique-Output to input Technique-Divergent Paths Technique-Convergent paths Technique-Feedback Paths Technique-Switching Paths Technique, Measurement Techniques

(6L)

UNIT IV

TESTING OF PASSIVE COMPONENTS

Resistors, Preset, L.D.R, Capacitors, Inductors, Transformers, Passive component testing using C.R.O-Testing Semiconductor Devices-Diode, Zener diode, L.E.D, Transistor, Mosfet, Thyristors, Testing of Active components using C.R.O.

(6L)

UNIT V

TROUBLE SHOOTING DIGITAL SYSTEMS

Summary of Gates, Digital Logic Families-I.C packages, Digital Test Instruments-Logic Probe-Logic Pulser-Logic Clip-DigitalI.C Tester, Faults in Digital circuits, Precautions during Digital Troubleshooting-Troubleshooting-Power supply, SMPS, Oscilloscope.

(6L)

(Total: 30L)

TEXT BOOK

Maintenance of Electronic Equipments-K.Sudeep Singh - Kataria and Sons

2. COMPUTER HARDWARE

LTPC
2 0 0 2

Preamble: To equip the students with basic knowledge of Architecture and Design of a Personal Computer and Related Peripherals used in everyday life and to enable the student to get a detailed knowledge of all the hardware components of a personal computer and different interfaces and to understand different storage media.. Prerequisite needed is background of the basic science and computers.Students on completion of this course will understand the components on the motherboard**,** can address issues related to CPU and Memory.They will have good knowledge on Data storage devices and issues related to it.

UNIT I

CPU

CPU essentials – processor modes – modern CPU concepts – Architectural performance features – the Intel's CPU

(6L)

UNIT II

MEMORY CONCEPT

Essential memory concepts – memory organizations – memory packages –modules – logical memory organizations – memory considerations – memory types – memory techniques – selecting and installing memory.

(6L)

UNIT III

MOTHERBOARD

Active motherboards – sockets and slots – Intel D850GB – Pentium4 mother board – expansion slots – form factor – upgrading a mother board – chipsets –north bridge – south bridge

(6L)

UNIT IV

POWER SUPPLY

Power supplies and power management – concepts of switching regulation – potential Power problems – power management. The floppy drive – magnetic storage – magnetic recording principles – data and disk organization – floppy drive – hard drive – data organization and hard drive – sector layout

(6L)

UNIT V

DRIVES

IDE drive standard and features – Hard drive electronics – CDROM drive – construction – CDROM electronics – DVD-ROM – DVD media – DVD drive and decoder.

(6L)

(Total: 30L)

TEXT BOOK:

1. Stephen J.Bigelow, "Trouble Shooting, maintaining and Repairing PCs", Tata McGraw-Hill, New Delhi, 2001.

BOOK FOR REFERENCE:

1. Craig Zacker & John Rourke, "The complete reference: PC hardware", Tata McGraw-Hill, New Delhi, 2001.
2. Mike Meyers, "Introduction to PC Hardware and Trouble shooting", Tata McGraw-Hill, New Delhi, 2003.
3. B.Govindarajulu, "IBM PC and Clones hardware trouble shooting and Maintenance", Tata McGraw-Hill, New Delhi, 2002.

SEMESTER IV

IV Semester-Core subject: 1

LINEAR INTEGRATED CIRCUITS

LTPC
4 0 0 4

Preamble: To equip the students with detailed knowledge of Analog IC's like OPAMP 741, IC 555 etc and to learn the basics of differential Amplifiers, Characteristics of OPAMP, filters, wave form generators, comparators, multivibrators and various OP AMP applications. Prerequisites needed are the background of the basic electronics. By the end of the programme, students should have a thorough knowledge about all the electrical and electronic characteristic of analog integrated circuit devices present.

UNIT I

DIFFERENTIAL AMPLIFIERS

Differential amplifiers-dual input-balance output differential amplifier- current mirror- level translator- block diagram representation of typical op amp- interpreting a typical set of data sheets- the ideal opamp- equivalent circuit of an op amp- ideal voltage transfer curve.

(12L)

UNIT II

OP AMP CHARACTERISTICS

Input off set voltage – input bias current- input offset current- total output offset voltage-input and output resistance-thermal drift-CMRR-voltage shunt and voltage series feed back amplifiers.

(10L)

UNIT III

FREQUENCY RESPONSE

Frequency response of initially compensated op amp- circuit stability-slew rate. Filters low pass filters- high pass filters- band pass filters-band reject filters-all pass filters.

(12L)

UNIT IV

OP AMP APPLICATIONS

Adder-subtractor-Integrator-differentiator – V to I and I to V converter. Oscillator Principles-types-frequency stability phase shift oscillator-wein bridge oscillator- square wave generator –triangular wave generator.

(14L)

UNIT V

COMPARATOR

Comparator-Schmitt trigger-clipper and clamper-peak detector-zero crossing detectors- IC-555 function block diagram-mono stable operation –astable operation –applications

(12L)

(Total: 60L)

BOOKS FOR STUDY:

1. Linear Integrated Circuits- D.Roychoudry & Shail Jain (New age publications 1999).
2. Operational amplifiers and linear integrated circuits-F.Couglin & Drison (4th edition prentice hall of India, 1992).
3. Operational amplifiers and linear integrated circuits- Denton J.Dailey, McGraw Hill 1989.
4. Operational amplifiers and linear integrated circuits-Ramakant A.Gayakwad 3rd edition PHI.
5. Second Edn. Operational amplifiers and Linear Ics-David A. Bell.

IV Semester-Core subject: 2

COMPUTER NETWORKS

LTPC
3 2 0 4

Preamble: To understand the concept of data communication and networking models and to study the functions of OSI layered architecture and its protocols. To recognize the real time multimedia application in wired and wireless networks Prerequisite is knowledge of computers and electronics on completion of course students will be able to demonstrate the layered protocols and their functions of wired and wireless networks.They identify the networking devices and supporting software in computer networks. Create a network scenario and analyse its performance using network simulator. Choose security component for five layers of networks and identify the important application layer protocols.

UNIT I

DATA COMMUNICATION CONCEPTS:

Transmission media – Data encoding – Interface and Modems – Multiplexing – Error detection and correction – Digital subscriber line – Circuit switching – Packet switching – Message switching

(12L)

UNIT II

WIDE AREA NETWORKS:

ISO – OSI layered architecture – Function of the layers – Data link protocols – HDLC, LAPB, LAPD, Inter networking devices – Repeaters, Bridges, Routers, Routing algorithms – Distance vector routing, link state routing, X.25protocol,congestioncontrol.

(12L)

UNIT III

FRAME RELAY AND ATM NETWORKS:

Frame relay operation – layers and traffic control; ATM networks – Architecture switching, layers service classes.

(12L)

UNIT IV

LOCAL AREA NETWORK:

LAN topology – Ethernet – Token bus – Token ring – FDDI – Wireless LAN, ATM LAN – IEEE 802 Medium access control layer standard –Random access protocols – ALOHA – SlottedALOHA.

(12L)

UNIT V

OSI LAYERS:

Transport layer issues – Session layer – Synchronization – Presentation layer – Encryption, decryption, Application layer – Message handling system, file transfer, virtual terminal – E-mail.

(12L)

(Total: 60L)

TEXT BOOK

1. William Stallings, "Data and Computer Communication", sixth edition, Pearson Education Asia, 2000.

REFERENCES

1. Behrouz A, Forouzan, "Data Communication and Networking", second edition, Tata McGraw-Hill, 2000.
2. Fred Halsall, "Data Communication, Computer networks and Open Systems", Fourth edition, Addison Wesley, 1995.
3. Andrew S.Tanenbaum, "Computer networks", Third edition, PHI, 1996,

IV Semester-Core Practical

LINEAR INTEGRATED CIRCUITS LAB

LTPC
0 0 4 2

1. Inverting and Non Inverting Amplifier.
2. Integrator and Differentiator.
3. Instrumentation Amplifier.
4. High pass, Low pass filters.
5. Band pass filter.
6. Astable multivibrator using OP-AMP.
7. Monostable multivibrator using OP-AMP.
8. Phase shift oscillator using OP-AMP.
9. Wien Bridge oscillator using OP-AMP.
10. Digital to Analog Converter.
11. Analog to Digital Converter.
12. Astable Multivibrator using IC555.
13. Monostable Multivibrator using IC555.
14. Schmitt Trigger and Comparator using OP-AMP.
15. Design of light switch using LDR and Relay.

IV Semester-Core Practical

ELECTRONIC CIRCUITS LAB

LTPC
0 0 4 2

1. Half wave rectifier
2. Full wave rectifier
3. Construction of power supply using C filter and zener diode as regulator
4. Construction of variable power supply using IC723
5. Construction of variable power supply using LM317
6. Characteristics of Class A Power Amplifier
7. Characteristics of Class B Power Amplifier
8. Design a Single Stage CE amplifier.
9. Design of Two stage RC coupled Amplifier.
10. Darlington pair Amplifier.
11. Clipping circuits.
12. Clamping circuits.
13. Hartley Oscillator.
14. Colpitt's Oscillator.
15. Astable Multivibrator using BJT.

IV Semester-Allied Theory 1

Allied Electronics for other major students

DIGITAL CIRCUITS

LTPC
3 0 0 3

Preamble: To equip the students with detailed knowledge in digital electronics, digital IC's in the CMOS series. Many of the ideas are important to learn microprocessors.The students will learn different number systems, logic gates, comparators, flip flops etc.Prerequisites is the knowledge about the origin of numbers, counting etc. Introduction of zero and positional number system etc.Upon completion of this course student will be thorough with binary arithematic, logical expression simplification working of flip flops, shift registers counters etc.

UNIT I

NUMBER SYSTEM

Basics and Number systems-Digital signals – Basic Digital circuits – NAND, NOR, EX-OR – Universality of NAND and NOR – Number systems – Conversions.

(9L)

UNIT II

LOGICAL CIRCUITS

Combinational Logic Design-Boolean Algebra – Demorgan's Theorem – Karnaugh Map – Don't care condition – Multiplexer – Demultiplexer.

(9L)

UNIT III

FLIP FLOPS

Flipflops-Rs flipflop – JKFF – D FF – T FF – Master slaVe FF – Applications

(9L)

UNIT IV

SHIFT REGISTERS

Shift Registers and counters-Registers – Left shift, Right shift, Parallel in parallel out Counters – Ripple counter, Decade counter – Modulo counters.

(9L)

UNIT V

MEMORY

RAM – static, Dynamic – Diode ROM – PROM – EPROM – E2 PROM

(9L)

(Total: 45L)

TEXT BOOK

1. Modern Digital electronics: R.P. Jain, TataMcGraw Hill 1997
2. Digital Electronics, V.K. Puri, Tata Mc Graw Hill
3. Computer System Aaraachitecture, 2nd Edition, M. Marris mano, Prentice Hall, 1998

IV Semester-Allied Practical

Allied Practical for other major students

DIGITAL CIRCUITS LAB

LTPC
0 0 4 2

1. Study of AND, OR, NOT, NAND, NOR and XOR gates using IC
2. Designing of all the logic gates using NAND gate IC
3. Designing of all the logic gates using NOR gate IC
4. Verification of Demorgan's theorems
5. Construction of gates using discrete components
6. Code conversion
7. Half adder and Full adder
8. Half subtractor and Full subtractor
9. Multiplexer and De-Multiplexer
10. Encoder and Decoder
11. Study of Flip flops
12. Shift register
13. Ripple counter

IV Semester-Skill based

MAINTENANCE AND TROUBLE SHOOTING OF AUDIO AND VIDEO EQUIPMENTS

LTPC
4 0 0 4

Preamble: To equip the students with basic knowledge in various electronic devices used in everyday life and to understand the principles of operation of the electronic household devices, its care and Maintenance and troubleshooting. Prerequisite needed is background of the basic science and knowledge of working.Students on completion of this course will have good knowledge about the basic everyday household electronic devices, its operation, maintenance and troubleshooting in detail.

UNIT I

RECORDING

Recording and reproduction principles - Optical recording - Different types - Methods of recording and reproduction - Optical recording on compact disc - play back process - Advantage of compact disc - Trouble shooting in compact disc

(12L)

UNIT II

AUDIO SYSTEMS

Stereophony - Stereophonic recording on disc and reproduction - Hi-Fi Stereo reproducing system - Block diagram of Public Addressing system - Requirement of Public Addressing system - Typical PA installation planning for a public meeting - PA system for an auditorium troubleshooting in PA system.

(12L)

UNIT III

TELEVISION

Monochrome, PAL colour TV transmitters Faults in TV transmitter - Testing of TV transmissions monochrome TV receiver - Fault in monochrome TV receiver - PAL colour TV receiver - Faults in colour TV receiver - Testing of TV receiver.

(12L)

UNIT IV

VIDEO DISC

Video disc format - Video recording on disk - Very High density disk - High definition TV system - Block diagram of MAC encoder - MAC receiver - Advantages.

(12L)

UNIT V

DIGITAL TV

Digital TV system - Cable TV concepts set top box - Dish TV and connections - Closed circuit television - Introduction to FLAT LCD and Plasma television systems.

(12L)

(Total: 60L)

TEXTBOOKS

1. Audio and Video systems Principles, Maintenance and Troubleshooting. - R.G. Gupta Tata Mc Graw Hill Publishing Co.Ltd.
2. Colour Television Theory and Practice - S.P. Bali, Tata Mc Graw Hill Publishing Co.Ltd.

REFERENCE BOOKS

1. Electronic Instruments and systems, Principles, Maintenance and Troubleshooting - R.G. Gupta Tata Mc Graw Hill Publishing Co.Ltd.

2. Monochrome and Colour Television - R. Gulati. New Age Interbational (P) Ltd. New Delhi.

IV Semester-: Non Major Elective
Non Major Elective for other major students

(Select any one course 1 or 2)

1. RADIO AND TELEVISION

LTPC
2 0 0 2

Preamble: To equip the students with basic knowledge in Radio andTelevision Technology which has now become a vital tool to the information revolution that is sweeping across the countries of the world. The syllabus aims at a comprehensive coverage of basics of waves and wave propogation, working of Radio andTelevision Systems Prerequisite is knowledge in fields and electronics science.Upon completion of the course student will be well versed with radio and television transmission and reception and abot propogation of radio waves.

UNIT I

RADIO COMMUNICATIONS

Radio waves – Frequency & Wavelength – Modulation – Propagation of radio waves – Ground, Sky and Space waves – Fading – Radio Broadcast – Transmission and Reception.

(6L)

UNIT II

RADIO TRANSMISSION

Classification of radio waves – Amplitude modulation – Frequency modulation – Radio transmitter – AM transmitter – Antennas (transmitting antenna), Basic ideas.

(6L)

UNIT III

RADIO RECEPTION

Reception and detection of amplitude modulated waves – Function of a radio receiver – Characteristics of a receiver – Super heterodyne receiver – FM Broadcast receiver.

(6L)

Unit IV

TV TRANSMISSION

TV broadcasting system – scanning – Synchronization – Blanking – Video Signal – Television band and channels – Camera tubes – Image orthicon Vision.

(6L)

UNIT V

TV RECEPTION

TV receiver – Tuner – Picture section – Receiver sweep section – Sound section power supply section – Color Mixing principles in color TV.

(6L)
(Total: 30L)

TEXT BOOKS

1. Basic Television and Video Systems, B.Grob, McGraw Hill
2. Electronics and Radio Engineering, F.E. Terman, McGraw Hill

REFERENCE BOOK

1. Monochrome and Color Television, R.R. Gulari, Wiley Eastern Ltd.,

2. RADAR AND NAVIGATION

LTPC
2 0 0 2

Preamble: To equip the students with basic knowledge in study the Doppler principle to radars and to detect moving targets, cluster and tracking radars. Learn the principles of transmitters, receivers, antennas and propagation as related to radars. Understand principles of navigation, in addition to approach and landing aids as related to navigation.Prerequisite is knowledge in science and electronics.Upon completion of the course student will be able to illustrate the principles of navigation, in addition to approach and landing aids as related to navigation.Acquire knowledge about the Range equation and the nature of detection Recognize the navigation systems using the satellite. Apply the concepts to the design of different types of radar and navigation systems. Analyze the characteristics of navigation systems

UNIT I

BASIC RADAR:

Basic Radar, The simple form of the Radar Equation Block schematic of pulse radar- Radar frequencies- Applications of radar, the origins of Radar

(6L)

UNIT-II

CW RADAR

Applications of CW radar- CW radar with nonzero IF- FM CW radar-FM CW altimeter- MTI and Pulse Doppler radar.

(6L)

UNIT-III

DOPPLER RADAR

Introduction to Doppler and MTI radar delay line Cancellers, digital MTI processing, Moving target detector, pulse Doppler radar.

(6L)

UNIT IV

NAVIGATION

Direction finders- Instrument Landing System- Radio ranges. Navigation- Hyperbolic navigation- LORAN. Satellite navigation- Doppler navigation

(6L)

UNIT-V

GPS

Global positioning system- Different types of microwave antennas-basic principles. Microwave passive devices, Coaxial connectors and adapters, Phase shifters, Attenuators, Waveguide Tees, Magic tees,

(6L)

(Total: 30L)

TEXT BOOKS

1. Microwave Devices and circuits- Liao / Pearson Education
2. Introduction to Radar systems-Merrill I Skolnik, 3rd Ed, TMH, 2001.
3 Microwave Engineering – Annapurna Das, Sisir K Das TMH Publication, 2001

REFERENCE BOOK

1. Microwave Engineering – David M Pozar, John Wiley, 2e, 2004
2. Microwave devices and circuit: Samuel Liao, PHI.
3. Microwave and radar — A K Maini, Khanna Publishers.
4. Microwave and Radar Engg. — M Kulkarni.
5. Introduction to radar systems — Merrill I Skolnik, McGraw Hill.
6. Radar systems and radio aids to navigation — A K Sen & A B Bhattacharya.

SEMESTER V

V Semester-Core subject: 1

MICROPROCESSORS AND MICROCONTROLLERS

LTPC
4 0 0 4

Preamble: To equip the students to understand architecture and assembly language programming of microprocessor and microcontroller, to understand the concept of interrupts and interfacing with various peripherals and to realize the features of a microcontroller and its timer applications.Prerequisite is knowledge of digital electronics.Upon completion of course student will be able to apply the basic concepts of digital fundamentals to Microprocessor based personal computer system.Able to program microprocessor applications using assembly language programming. Able to illustrate how the different peripherals (8255, 8279, 8253, 8237, 8251) are interfaced with Microprocessor.Able to Program,design, develop and interface complete microcontroller based systems to peripheral devices using 8051 microcontroller.Able to illustrate how the different peripherals are interfaced with microcontroller.

UNIT I

8085 ARCHITECTURE

Architecture of 8085 -Instruction set – Data Transfer, Arithmetic, Logical, Branching and I/O Instruction, Instruction types- various Addressing Modes. Timing sequence- Instruction cycle- Machine cycle- Halt wait state-. ALP- Mnemonic - simple Assembly language program flow chart stack and subroutines- Interrupts.

(12L)

UNIT II

INTERFACE CONTROLLERS

Peripheral device – Programmable peripheral Interface (8255 A) - Programmable Interrupt controller (8259 A) - USART- Serial Communication Interface. Programmable DMA Controller (8257), Interfacing –Analog to Digital Converter- Stepper Motor – Key Board & Display Interface.

(12L)

UNIT III

8051 MICROCONTROLLER

Intel 8051 microcontroller – Block Diagram, pin out – oscillator and clock – Program Counter and Data pointer, A and B registers, flags and program status word – Internal RAM – the Stack and Stack pointer –special functions registers – Internal ROM – I/O Pins, ports and circuits – External memory. Counters, Timers and Addressing Modes

(12L)

UNIT IV

8051 INSTRUCTIONS

Data exchanges – Logical operations – Byte level operation – Bit level logical operations – Rotate and swap operations – Arithmetic operations – Jump and call instructions – Jump and call program range – Jumps – Calls and subroutines – Interrupts and return.

(12L)

UNIT V

8051 PROGRAMMING

Assembly Language programming for 8051 Micro controller family – Programs 8–Bit addition – 8–Bit subtraction – 8-Bit Multiplication – 8-Bit Division - Greatest and smallest number in an array – ascending and Descending –Interfacing Keyboard– Interfacing LED, LCD Display– A/D and D/A Interfacing.

(12L)

(Total: 60L)

BOOKS FOR STUDY:

1. Microprocessor and Interfacing: Programming and Hard ware, Douglas V.Hall,Mc GrawHill, New York (1988)
2. Microprocessor Architecture Programming and applications with 8085/ 8080A. S.Ramesh Goankar, Wiley Eastern Limited(1986)
3. Digital systems & Microprocessor Douglas V.Hall, Mcgraw Hill.
4. Microprocessor- Srinath, PHI Ltd.
5. 8051 Micro controller Architecture, Kennath J. Ayala, Programming and Applications, Penram International Publishing
6. Microprocessor Principles and Applications – 2nd Edition, Gilmore – Tata McGraw Hill.

V Semester-Core subject: 2

MEDICAL ELECTRONICS

LTPC
4 0 0 4

Preamble: To equip the students to understand various bio-potentials and Transducers, various systems and measuring instruments related to human body andworking principles of medical instruments. Prerequisite is knowledge of instrumentation and anatomy. On successful completion of the course the students should have understood the concept of bio-potential; concepts of medical instrument its maintenance and develop the troubleshooting skills of medical instruments.

UNIT I

TRANSDUCER AND ITS PRINCIPLES

Active transducers-passive transducers- transducers in bio medical applications-resting and action potentials-propagation of action potentials-bio electric potentials- bio potential electrodes.

(12L)

UNIT II

THE HEART AND CARDIO VASCULAR SYSTEM

Blood pressure-characteristics of blood flow-heart sounds-electro cardio graphy ECG Recorder Principles-measurement of blood pressure, blood flow and cardiac output-pletnysmography- measurement of hearts sounds.

(12L)

UNIT III

PATIENT CARE AND MONITORING

The elements of intensive care monitoring-diagnosis calibration and reparability of Patient monitoring equipment-pace makers-defibrillators.

(12L)

UNIT IV

PSYCHO PHYSIOLOGICAL MEASUREMENTS

Testing motor responses-sensory measurements –bio feed back instrumentation-bio telemetry introduction physiological parameters- bio telemetry components-application of telemetry.

(12L)

UNIT V

IMAGING SYSTEM

X-ray machine-computer tomography (CT scanner) - Magnetic Resonance Imaging system- Ultra sonic imaging system. Colour Doppler.

(12L)
(Total: 60L)

TEXT BOOKS

1. Bio medical instrumentation and measurements – Leslie Cromwell, Fred J.Weibell and Erich A Pfeiffer-PHI, second edition-1996

2. Hand book of Bio medical instrumentation- R.S.Khandpur, Tata McGraw Hill 1997 (Unit V: Chapter 19, 20, 21).

V Semester-Core subject: 3

MATHEMATICS FOR ELECTRONICS

LTPC
4 0 0 4

Preamble: To equip the students to identify and classify the numerical problem to be solved choose the most appropriate numerical method for its solution based on characteristics of the problem to understand the characteristics of the method to correctly interpret the results and to understand the basic methods, algorithms and programming techniques to solve mathematical problems.Prerequisite is high school mathematics.Upon completion of this course students will be well versed in solving Homogeneous difference equations,Interpolation.Find solution of variousequation using various methods.

UNIT I

FINITE DIFFERENCES

Difference table operator E, Δ, D-Relations between these operators-Difference equations-Linear difference equation Homogeneous linear difference equation with constant coefficients

(12L)

UNIT II

INTERPOLATION USING FINITE DIFFERENCES

Newton Gregory formula for forward interpolation-Divided differences-properties-Newtons formula for unequal intervals-Lagranges formula-Relation between ordinary differences and divided differences

(12L)

UNIT III

SOLUTIONS OF ALGEBRAIC AND TRANSCEDENTAL EQUATION

Iterative method, Bisection method, Newton raphson method. Solution of simultaneous Linear equations-Gauss method-Gauss Jordan method –Iteration method-Gauss Seidel method

(12L)

UNIT IV

THEORY OF EQUATION

Relation between roots and coefficients-Transformation of equation

(12L)

UNIT V

RECIPROCAL EQUATION

Approximate solution of equation-Newton's method and Horner's method

(12L)
(Total: 60L)

BOOKS FOR STUDY

1. Mathematics For Electronics-K.C Pillai
2. Numerical analysis-Armugam and Isaac
3. Numerical analysis-Gupta and Kapoor
4. Theory ofequation-Armugam and Isaac
5. Algebra-Manikavasagam pillai

V Semester-Core subject: 4

COMPUTER HARDWARE AND MAINTENANCE

LTPC
4 0 0 4

Preamble: To equip the students with basic knowledge of Architecture and Design of a Personal Computer and Related Peripherals used in everyday life and to enable the student to get a detailed knowledge of all the hardware components of a personal computer and different interfaces and to understand different storage media.. Prerequisite needed is background of the basic science and computers.Students on completion of this course will understand the components on the motherboard**,** can address issues related to CPU and Memory.They will have good knowledge on Data storage devices andtroublshooting techniques related to it.

UNIT I

COMPUTER HARDWARE OVERVIEW

Computer organization – PC hardware – Functional block of a PC – Buses – Bus concept – Bus cycle – Bus interface unit – Peripheral devices – Keyboard – CRT display – Monitor – Printer – Floppy disk drive – SMPS

(12L)

UNIT II

MOTHER BOARD FUNCTIONS

Functional units and inter communication – Reset logic – CPU nucleus logic – DMA logic – Wait state logic – Bus arbitration logic – RAM logic – NMI logic – Speaker logic – Mode switch input logic – New generation mother board

(12L)

UNIT III

FLOPPY DISK CONTROLLER

Floppy disk controller overview – Disk format – FDC system interface – FDD interface – Overall operation of floppy disk subsystem – New generation floppy disk controller Display adapter introduction – CRT display – 6845 CRT controller – CGA & AGA – Device interface

(12L)

UNIT IV

HARD DISK CONTROLLER AND PRINTER

Overview of HDC organization – Disc drives types and interface – Hard disk card – Hard disk format Printer introduction: Centronics interface programming – Programming sequence – Hardware overview – Printer controller

(12L)

UNIT V

TROUBLE SHOOTING

Types of faults – Hardware and software – Nature of faults – Solids and intermittent – Fault elimination process – Systematic troubleshooting – FDC & HDC problems – CRT monitor problems – Keyboard problems – SMPS problems.

(12L)

(Total: 60L)

TEXT BOOK

1. Govinda Rajulu B, ―PC IBM and Clones – Hardware, Troubleshooting and Maintenance, Tata McGraw Hill Publishing Company Ltd., New Delhi, 1991

V Semester-Core Practical

MICROPROCESSOR AND MICROCONTROLLER LAB

LTPC
0 0 4 2

All experiments have to be carried out compulsorily from A and B

A. Microprocessor Lab

1. Program for 8 Bit Addition and Subtraction
2. Program for16 Bit Addition and subtraction
3. Program for 8 Bit Multiplication and division
4. Program for 16Bit Multiplication and Division
5. Program for Square and Square root of a number
6. Program for Sorting and Searching
7. Program for Smallest and Largest number in an array.
8. Program for Reversing a String
9. Program for Fibonacci series.
10. Program for Factorial of a number
11. Program for B.C.D to Binary, Binary to B.C.D, A S C I I to Binary,
12. Binary to ASCI I Conversion
13. Six letter word display.
14. Rolling display
15. Interfacing seven segment display to display any character.
16. Program to display Time(Hours and Minutes)
17. Program for 1's complement and 2's complement of 8 bit and 16 bit data
18. Interfacing Traffic light controller
19. Interfacing Stepper motor control
20. Interfacing Matrix Keyboard
21. Interfacing A.D.C
22. Interfacing D.A.C
23. Study of 8255 chip and generation of
    1. Square wave
    2. Triangular wave
    3. Saw Tooth wave

B. Microcontroller 8051 Lab

1. Addition – 8 bit, 16 bit.
2. Subtraction – 8 bit, 16 bit.
3. Multiplication 8 bit
4. Division 8 bit
5. Array addition (multibyte)
6. Logical Operations – AND, OR, NOT
7. Decimal to ASCII and ASCII to Decimal.
8. Decimal to Hexa and Hexa to Decimal.
9. Ascending Order.
10. Descending Order
11. Up/down Counter
12. Block data transfer
13. Interfacing with LCD.
14. Interfacing with Matrix Keypad.
15. Square wave generator
16. Interfacing with ADC.
17. Interfacing with DAC.
18. Digital Clock.
19. Interfacing with Stepper Motor.

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V Semester-: Major Elective

(Select any one course 1 or 2)

1. TELEVISION ENGINEERING

LTPC
4 0 0 4

Preamble: To equip the students to understand various aspects ofTelevision Technology which has now become a vital tool to the information revolution that is sweeping across the countries of the world. The syllabus aims at a comprehensive coverage of Television Systems with all the new developments in Television Engineering.Prerequisite is basic electronics and science.On completion of the course student will be well versed with TV Pictures, composite Video Signal, Receiver Picture Tubes and Television Camera Tubes, principles of Monochrome Television Transmitter and Receiver systems, Various Color Television systems with a greater emphasis on PAL system. And the advanced topics in Television systems and Video Engineering

UNIT I

ELEMENTS OF TELEVISION SYSTEM:

Basic block schematic of television transmitter and receiver, Analysis of Television pictures, Scanning, human factor consideration, flicker, interlaced scanning, number of scanning lines, Horizontal and vertical resolution, Composite video signal, video signal dimensions, channel bandwidth, vestigial side band transmission, channel bandwidth and allocations for colour transmission.

(12L)

UNIT II

TELEVISION CAMERA AND TRANSMITTERS:

Photoelectric effects, Working principle of image orthicon, vidicon, plumbicon, CCD, structure of CCD and its working, Monochrome and Colour television camera: block schematic explanation, TV transmitters: Positive and negative modulation and its comparison, Colour TV picture tubes: purity and convergence, Delta gun, PIL, Trinitron tubes, LCD screens.

(12L)

UNIT III

MONOCHROME AND COLOUR RECEPTION:

Monochrome receiver: Detailed block schematic, Antenna system,RF section,IFsection,VSB correction,Choice of intermediate frequencies,Picture Tube circuitary and controls, Sound signal seperation,Sound section,Sync Processing and AFC circuit, horizontal and vertical deflection circuits Low voltage Power supply,EHT Power supply, SMPS and block schematic explanation,

(12L)

UNIT 1V

COLOUR TELEVISION:

Compatibility consideration, Colour response of human eye, Three colour theory, additive mixing of colours, chromaticity diagram, Luminance and chrominance, colour difference signal and its generation, Polarity of colour difference signal, Frequency interleaving and Colour burst signal, delay lines, Basic colour television systems: PAL and NTSC, Block schematic explanation.

(12L)

UNIT V

TELEVISION APPLICATIONS:

CCTV and its functional block schematic, Cable television: converters, cable connections, and Satellite television: Dish antenna, LNB, down converters, Video discs: VCD and DVD, Digital recording, LASER source, High definition television.

(12L)

(Total: 60L)

BOOKS FOR STUDY:

1. Monochrome and colour television: R R Gulati, Wiley Eastern.
2. Colour Television, Theory and Practice: S P Bali, Tata Mc Graw Hill.
3. Television engineering: A M Dhake, Tata Mc Graw Hill
4. Basic Television Engineering: Bernad Grob, Mc Graw Hill.

2. MOBILE COMMUNICATION

LTPC
4 0 0 4

Preamble: To equip the students to understand the basic foundation in mobile communication and understand cellular design concepts and apply those in wireless communication.To design a 3G and 4G wireless communication system to meet desired needs within realistic constraints. Pre-Requisite is knowledge in Digital Communication.On completion Student will be able to understand the concepts and techniques of mobile radio communication fundamentals like reflection, diffraction, scattering and fading. Know various multiple access techniques and fundamentals of equalization in wireless communication. Understand cellular design concepts and apply them in wireless communication.Design GSM and CDMA and its components in mobile and wireless communication.Design a 3G and 4G wireless communication systems to meet desired needs within realistic constraints.

UNIT I

INTRODUCTION

Introduction to cellular mobile system, Performance criteria, uniqueness of mobile radio environment, operation of cellular systems, Hexagonal shaped cells, Analog and Digital Cellular systems, General description of the problem, concept of frequency channels, Co-channel Interference Reduction Factor, desired C/I from a normal case in a omni directional Antenna system, Cell splitting, consideration of the components of Cellular system.

(12L)

UNIT II

INTERFERENCE

Introduction to co-channel interference, real time Co-Channel interference, Co-Channel measurement, design of Antenna system, Antenna parameters and their effects, diversity receiver, non-co channel interference-different types, Signal reflections in flat and hilly terrain, effect of human made structures, phase difference between direct and reflected paths, constant standard deviation, straight line path loss slope, general formula for mobile propagation over water and flat open area, near and long distance propagation antenna height gain, form of a point to point model.

(12L)

UNIT III

SIGNAL TRANSMISSION

Sum and difference patterns and their synthesis, omni directional antennas, directional antennas for interference reduction, space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, high gain antennas, Numbering and grouping, setup access and paging channels channel assignments to cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells, non fixed channel assignment, Handoff, dropped calls and cell splitting, types of handoff, handoff invitation, delaying handoff, forced handoff, mobile assigned handoff. Intersystem handoff, cell splitting, micro cells, vehicle locating methods, dropped call rates and their evaluation.

(12L)

UNIT IV

MOBILE STANDARDS

Second generation and Third generation Wireless Networks and Standards, WLL, Bluetooth, GSM, IS-95, DECT, GSM architecture, GSM channels, multiplex access scheme, TDMA, CDMA.

(12L)

UNIT V

CELL CONCEPTS

Intelligent Cell Concept, Advanced Intelligent Network, SS7 Network and ISDN for AIN, AIN for Mobile communication, Asynchronous TransferMode Technology, Future Public Land Mobile Telecommunication System, Wireless Information Superhighway.

(12L)

(Total: 60L)

BOOKS FOR STUDY

1. W.C.Y. Lee, "Mobile Cellular Telecommunications", 2nd Edition, Tata McGraw Hill, 2006.
2. Gordon L. Stuber, "Principles of Mobile Communications", 2nd Edition, Springer International, 2007.
3. Theodore. S. Rapport, "Wireless Communications", 3rd Edition, Pearson Education, 2003.
4. Lee, "Wireless and Mobile Communications", 3rd Edition, McGraw Hill, 2006.
5. Jon W. Mark and Weihua Zhqung, "Wireless Communication and Networking", PHI, 2005.
6. R. Blake, "Wireless Communication Technology", Thompson Asia Pvt. Ltd., 2004.

V Semester Mini project

LTPC
0 0 4 6

Course Objectives

- To develop skills to formulate a technical project.
- To give guidance on the various tasks of the project and standard procedures.
- To teach use of new tools, algorithms and techniques required to carry out the projects.
- To give guidance on the various procedures for validation of the product and analyse the cost effectiveness.
- To provide guidelines to prepare technical report of the project.

Course Outcomes

1. Formulate a real world problem, identify the requirement and develop the design solutions.
2. Identify technical ideas, strategies and methodologies.
3. Utilize the new tools, algorithms, techniques that contribute to obtain the solution of the project.
4. Perform test and validate through conformance of the developed prototype and analysis the cost effectiveness.
5. Explain the acquired knowledge through preparation of report and oral presentations

Mini Project shall be a group activity with a maximum of 5 students in a group.

Students are adviced to select topics of their own interest in hardware and develop their hardware skills by designing a circuit of their own.Periodical assesment may be done to evaluate their skills.

VI SEMESTER

VI Semester-Core subject: 1

POWER ELECTRONICS

LTPC
4 0 0 4

Preamble: To equip the students with a basic knowledge in power devices. Learn the working of power devices . Learn the basics of inverters and static switches To learn the circuits dc choppers and power supplies To study the basics of battery charging, DC motors welding. This subject presents the principles and applications of industrial and power electronics.

Prerequisites are basic electronics. On successful completion of the course the students should have: Developed the circuit designing skills in power electronics. Understood the concepts in industrial electronics system design.

UNIT I

POWER DEVICES:

Need for semiconductor power devices, Power diodes, Enhancement of reverse blocking capacity, Introduction to family of thyristors. Silicon Controlled Rectifier (SCR): structure, I-V characteristics, Turn-On and Turn-Off characteristics, ratings, Factors affecting the characteristics/ratings of SCR, Gate-triggering circuits, Control circuits design and Protection circuits, Snubber circuit.

(12L)

UNIT II

DIAC AND TRIAC:

Basic structure, working and V-I characteristic of, application of a Diac as a triggering device for a Triac. Insulated Gate Bipolar Transistors (IGBT): Basic structure, I-V Characteristics, switching characteristics, device limitations and safe operating area (SOA) etc. Power MOSFETs: operation modes, switching characteristics, power BJT, second breakdown, saturation and quasi-saturation state.

(12L)

UNIT III

CHOPPERS:

basic chopper circuit, types of choppers step-down chopper, step-up chopper, operation of d.c. chopper circuits using self commutation, cathode pulse turn-off chopper, load sensitive cathode pulse turn-off chopper (Jones Chopper), Morgan's chopper Application of SCR: SCR as a static switch, phase controlled rectification, single phase half wave, full wave and bridge rectifiers with inductive & non-inductive loads; AC voltage control using SCR and Triac as a switch.

(12L)

UNIT IV

D.C MOTORS:

Motor Principle-Comparison of motor and generator action. – AC motors – Induction motors – Speed control – Synchronous motors .Relays and their characteristic and applications

(12L)

UNIT V

WELDING

Welding – Resistance welding – Seam welding –Heating, Induction heaters – High voltage DC transmission – Fan regulator using TRIAC. Electromechanical Machines: Principle of operation Thyristor based speed control of dc motors, AC motor.

(12L)

(Total: 60L)

BOOKS FOR STUDY

1. Power Electronics, P.C. Sen, TMH
2. Power Electronics & Controls, S.K. Dutta
3. Power Electronics, M.D. Singh & K.B. Khanchandani, TMH
4. Power Electronics Circuits, Devices and Applications, 3rd Edition, M.H. Rashid, Pearson Education
5. Power Electronics, Applications and Design, Ned Mohan, Tore.
6. Power Electronics, K. HariBabu, Scitech Publication.
7. Power Electronics, M.S. Jamil Asghar, PHI.
8. A Textbook of Electrical Technology, B.L. Thereja, A.K. Thereja, S.Chand
9. Industrial electronics – G.K. Mithal, Khanna Publications – Delhi – 15th Ed. 1992.
10. Industrial and power electronics – C. Harish – Raj Umesh Publications – 4th Edn. 1992.
11. Basic electronics and linear circuits – N.N. Bhargava, D.C.Kulsheshtha and S.C.Gupta – Tata McGraw Hill - 1987.

VI Semester-Core subject: 2

SEMICONDUCTOR FABRICATION TECHNOLOGY

LTPC
4 0 0 4

Preamble: To equip the students with basic understanding in Semiconductor fabrication technology and VLSI devices. Providing exposure to different methods of VLSI design and the principles behind such design. To understand the concepts of MOSFETs to analyze the working of various MOS based invertors. Pre-Requisite is Electronics devices, Electronics Circuits, IC Technology. On completion of course Students will be able to: Understand various VLSI design methodologies and fabrication techniques required for modern VLSI circuits. Apply basic concepts of MOSFETs to analyze the working of various MOS based invertors. Realize and implement various Boolean functions using CMOS invertors. Understand the working and design of different types of semiconductor memories to meet needs related to storage of large data in very small area.

UNIT I

INTRODUCTION

General classification of integrated circuits – Scale of integration – Advantages over discrete components. **(12L)**

UNIT II

THICK FILM TECHNOLOGY

Features of hybrid IC technology – Thick film conductors – Dielectric – Resistors – Thick film processing – Thick film substrate – Design ideas – Advantages and applications.

(12L)

UNIT III

THIN FILM TECHNOLOGY

Thin film conductors – resistors – dielectric – substrates – thin film processing – Advantages and applications – Monolithic IC process : Growth and refining of Si crystals – Substrate slicing and polishing – Wafer preparation – Diffusion – Ion implantation – Oxidation – Photolithography – CVD – Epitaxial grown – Metallization – Monolithic resistors and capacitors.

(12L)

UNIT IV

MODERN VLSI DEVICES

Introduction – Modern VLSI devices – High field effect – MOSFET devices – long channel & short channel MOSFET.

(12L)

UNIT V

BIPOLAR DEVICES

Bipolar devices – n.p.n. transistor – characteristics of typical n.p.n. transistor – Bipolar device design – Design of emitter, base and collector region – concept of HDL.

(12L)

(Total: 60L)

TEXT BOOKS

1. Integrated Circuits (K.R. Botkar). Unit (i, ii, iii).
2. Fundamentals of Modern VLSI Devices by Yuan Taur and Tak H. NING Cambridge Publishers. Unit (iv and v)

BOOKS FOR REFERENCE:

1. Basic VLSI Design Systems and Circuits by Dougles A. Pucknell and Kamran Eshragian, PHI.
2. Device Electronics for Integrated Circuits – Richard Maller.
3. Integrated Electronics – Millman & Halkars.
4. VLSI Technology – S.M. Sze.

VI Semester-Core subject: 3

ROBOTICS AND AUTOMATION

LTPC
4 0 0 4

Preamble: To equip the students with fundamental knowledge about Robotics its working and its role in automation and its applications.To learnabout programming of a robot,its industrial application.To learn about various drives,Actuators and sensors.Study the role of CNC machines in automation.Learn about Programmable Logic Controllers.Prerequisite is knowledge of instrumentation and electronics Upon completion of the course the student should understand the Basic concepts and the applications of robots in automation.CNC machines and PLC Controllers.

UNIT I

INTRODUCTION

Introduction Robotics and programmable automation, historical background, laws of robotics, robot definition, robot anatomy and systems, human systems and robotics. Specification of robotics

(12L)

UNIT II

ROBOT DRIVES

Actuators and control, Function of drive systems, general types of fluids, pump classification pneumatic system, Hydraulic system, Directional control valves, Process control valves, Rotary actuators electrical drives, DC: motors, stepper motor and drives mechanisms

(12L)

UNIT III

ROBOT END-EFFECTORS

Robot End-Effectors Classification of end-effectors, drive system for grippers, mechanical, magnetic, vacuum and adhesive grippers, hooks, scoops and others devices, active and passive Grippers

(12L)

UNIT IV

SENSORS AND INTELLIGENT ROBOTS

Sensors And Intelligent Robots Artificial intelligence and automated manufacturing, AI and robotics, need for sensing systems, sensory devices, types of sensors, robot vision systems-Robot Languages and programming Different languages, Computer numerical control-Features of CNC-CNC machine control unit CNC software

(12L)

UNIT V

PROGRAMMABLE LOGIC CONTROLLERS (PLC)

Discrete Process control-Logic control, Sequencing-Ladder logic diagrams-Programmable logic controllers-Components of the PLC, PLC operating cycle-Addiditional capabilities of PLC, Programming the PLC-Personal computers using soft logic. Introduction to HMI, DCS and SCADA systems.

(12L)

(Total: 60L)

TEXT BOOK

l. Robotics techology and flexible automation by S.R. DEB Tata Mc Graw Hill

2. Mikell P.Groover, "Automation Production systems and Computer Integrated Manufacturing", Prentice-Hall India, New Delhi, 1987. / Pearson Education, New Delhi

3. W. Bolton, "Mechatronics", Pearson Education Asia, 2002.

4. Introduction to robotics, mechnics and control by John J. Craig from Addison Wesley;

REFERENCE BOOKS

1. Robotics principles and practice by Dr. K.C. Jain and Dr. L.N Agarwal from Khanna publishers

2. Introduction to robotics, mechnics and control by John J. Craig from Addison Wesley;

3. Mikell P. Groover, "Industrial Robotics - Technology, Programming and Applications", McGraw Hill, New Delhi, 1986

4. K.S. Fu, R.C. Gonzalez and C S G Lee, "Robotics: Control, Sensing, Vision and Intelligence", McGraw Hill, New Delhi, 1987.

VI Semester-Core subject: 4

COMMUNICATION SYSTEM

LTPC
4 0 0 4

Preamble: To equip the students with fundamental knowledge about various forms of communication such as Optical fiber transmission,Cable Transmission,Telephone instruments,Telephone switching and transmission,Cellular phones and satellite communications ,Prerequisite is knowledge of electronics .On completion of this course student will be well versed in Opticalfibre transmission media,its connections its coupling devices,Telephone instrument and signal transmission.Operation of telephone exchange,Parts of telephone.Cellular phones its transmission and satellite communications

UNIT-I

OPTICAL FIBER TRANSMISSION MEDIA

Optical Communication-Advantages of optical fibers-Block diagram of an Optical fiber communication system.Optical fiber construction, Light Propogation-Refraction, Refractive index, Snells law-Optical fiber configurations-Coupling fibers-Fiber splicing-Optical fiber connections-Coupling losses;Optical sources-L.E.D's,ILD,Light Detectors-PIN Diodes.

(12L)

UNIT –II

TELEPHONE INSTRUMENT AND SIGNALS

Introduction-Carbon granule transmuitter,Receiving transducer,Simple local battery telephone circuit-Functions of Telephone set,Block diagram of Telephone set,Basic telephone call procecdures,Call progress tones and signals-Dial tone,DTMF tone,Dial Pulse,Station busy,Equipment busy,Ringing,Ring-back,Receiver on/off hook,Cordless Telephones,Caller ID,Electronic telephones

(12L)

UNIT –III

PUBLIC TELEPHONE NETWORK AND SWITCHING

Instruments,Local Loops,Trunk Circuits and Exchanges,Local central office Telephone Exchanges,Operator assisted local exchanges,Automated central office switches and exchanges,Matrix switching,Step by step switching.

(12L)

UNIT-IV

CELLULAR TELEPHONE CONCEPT

Cellular Telephone-Fundamental concepts of cellular Telephones:Frequency Reuse,Interference-Co-channel,Adjacent Channel,Cell splitting,Sectoring,Segmentation and Duplication,Cellular system topology,Roaming ,Handoff,Cellular Telephone Network components-Electronic switching center,Cell site controller,Radio Transceiver,System interconnects,Mobile and portable telephone units,Communication Protocols

(12L)

UNIT-V

SATELLITE COMMUNICATIONS

Keplers Laws,Satellite orbital pattern,Geosynchronous Satellites,Satellite classifications, Spacing and frequency allocation,Satellite antenna Radiation patterns,Footprints,Satellite system link models-Uplink,Transponder,Downlink,Cross-Links.

(12L)

(Total: 60L)

BOOKS FOR STUDY

1. Advanced Electronic Communication systems-Wayne Tomasi, PHI 6th Edition.
2. Telecommunication Systems-P.H Smale, Wheeler Publication 2nd Edition.
3. Optical Fiber Communications-Gerd Kaiser, Mc Graw-hill 2nd Edition.
4. Satellite Communications-Roddy, Mc Graw-hill 4th Edition.

VI Semester-Core Practical

POWER ELECTRONICS AND SYSTEM DESIGN LAB

LTPC
0 0 4 2

All experiments have to be carried out compulsorily from A and B

A .Power Electronics Lab Practical

1. Characteristics of S.C.R
2. Characteristics of U.J.T
3. Characteristics of D.I.A.C
4. Characteristics of Triac
5. Characteristics of Power MOSFET
6. Characteristics of IGBT
7. R Triggering for Thyristors
8. R C Triggering for Thyristors
9. U.J.T Triggering For Thyristors
10. Speed control of D.C Motor
11. UJT Relaxation Oscillator
12. AC Power Control.

B. Electronics Design Lab Practical

Students must use dotted boards or Group boards and interconnect the joints by soldering.

Soldering Practice

1. Design and construction of fixed voltage power supply
2. Design and construction of Dual power supply
2. Design and construction of switching power supply
3. Design and construction of 1.5 to 12 V power supply using multi tap transformer.
4. Design and construction of Burglar alarm using L.D.R
5. Design and construction of Temperature switch using Thermistor
6. Design and construction of Light sensitive switch using Photo diode
7. Design and construction of Audio amplifier using LM 380
8. Design and construction of Timer circuit
9. Design and construction of Decade counter/ Seven segment decoder
10. Design and construction of Logic probe

VI Semester-: Major Elective

(Select any one course 1 or 2)

1. PCB DESIGN

LTPC
4 0 0 4

Preamble: To equip the students with fundamental knowledge about Printed Circuit boards To study the basics of Printed circuit boards, To know the layout planning and design, To know the design considerations for special circuits.Prerequisite is knowledge of electronic components.On completion of course student will be having good knowledge on PCB designing ,manufacturing , its characteristics,Various types,Application.Drawing schematics and preparing PCB's and testing.

UNIT I

PCB BASICS

Advantages of PCB's – Components of a PCB – PCB Classification – Manufacturing of PCB's. Layout Planning: Electrical Design Considerations – Conductor Patterns – Component Placement Rules. Design Rules for Analogue, Digital and Power Electronic Circuits.

(12L)

UNIT II

ARTWORK GENERATION AND IMAGE TRANSFER

Basic Approach to Manual Artwork – Guidelines for Artwork Preparation – Artwork Generation Guidelines. Laminates: Anatomy, Properties and Types. Image Transfer Techniques: Laminate Surface Preparation – Screen Printing – Pattern Transferring Techniques – Printing Process – Photo Printing.

(12L)

UNIT III

PLATING, ETCHING AND MECHANICAL OPERATIONS

Electroplating Process – Plating Techniques – Problems in Plating. Etching Techniques: Etching Solutions and Chemistry – Etching Arrangements – Equipment and Techniques – Etching Problems. Mechanical Operations: Need – Cutting Methods – Hole Punching – Drilling.

(12L)

UNIT IV

FLEXIBLE PCB'S AND SOLDERING

Construction of Flexible PCB's – Rigid Flex PCB's – Terminations – Advantages – Special Applications. Soldering: Theory – Variables – Materials – Soldering and Brazing – Soldering Tools – Hand Soldering – Mass Soldering – Post Soldering and Cleaning – Rework and Repair of PCB's.

(12L)

UNIT V

ENVIRONMENTAL CONCERNS

Pollution Control in PCB Industry – Pollutiong Agents – Recycling of Water – Recovery Techniques – Air Pollution – Recycling of PCB's – Environmental Standards – Safety Precautions – Toxic Chemicals.

(12L)

(Total: 60L)

TEXT BOOKS:

1. R S Khandpur - Printed Circuit Boards: Design, Fabrication, Assembly and Testing – McGraw Hill, India – 2005
2. Christopher T. Robertson - Printed Circuit Board Designer's Reference: Basics – Prentice International, U.S. – 2004
3. PCB Design & Fabrication – Walter.C. Bosshart – TMH

2. EMBEDDED SYSTEM AND RTOS

LTPC
4 0 0 4

Preamble: To equip the students to undertake the design and development process for embedded computer systems in relation to the environment in which they operate and to know how to integrate embedded hardware, software, and operating systems to meet the functional requirements of embedded applications. Prerequisite is knowledge of microprocessor and microcontroller .On completion of course student will be thorough to the embedded systems, its hardware and software. Learnt devices and buses used for embedded networking.explain programming concepts and embedded programming in C and C++. Explain real time operating systems, inter-task communication and an exemplary case of RTOS

UNIT I

INTRODUCTION TO EMBEDDED SYSTEMS:

Embedded systems - Application of Embedded Systems - processors in the system - Other Hardware units - software embedded to a system - Exemplar embedded system - Embedded system – on - chip (SOC) and in VLSI circuit

. **(12L)**

UNIT II

DEVICES AND BUSES FOR DEVICE NETWORK:

I/O Device - timer and counting devices - serial communication using I^2C, CAN and USB. Parallel communication using PCI, PCIX and advanced parallel High Speed Buses.

(12L)

UNIT III

DRIVERS FOR DEVICE AND INTERRUPTS SERVING MECHANISM:

Device drives-parallel port devices drive in a system, serial port Device Drivers in a system, Drivers for internal programmable timing Devices – Interrupt servicing Mechanism – Context and the periods for context switching, Deadline and Interrupt Latency.

(12L)

UNIT IV

EMBEDDED SOFTWARE DELOPMENT USING IDE:

Introduction to Integrated development environment (IDE) – programming concepts and embedded programming in Assembly and C – creating a New project – Adding Files to a project – Building a project – Debugging and simulating the application – Getting Embedded software into the Target system.

(12L)

UNIT V

REAL TIME OPERATING SYSTEM (RTOS):

Introduction to basic concepts of RTOS, Basics of real time& embedded system operating systems, RTOS-Interrupt handling, task scheduling; embedded system design issues in system development process-Action plan, use of target system, emulator,use of software tools.

(12L)

(Total: 60L)

TEXT BOOKS

1. Rajkamal,"Embedded System-Architecture, Programming, Design"Tata Mc Graw Hill 2006.
2. Daniel W.Lewis"Fundamentals of Embedded Software" Prentice Hall of India, 2004.

REFERENCE BOOKS

1. David E Simon," An Embedded Software Primer" person Education Asia, 2006.
2. Frank Vahid, Embedded System Design – A Unified hardware & Software Introduction John Wiley, 2002.
3. SriramV.Iyer, Pankaj Gupte, Embedded Real Time Systems Programming"Tata Mc Graw Hill, 2004.
4. Steve Heath, " Embedded System Design"II edition, Elsevier, 2003.
5. Arnold Berger," Embedded System Design: An Introduction to processes, Tools, and Techniques", CMP Books, 2001.
6. Wayne Wolf, "Computers as components" Morgan Kaufmann Publishers, 2005.
7. Douglas V Hall, "Microprocessors and Interfacing: Programming and Hardware", Tata McGraw – Hill, Second Edition, 2001.

VI Semester Major Project

PROJECT WORK

LTPC
0 0 6 7

The objective of the project work is to motivate the students for doing research and to inculcate in them the self confidence to work independently. Each student should do an individual project and they can freely choose their own topic of experimental nature. The project should be of investigative type not a hobby project one.

Students are encouraged to take the project work as a challenge so that their project will boost up their industrial career.

Periodic Seminars should be conducted to assess the students. The students should present the progress of the project to their respective guides and get the required assistance from them

At the completion of the project .The student will submit Project Report in the form of Dissertation which will be examined by the examiners.

The examination shall consist of i) evaluation of the dissertation and ii) comprehensive viva-voce

MANONMANIAM SUNDARANAR UNIVERSITY,
TIRUNELVELI
UG COURSES – AFFILIATED COLLEGES

B.Sc. MATHEMATICS

(Choice Based Credit System)

(with effect from the academic year 2017-2018 onwards)

Sem	Part	Sub. No	Subject Status	Subject title	Hrs / Week	Cre-dits	Mark				
							Maximum			Passing minimum	
							Int.	Ext.	Tot.	Ext.	Tot.
III	I	13	Language	Tamil/Other Languages	6	4	25	75	100	30	40
	II	14	Language	English	6	4	25	75	100	30	40
	III	15	Core-5	Real Analysis-I	6	4	25	75	100	30	40
		16	Allied-II	Statistics-I OR Physics/ Chemistry/Computer With Practicals	6 6	3 4	25 25	75 75	100 100	30 30	40 40
		17	Skill Based core	Vector Calculus	4	4	25	75	100	30	40
	IV	18	Non-major Elective	Any one of the following 1.1) Mathematics for Competitive Examinations- I 1.2) Fundementals of Statistics-I	2	2	25	75	100	30	40
		19	Common	Yoga*	2	2	25	75	100	30	40

IV	I	20	Language	Tamil/Other Languages	6	4	25	75	100	30	40
	II	21	Language	English	6	4	25	75	100	30	40
	III	22	Core-6	Abstract Algebra- I	6	4	25	75	100	30	40
		23	Allied-II	Statistics II OR Physics/ Chemistry/ Computer with Practicals	6 6	3 4	25 25	75 75	100 100	30 30	40 40
		24	Skill Based Core	Trigonometry, Fourier Series and Laplace Tranforms	4	4	25	75	100	30	40
	IV	25	Non-major Elective	Any one of the following2.1) Mathematics for Competitive Examinations- II 2.2) Fundementals of Statistics II	2	2	25	75	100	30	40
		26	Common	Computers for Digital Era*	2	2	25	75	100	30	40
	V		Extension Activities	NCC/NSS/YRC/ YWF/PE	-	1	-	-	-	-	-

V	III	27	Core-7	Abstract Algebra II	5	4	25	75	100	30	40
		28	Core-8	Real Analysis II	5	4	25	75	100	30	40
		29	Core-9	Statics	5	4	25	75	100	30	40
		30	Core-10	Transforms and their Applications	5	4	25	75	100	30	40
		31	Major Elective -I	Any one of the following 1.1. Astronomy -I 1.2.Discrete Mathematics 1.3.Combinatorial Mathematics	4	4	25	75	100	30	40
		32	Major Elective-II	Any one of the following 2.1.Operations Research - I 2.2.Stochastic Process 2.3. MS Office	4	4	25	75	100	30	40
	IV	33	Skill Based Common	Personality Development /Effective Communication / Youth Leadership	2	2	25	75	100	30	40

VI	III	34	Core-11	Complex Analysis	5	4	25	75	100	30	40
		35	Core-12	Number Theory	4	4	25	75	100	30	40
		36	Core-13	Graph Theory	5	4	25	75	100	30	40
		37	Core-14	Dynamics	4	4	25	75	100	30	40
		38	Core-15	Numerical Methods	4	4	25	75	100	30	40
		39	Major Elective-III	Any one of the following 3.1 Astronomy II 3.2Fuzzy Mathematics 3.3 Mathematical Modeling	4	4	25	75	100	30	40
		40	Major Elective-IV	Any one of the following 4.1 Operations Research II 4.2 Coding Theory 4.3 Programming in	4	4	25	75	100	30	40

SEMESTER – III

CORE PAPER –V

REAL ANALYSIS - I (90 Hours) (SMMA31)

L	T	P	C
2	4	0	4

Objectives:

-To lay a god foundation of classical analysis

-To study the behaviour of sequences and series

Unit I **Real number system :**
The field of axioms, the order axioms, the rational numbers, the irrational numbers, upper bounds, maximum element, least upper bound (supremum). The completeness axiom, absolute values, the triangle inequality. Cauchy – schwartz's inequality**.** **11L**

Unit II **Sequences :** Bounded sequences – monotonic sequences – convergent sequences – divergent and oscillating sequences – The algebra of limits. **17L**

Unit III Behaviour of monotonic sequences – Cauchy's first limit theorem – Cauchy's second limit theorem – Cesaro's theorem – subsequences - Cauchy sequence – Cauchy's general principle of convergence**.** **19L**

Unit IV **Series :** Infinite series – n^{th} term test – Comparison test – Kummer's test – D'Alemberls ratio test – Raabe's test - Gauss test – Root test **23L**

Unit V Alternating series – Leibnitz's test - Tests for convergence of series of arbitrary terms – Multiplication of series- Abel's Throrem-Mertens theorem-Power Series-Radius of convergence **20L**

Text Books:

- Arumugam .S and Thengapandi Issac – "sequences and series", New Gamma publishing House, Palayamkottai – 627 002.
- Tom M. Apostol – Mathematical Analysis, II Edition, Narosa Publishing House, New Delhi (unit I)

Book for Reference :

- Goldberg .R – Methods of Real Analysis, Oxford and IBH Publishing Co., New Delhi.

L	T	P	C
0	6	0	3

SEMESTER – I/III

Statistics

(For Mathematics Students)

Paper – I (90 Hours)

Objectives:

-To study the concept of measures of dispersion and measures of central tendencies
-To develope the concept Probability distributions

Unit I Moments, Skewness and Kurtosis - Curve fitting - method of least squares – Fitting lines – Parabolic, Exponential and Logarithmic curves. **16L**

Unit II Correlation and Regression – Scatter Diagram – Karl Pearson's coefficient of correlation – Properties – Lines of Regression – Coefficient of Regression and properties – Rank Correlation. **16L**

Unit III Association of Attributes – Consistency of data – criteria for independence – Yule's coefficient of Association. **14L**

Unit IV Random variable – Distribution function – properties of Distribution function – Mathematical Expectation – Addition theorem of Expectation – Multiplication theorem of Expectation – Moment generating function – cumulants – characteristic function – Properties of characteristic function**.** **22L**

Unit V Discrete and continuous Probability Distributions - Binomial and Poisson Distribution and their moments, Generating function, characteristic function, properties and simple applications. Normal Distribution – Standard normal distribution and their properties – simple problems**.** **22L**

Text Book:

Gupta .S.C and V.K. Kapoor – Fundamentals of Mathematical Statistics – (2002) Sultan Chand & Sons, New Delhi.

Books for Reference :

- Vittal, V.R. – Mathematical Statistics (2004) Maragatham Publications
- D.C. Sancheti & Kapoor – Statistics
- M.L. Khanna – Statistics
- S. Arumugam & others – Statistics

L	T	P	C
0	6	0	3

SEMESTER – I/III

Allied Mathematics

(For Science Students)

Paper – I

Algebra and Differential Equations (90 Hours)

Objectives:

-To know the order and degree of the ODE
-To understand the basic Theory of equations
-To study the concept of Laplace transforms
-To know the theory of matrices

Unit I Theory of Equations – Formation of Equations – Relation between roots and coefficients – Reciprocal equations. **20L**

Unit II Transformation of Equations – Approximate solutions to equations – Newton's method and Horner's method.18L

Unit III Matrices – Characteristic equation of a matrix – Eigen values and Eigen vectors – Cayley Hamilton theorem and simple problems **15L.**

Unit IV Differential equation of first order but of higher degree – Equations solvable for p, *x*, y – Partial differential equations – formations – solutions – Standard form $P_p + Q_q = R$**.** **20L**

Unit V Laplace transformation – Inverse Laplace transform**.** **17L**

Text book:

- Dr. S. Arumugam & others – Allied Mathematics – I

SEMESTER III

Skill Based Core
Paper – I
VECTOR CALCULUS (60 Hours) (SSMA3A)

L	T	P	C
4	0	0	4

Objectives:

-To provide basic knowledge of vector differentiation and vector integration

-To solve problems related to that

Unit I Vector point functions – Scalar point functions – Derivative of a Vector & Derivative of sum of vectors – Derivative of product of a Scalar and Vector point function – The vector operator 'del' – Gradient **13L**

Unit II Divergence – Curl, solenoidal, irrotational vectors – Laplacian operator**.** **12L**

Unit III Integration of point function – Line integral – Surface integral**,** **13L**

Unit IV Volume integral – Gauss divergence theorem (statement only) – Problems. **12L**

Unit V Greens theorem and Stoke's theorem (statements only) – problems. **10L**

Text Book:

- Durai Pandian.P and Laxmi Durai Pandian – Vector Analysis (Revised Edition – Reprint 2005) Emerald Publishers.

Books for Reference :

- Dr. S. Arumugam and others – Vector Calculus, New Gamma Publishing House.
- Susan .J.C - Vector Calculus, (4th Edn.) Pearson Education, Boston 2012.
- Anil Kumar Sharma, - Text book of Vector Calculus, Discovery Publishing House, 1993.

SEMESTER – III

L	T	P	C
2	0	0	2

Non – Major Elective Paper – I

Mathematics for Competitive Examinations -I (30 Hours) (SNMA3A)

Objectives:

-To learn the problems solving techniques for aptitude problems

-To enable the students prepare themselves for various competitive examinations

Unit I	Simplifications, averages	**7L**
Unit II	Ratio and proportion	**5L**
Unit III	Partnership – Percentage	**5L**
Unit IV	Profit and Loss	**6L**
Unit V	Problems on numbers	**7L**

Text Book:

Objective Arithmetic – R.S. Aggarwal – S.Chand & Co

Books for Reference :

- Quantitative Aptitude for Competitive examinations – Abhijit Guha – TMH
- Mathematics for life – M. Immaculate – Nanjil offset Printers

L	T	P	C
2	0	0	2

SEMESTER – III

Non – Major Elective Paper – I

Fundamentals of Statistics - I (30 Hours) (SNMA3B)

Objectives:

-To introduce measures of central tendency to other major students

-To study correlation and regression and solving simple problems

Unit I	Classification of datas – Bar diagram – Pie chart	**7L**
Unit II	Measures of Central tendency : Mean, median, mode (with frequency)	**5L**
Unit III	Measures of dispersion : Range – standard deviation, variance – Quartile deviation **7L.**	
Unit IV	Correlation – rank correlation (Problems only**)**	**6L**
Unit V	Regression equations (Problem only)	**5L**

Text Book:

- Dr. S. Arumugam – Statistics

Books for Reference :

- S.P. Gupta – Statistics
- M.L. Khanna – Statistics
- T.Veerarajan-Fundamentals of Mathematical Statistics

SEMESTER – IV

L	T	P	C
2	4	0	4

CORE PAPER – VI
ABSTRACT ALGEBRA-I (90 Hours) (SSMA41)

Objectives:

-To introduce the concept of Groups ,Ring and Field

-To study the concept of homomorphism

Unit I Groups – definition and Examples – Subgroup – order of an element – centre of a group – Normalizer and centralizer. Product of two subgroups – order of HK – Intersection and union of subgroups. **18L**

Unit II Cyclic groups – generators of a cyclic group – Number of generators of a cyclic groups – Cosets – Partitioning of a group by Cosets – Lagrange's theorem – Euler's theorem – Fermat's theorem **16L**

Unit III **Normal subgroups :** Quotient groups – Group Homomorphis – Canonical homomorphism – kernel of a homomorphism – Isomorphism – Automorphism – Inner automorphism – Permutation groups – Cayley's theorem**.** **20L**

Unit IV **Rings:** Definition and examples – Types of rings – Elementary properties of a ring – Integral domain – Field – Sub rings – Subfields – Ideals – Principal ideal – quotient ring – Maximal and prime ideals - characteristic of a ring – PID – UFD**.** **18L**

Unit V Homomorphism of rings – Isomorphism – kernel of a homomorphism – Fundamental theorem – Field of quotients of an integral domain – polynomial rings – Division algorithm **18L**

Text Book:

- Arumugam .S and Tangapandi Issac .A – "Modern Algebra"scitech publications Pvt. Ltd.

Books for Reference :

- Anton .H and C. Rorres - Elementary Linear Algebra (9th Edn) John Wiley and Sons, Inc., New York 2005.
- Manicavasagam Pillai .T.K and others – Modern Algebra, S. Viswanathan Publishers, Chennai 1993.
- Herstein .I.N – Topics in Algebra, Vikas Publishing Pvt. Ltd. 1975, New Delhi.

L	T	P	C
0	6	0	3

SEMESTER – II / IV

Statistics

(For Mathematics Students)

Paper – II (90 Hours)

Objectives:
-To know the concept of index numbers
-To study the distribution functions
-To understand the Analysis of varience

Unit I Characteristics of index numbers – Laspeyer's and Paasche's – Fisher's and Bowley's Marshall and Edgeworth's index numbers – Tests – Unit test, Commodity Reversal test, Time Reversal test, circular test**.** **12L**

Unit II Testing of Hypothesis – Null hypothesis and Alternate hypothesis – Type I and Type II errors - Critical Region, Level of significance – Test of significance for large samples – Testing a single proportion – Difference of proportions. Testing a single mean and Difference of means. **18L**

Unit III Tests based on t-distribution – single mean and Difference of means – Tests based on F-distribution – Variance Ratio test – Tests based on Chi-square Distribution – Independence – Goodness of fit**.** **16L**

Unit IV Analysis of varience – one way and two way classified data – Basis of experimental design – Randomized Block Design – Latin square – simple problems. **22L**

Unit V Statistical Quality control – Definition – Advantages, Process control – Control chart, Mean chart, Range chart, P-chart, Product Control – Sampling Inspection Plans . **22L**

Text Book:

- Gupta .S.C & V.K. Kapoor – Fundamentals of Mathematical Statistics – (2002) Sultan Chand & Sons, New Delhi.

Books for Reference :

- Vittal .P.R – Mathematical Statistic (2004) – Maragatham Publications
- DC Sancheti & Kapoor – Statistics
- M.L. Khanna – Statistics
- S. Arumugam & others – Statistics

L	T	P	C
0	6	0	3

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc. Mathematics) / Semester – II / Allied – II

Allied Mathematics

(For Science Students) Paper – II

Vector Calculus & Fourier Series (90 Hours)

Objectives:

-To provide basic knowledge of vector differentiation and integration
-To solve integration problems

Unit I Vector differentiation – Gradient – Divergence and curl **20L**

Unit II Evaluation of double and triple integrals **18L**

Unit III Vector integration – Line, surface and volume integrals **18L**

Unit IV Green's, Stokes and Divergence theorems (without proof) – simple problems **17L**

Unit V Fourier series – Even and odd functions – Half range Fourier series. **17L**

Text Books:

- Dr. S. Arumugam & Issac – Vector Calculus
- T.K. Manicavachagom Pillai – Calculus (Vol II)

SEMESTER – IV

L	T	P	C
4	0	0	4

Skill Based Core
Paper – II
TRIGONOMETRY, LAPLACE TRANSFORMS AND FOURIER SERIES

(60 Hours) (SSMA4A)

Objectives:

-To understand the concept of Trigonometry

-To know the concept of Laplace transform

-To study the concept of Fourier series

Unit I Trigonometry : Expansions of sin nx, cos nx, tan nx and expansions of $\sin^n x$ & $\cos^n x$**.** **10L**

Unit II Hyperbolic functions – Relations between hyperbolic functions and circular functions – Inverse hyperbolic functions – Logarithm of complex numbers – Summation of series by C + iS method. **13L**

Unit III Laplace Transforms – Inverse Laplace Transforms**.** **13L**

Unit IV Solving linear differential equations with constant coefficients and simultaneous equations using Laplace Transforms. **12L**

Unit V Fourier Series – Definition - Finding Fourier coefficients for a given periodic function with period 2π and $2l$ – Odd and even functions – Half range series. **12L**

Text Books:

Arumugam .S and Tangapandi Issac .A -Trigonometry and Fourier Series

Manichavasagam Pillai, T.K., and S. Narayanan-Differential Equations and its Applications

Books for Reference :

- Manichavasagam Pillai, T.K., and S. Narayanan, - Trigonometry, Viswanathan Publishers and Printers Pvt. Ltd.
- Loney - Trigonometry.
- Robert T. Seeley - Fourier Series and Integrals, Dover Publications, New York, 2006.
- Ray Hanna J., - Fourier Series, Transforms and Boundary Value Problems, Dover Publications, New York, 2008.

SEMESTER – IV

L	T	P	C
2	0	0	2

Non – Major Elective Paper – II

Mathematics for Competitive Examinations -II (30 Hours) (SNMA4A)

Objectives:

-To learn the problems solving techniques for aptitude problems

-To enable the students prepare themselves for various competitive examinations

Unit I	Simple Interest – Compound interest	**6L**
Unit II	Time and work	7L
Unit III	Time and distance	**7L**
Unit IV	Chain Rule	**5L**
Unit V	Pipes and Cistern	5L

Text Book:

- Objective Arithmetic – R.S. Aggarwal

Books for Reference :

- Descriptive Mathematics - R.S. Aggarwal, Deepak Aggarwal
- Mathematics for life – M. Immaculate – Nanjil offset Printers

L	T	P	C
2	0	0	2

SEMESTER – IV

Non – Major Elective Paper – II

Fundamentals of Statistics - II (30 Hours) (SNMA4B)

Objectives:

-To introduce measures of central tendency to other major students

-To study index numbers and simple problems

- To know the concepts of attributes

Unit I	Theory of attributes for two attributes (simple problems)	**7L**
Unit II	Characteristics of index numbers – Laspeyer's and Paasche's	**6L**
Unit III	Bowley's – Marshall index numbers	**6L**
Unit IV	Fisher's index number – Time Reversal test (Problems only)	**5L**
Unit V	Fitting a straight line	**6L**

Text Book:

S.Arumugam & Issac -Statistics

Books for Reference :

- S.P. Gupta – Statistics
- M.L. Khanna – Statistics
- T.Veerarajan-Fundamentals of Mathematical Statistics

SEMESTER – V

L	T	P	C
3	2	0	4

CORE PAPER – VII

ABSTRACT ALGEBRA II (75 Hours) (SMMA51)

Objectives:

- To facilitate a better understanding of vector space
- To solve problems in matrices

Unit I **Vector Spaces :** Definition and examples – elementary properties – subspaces – linear transformation – fundamental theorem of homomorphism **16L.**

Unit II Span of a set – linear dependence and independence – basis and dimension – theorems **14L**

Unit III Rank and nullity Theorem – matrix of a linear transformation
Inner product space : Definition and examples – orthogonality – orthogonal complement – Gram Schmidt orthognalisation process**.** **15L**

Unit IV **Matrices :** Elementary transformation – inverse – rank -Cayley Hamilton Theorem-Applications of Cayley Hamilton Theorem **15L**

Unit V **E**igen values and Eigen vectors – Properties and problems-Bilinear Forms-Quadratic Forms-Reduction of quadratic form to diagonal form **15L**

Text Book:

Arumugam & Issac – Modern Algebra

Books for Reference :

- Shama .J.N and Vashistha .A.R, "Linear Algebra", Krishna Prakash Nandir, 1981.
- John B. Fraleigh, "A First Course in Abstract Algebra", 7th edition, Pearson, 2002.
- Strang G., "Introduction to Linear Algebra", 4th edition, Wellesly Cambridge Press, Wellesly, 2009.
- Artin M., "Abstract Algebra", 2nd edition, Pearson, 2011

SEMESTER – V

L	T	P	C
3	2	0	4

CORE PAPER – VIII

REAL ANALYSIS - II (75 Hours) (SMMA52)

Objectives:

- To understand the real number of system and metric spaces
- To know the concepts of continuity and Riemann integrals
- To study the concept of connectedness and compactness

Unit I Metric spaces – Examples – bounded sets – open ball – open sets – subspaces – Interior of a set**.** **13L**

Unit II Closed sets – closure – Limit points – Dense sets – complete metric space – Cantor's intersection theorem – Baire's Category Theorem. **16L**

Unit III Continuous functions on metric spaces : Functions - continuous at a point on the real line – Functions - Continuous – uniform continuous in a metric space – Discontinuous function of R. **15L**

Unit IV Connectedness and compactness : Connectedness – connected subset of R – connectedness and continuity – compact metric spaces – compact subset of R – Heine Borel theorem. **16L**

Unit V **Riemann Integral :**
Sets of measure zero – Existence of the Riemann integral – Derivatives – Rolle's theorem – Fundamental theorem of Calculus – Mean value theorem – Cauchy's mean value theorem – Taylor's theorem**.** **15L**

Text Books:

Arumugam & Issac – Modern Analysis

- Malic .S.C - Mathematical Analysis, Wiley Eastern Limited, New Delhi.

Books for Reference :

- Tom .M. Apostal – Mathematical Analysis, II Edition, Narosa Publishing House, New Delhi (Unit I) (1997)
- Goldberg .R – Methods of Real Analysis Oxford and IBH Publishing Co. New Delhi (200)
- Viswanath Naik .K – Real Analysis, Emerald Publishers, Chennai.
- Berberian .S.K – First course in Real Analysis, Springer Verlag, New York.

L	T	P	C
3	2	0	4

SEMESTER – V

CORE PAPER – IX

STATICS (75 Hours) (SMMA53)

Objectives:

- To provide the basic knowledge of equilibrium of a particle
- To develop a working knowledge to handle practical problems

Unit I : Forces acting at a point – parallelogram Law f forces – Triangle of forces – Lami's Theorem – Problems. **16L**

Unit II: Parallel forces and moments – resultant of two parallel forces – resultant of two unlike unequal parallel forces – Varignon's Theorem – Problems. **14L**

Unit III : Equlibrium of three forces acting on a regid body – three coplanar forces theorem – problems. **16L**

Unit IV : Friction – Laws of friction – angle of friction – equilibrium of a particle (i) on a rough inclined plane (ii) under a force parallel to the plane (iii) under any force – problems **15L**

Unit V : Equilibrium of strings – equation of the common catenary – tension at any point – Geometrical properties of common catenary – problems. **14L**

Text Book:

Venkatraman, M.K. - Statics, Agasthiar Publications, Trichy.

Books for Reference:

.S – Statics, Emerald Publishers.
3. Duraipandian, P, Laxmi Duraipandian and Muthamizh Jayapragasam- Mechanics, S.Chand & Company.
1. Narayanan, S-Statics, S.Chand & Company, New Delhi.
2. Viswanatha Naik, K and Kasi, M

L	T	P	C
3	2	0	4

SEMESTER-V

CORE PAPER-X

TRANSFORMS AND THEIR APPLIATIONS (75 HOURS) (SMMA54)

Objectives:

- To develop the knowledge of Transformations
- To solve the problems connected

Unit I	Fourier transforms-Properties of Fourier transforms	**13L**
Unit II	Infinite Fourier Cosines and Sine transforms-Properties	**12L**
Unit III	Finite Fourier transforms	**13L**
Unit IV	Z tranforms-Properties	**12L**
Unit V	Inverse Z transforms	**10L**

Text Book:

A.Singaravelu-Engineering Mathematics (Volume III)-Meenakshi Agency,Chennai

Reference Book:

A.Gangatharan-Engineering Mathematics (Volume II)-PHI (2007)

L	T	P	C
4	0	0	4

SEMESTER – V

Paper – XI
MAJOR ELECTIVE - I
1.1 ASTRONOMY - I (60 Hours) (SMMA5A)

Objectives:

- To introduce the exciting world of Astronomy to students
- To understand the movements of the celestial sphere
- To study the Kepler's laws of motion

Unit I **Spherical Trigonometry**

Spherical triangle – The fundamental formula of Spherical trigonometry, the sine, cosine, four parts and Napier formula (without proof) and simple problems. **13L**

Unit II **The celestial sphere**

Celestial co-ordinates – Diurnal motion – Rising and setting of a star – sidereal time – circumpolar stars – Morning and evening stars - Twilight. **12L**

Unit III Earth – length of a day – Refraction – Tangent formula – Cassini's formula – Effects of refraction **12L**

Unit IV Geocentric parallax – Effects – Heliocentric parallax – Effects **11L**

Unit V Kepler's laws – verification of Kepler's laws – True anomaly, mean anomaly, Eccentic anomaly – Relation between them. **12L**

Text Book:

- Kumaravelu .S and Susheela Kumaravelu – Astronomy for degree classes, Rainbow Printers, Nagercoil (2005)

Book for Reference :

- Ramachandran .G.V – Astonomy

SEMESTER – V

Paper – XI
MAJOR ELECTIVE - I
1.2 DISCRETE MATHEMATICS (60 Hours) (SMMA5B)

L	T	P	C
4	0	0	4

Objectives:
-To study the concept of Mathematical logic
-To understand the basics of Lattices and Boolean Algebra
-To know the number system and codes

Unit I **(Mathematical logic)** Statement and notation – Connectives – Negation – Conjunction – Disjunctions – Statement formula and truth table – conditional and Biconditional – Well defined formulae – Tautologies **12L**

Unit II Normal forms- The theory of inference for the statement calculus- The Predicate- The theory of inference for the Predicate calculus **13L**

Unit III **(Algebraic Structures)**
Groups and Monoids – Simple properties–group codes. **11L**

Unit IV **(Lattices and Boolean algebra)**
Lattices and Posets – Properties of lattices – special lattices – Boolean algebra – Gating networks – Minimal sums of products**.** **12L**

Unit V **(Number system and codes)**
Decimal, Binary, octal, Hexadecimal – Conversion from one to another – Binary addition, subtraction multiplication and division – BCD – weighted excess time – Gray code **12L**

Text Book:

- Tremblay and Manohar – Discrete Mathematical Structures with application to Computer Science, (Tata McGraw Hill, New Delhi) 1997.

Books for Reference :

- Ralph P. Grumaldi Pearson Edelen – Discrete and Combinatorial Mathematics – an applied Introduction (IV edition)
- Maluino .A and Leech – Digital Principles and Application McgraHill.
- Venkataraman .M.K. and others – Discrete mathematics 2000 The National Publishing Company.
- Balaji .G – Discrete Mathematics – Balaji Publishers, Chennai (2013)
- Veerarajan .T – Discrete mathematics – Tata McGraw Hill – (2009)

L	T	P	C
4	0	0	4

SEMESTER – V

Paper – XI

MAJOR ELECTIVE - I

1.3 Combinatorial Mathematics (60 Hours) (SMMA5C)

Objectives:

-To know the basic concepts of Pairings

-To understand relations

-To study the concepts of designs

Unit I	Selections and Binomial coefficients – Permutations – Ordered Selections – Unordered Selections – Miscellaneous Problems.	**13L**
Unit II	Pairings Problems - Pairings within a set – Pairings between sets	**12L**
Unit III	Recurrence – Fibonacci – type relations. Using generating functions – Miscellaneous methods.	**12L**
Unit IV	The inclusion – Exclusion Principles	**11L**
Unit V	Block designs – Square Block designs	**11L**

Text Book:

- Ian Andersen – A first course in combinatorial Mathematics – Clarendon Press, Oxford.

SEMESTER – V

L	T	P	C
4	0	0	4

Paper – XII

MAJOR ELECTIVE - II

2.1 Operations Research-I (60 Hours) (SMMA5D)

Objectives:

- To introduce the various techniques of operations research
- To make the students solve real life problems in Business Management
- To understand different types of LPP

Unit I **Linear Programming Problem :** Mathematical formulation of LPP –Graphical Method- Simplex Method – Artificial variable technique **13L**

Unit II Concept of Duality – Primal and Dual Problems – Duality – Dual Simplex Method. **12L**

Unit III **Transportation Problem :** North-West Corner Rule – Matrix Minima method – Vogel's Approximation Method – MODI Method – Degeneracy and Unbalanced Transportationproblem. **12L**

Unit IV **Assignment Problem :** Hungarian Method – Unbalance Assignment Problem **11L**

Unit V **Sequencing Problem:** n jobs and 2 machines- n jobs and 3 machines- 2 jobs and m machines **12L**

Text Book :

- KantiSwarup, P.K. Gupta and Manmohan – Operations Research – Sultan Chand & Sons – 2006, 12th edition.

Books for Reference :

- Gupta .P.K and D.S. Hira – Operations Research – S. Chand and Company.
- B.J. Ranganath and A.S.Srikantappa -Operations Research, Yesdee Publishing House,Chennai(2017)
- Hillier, F.S. and G.J. Lieberman - Introduction to Operations Research, 9th Ed., Tata McGrawHill, Singapore, 2009.
- Hamdy A. Taha, - Operations Research, An Introduction, 8th Ed., Prentice – Hall India, 2006.
- Hadley .G. - Linear Programming, Narosa Publishing House, New Delhi, 2002.

L	T	P	C
4	0	0	4

SEMESTER -V

Paper -XII
MAJOR ELECTIVE -II
2.2 STOCHASTIC PROCESS (60 Hours) (SMMA5E)

Objectives:

-To know probability and distribution functions

-To understand the concepts of stochastic process

-To identify Markov chains

Unit I Generating functions-Laplace transform of probability distribution-classification of distribution-Stochastic process-introduction-specification of Stochastic process**.**

12L

Unit II Markov chains-Definition and examples-Higher transition probabilities-Generalisation of Independent Bernoulli Trials-classification of states and chains-Determination of Higher transition probabilities-Stability of Markov systems-Graph theoretic approach.

12L

Unit III Markov chain with Denumerable number states-Reducible chains-Statistical inference for Markov chains-Markov chain with continuous state space-Nonhomogeniouschains **11L**

Unit IV Markov process with discrete state space-Poisson process-
Poisson process and related distributions-Generalisation of Poisson process-Birth and Death process

13L

Unit V Markov process with Discrete state space-Derived Markov chains-Erlang process

12L

Text Book :

Stochastic Proces-J.Medhi-New Age International Publishers (p) Ltd Third Edition

Reference Books:

Applied Stochastic Process-Suddhendu Biswas –New Central Book Agency (P) Ltd Kolkatta

Introduction to Stochastic Process-Hoel Port and Stone-Universal Book Stall, New Delhi

SEMESTER -V

L	T	P	C
4	0	0	4

Paper -XII
MAJOR ELECTIVE -II
2.3 M.S.OFFICE (60 Hours) (SMMA5F)

Objectives:

-To know the basic knowledge of computer

-To study word,excel andpowerpoint

Unit I: MS Word

Creating a document-saving, printing, editing and closing the document -copying, pasting, finding and replacing a text -adding headers and footers**.** **11L**

Unit II:

Formatting a document-Turning Bold on/off, Underline on/off, highlight on/off-changing font size ,page setup-changing margins-bullets and numbering, working with tables-changing the column width and row height-inserting or deleting a row/column-mailmerge**.** **12L**

Unit III: MS Excel

Creating a worksheet-entering, editing, deleting data in cells-saving and previewing the worksheet- entering formulas , working with basic functions SUM,AVERAGE,MAX and MIN -sorting **10L.**

Unit IV :

Formatting a worksheet-inserting ,deleting a row/column changing font size -Graphs and charts-Simple calculations using mathematical, statistical, logical functions. **12L**

Unit V: MS Power point

Creating a simple presentation -adding transition effects to a presentation-adding sound effects to a presentation-creating hyperlinks between slides-changing the background-inserting images on slides. **15L**

Text Book :

Dr.P.Rizwan Ahmed, "Office Automation 2010", Margham Publications 2016.

Reference Books :

1. Stephen . L . Nelson, "Office 2010, Computer Reference", Tata McGraw Hill Publishing company Ltd.
2. Sumner Mary- "Enterprise Resource Planning", Pearson Education, inc. I Edition 2012.

SEMESTER – VI

L	T	P	C
3	2	0	4

CORE -XI
Major Paper – XIII

COMPLEX ANALYSIS (75 Hours) (SMMA61)

Objectives:

-To understand thefunctions of complex variables

-To learn about elementary transformations concepts in complex variables

-To understand the singularity concepts and residues

Unit I **(Analytic functions)**

Functions of a complex variable – Derivatives – Cauchy – Riemann equations – sufficient conditions – Polar form – Analytic functions – Harmonic functions**.** **13L**

Unit II **(Integrals)**

Definite integrals – Contours – Cauchy – Goursat theorem – antiderivatives and independence of path – Cauchy Integral formula – Morera's theorem. **17L**

Unit III **(Series)**

Taylor's series – Examples – Laurent's series – Zeros of analytic functions – Residues – Residue theorem – Principal part of functions – Residues at poles. **16L**

Unit IV **(Evaluation of Integrals)**

Evaluation of improper real integrals – improper integrals involving sines and cosines – Definite integrals involving sines and coines**.** **14L**

Unit V **(Transformations)**

Conformal mappings–basic properties–Bilinear maps – fixed points – Applications 1**5L**

Text Book:

- Arumugam.S and T. Issac – "Complex Analysis" – Scitech Publishing House – Chennai.

Books for Reference :

- Churchill .R.V. and J.W. Brown – "Complex variables and Applications" – IV edition – McGraw Hill International Editions.
- Ponnuswamy .S – "Foundations of Complex Analysis", Narosa Publication House, New Delhi, II edition 2005.
- Duraipandian .P and Lakshmi Duraipandian – "Complex Analysis" – Emerald Publications, Chennai (2001)

SEMESTER – VI

L	T	P	C
4	0	0	4

CORE -XII
Major Paper – XIV

NUMBER THEORY (60 Hours) (SMMA62)

Objectives:

-To highlight the beauties in the world of numbers

-Toprepare the students for coding through cogruences

Unit I Peano's Axioms – Mathematical Induction – The Binomial Theorem – Early NumberTheory. **11L**

Unit II Division Algorithm – GCD – Euclidean Algorithm – The Diaphantine Equation ax+by=c. **12L**

Unit III The fundamental Theorem of Arithmetic – The Sieve of Eratosthenes – The Goldbach conjecture. **13L**

Unit IV Basis properties of congruences – Linear congruence and the Chinese Remainder Theorem. **11L**

Unit V Fermat's Theorem – Wilson's Theorem – The Fermat – Kraitchik Factorization Method. **13L**

Text Book:

- David .M. Burton - Elementary Number Theory (Sixth Edition) Tata McGraw Hill Education Pvt. Ltd.

Books for Reference :

- Ivan Niven and H, Zuckerman - An Introduction to Theory of Numbers.
- Kumaravelu .S, and Susheela Kumaravelu - Elements Theory - Nagercoil, 2002.

SEMESTER – VI

L	T	P	C
3	2	0	4

CORE -XIII
Major Paper – XV
GRAPH THEORY (75 Hours) (SMMA63)

Objectives:

-To introduce the notion of graph theory and its applications

-To learn the techniques of combinatorics in graph theory

Unit I: Definition and examples of graphs – degrees – subgraphs – isomorphism – independent sets and coverings – matrices – operation on graphs.
18L

Unit II: Degree sequences – graphic sequences – walks – trails and paths – connectedness and components – connectivity. **18L**

Unit III: Eulerian graphs – Hamiltonian graphs – characterisation of trees – centre of a tree**.**
13L

Unit IV: Definition and properties of planar graphs – chromatic number and chromatic index
13L.

Unit V: Chromatic polynomials – definition and basic properties of digraphs – paths and connectedness in digraphs**.**
13L

Text book:

Arumugam,S and S. Ramachandran – Invitation to graph Theory, Scitech publications, Chennai.

Books for reference:

- Kumaravelu. S and Susheela Kumaravelu – Graph theory.
- Narasingh Deo – Graph theory with application to engineering and computer science, Prentice – Hall of india pvt. Ltd., New Delhi.

L	T	P	C
4	0	0	4

SEMESTER -VI

CORE -XIV

MAJOR PAPER -XVI

DYNAMICS(60 Hours) (SMMA64)

Objectives:

-To provide a basic knowledge of the behaviour of objects in motion

-To develop a working knowledge to handle practical problems

Unit I : Projectiles- Equation of path – range – maximum height- time of flight- range on an inclined plane-problems. **14L**

Unit II : Collision of elastic bodies- Laws of impact- direct and oblique impact-Problems. **11L**

Unit III : Simple Harmonic Motion (SHM) in a straighrt line- Geometrical representation – composition of SHM's of the same period in the same line and along two perpendicular directions – problems**.** **13L**

Unit IV : Motion under the action of central forces – velocity and acceleration in polar co-ordinates – problems. **10L**

Unit V : DifferentialEquation of central orbit - pedal equation of central orbit – problems to find the law of force towards the pole when the orbit is given. **12L**

Text Book:

Venkatraman, M.K. - A Text Book on Dynamics, Agasthiar Publication, Trichy.

Books for Reference:

1. Narayanan, S- Dynamics, S.Chand & company, 16th Edition,1986, New Delhi.
2. Duraipandiyan, P, Laxmi Duraipandian and Muthamiz Jayaprgasam- Mechanics 2003, S.Chand & Company.

L	T	P	C
4	0	0	4

SEMESTER -VI
CORE -XV
MAJOR PAPER -XVII
NUMERICAL METHODS (60 Hours) (SMMA65)

Objectives:

-To introduce the finite differences

-To solve numerical problems by different methods

Unit I Solution of Numerical algebraic and Transcendental Equations : bisection method – Newton's method. Criterion of order of convergence of Newton's method. Regula False method – Gauss elimination – Gauss Jacobi – Gauss Seidal method **13L**

Unit II **Finite Difference :** First and higher order differences – Forward and backward differences – Properties of Operator – Differences of a polynomial –Factorial Polynomial **11L**

Unit III Interpolation : Newton's Forward – backward, Gauss forward – backward interpolation formula – Bessel's formula. Divided differences – Newton's divided difference formula – Legrange's interpolation formule **11L**

Unit IV Numerical Differentation and Integration : Newtons forward and backward differences for differentiation – Derivatives using Bessel's formula – Trapezoidal rule, simpson's 1/3 rule & 3/8 rule **13L**

Unit V **Difference Equations :** Definition – order and degree of difference equation – Linear difference equation – Finding complementary function – particular Integral –simpleapplications. **12L**

Text Book:

- Venkatraman .M.L - Numerical methods in Science and Engineering National Publishing Company V Edition 1998

Books for Reference :

- Kandasamy .P.K. Thilagavathy and K. Gunavathy 'Numerical Methods' S. Chand & Company Ltd. Edn. 2006.
- B. Stephen John – Numerical Analysis
- Autar Kaw and Egwwn Enc Kalu - Numerical methods with Application Abidet. Autokaw.com 2nd 2011.

L	T	P	C
4	0	0	4

SEMESTER – VI

Paper – XVIII

MAJOR ELECTIVE - III

3.1 Astronomy - II (60 Hours) (SMMA6A)

Objectives:

-To understand the exiting world of Astronomy to the students

-To study the concepts of eclipses

-To facilitate the movements of celestial objects

Unit I Equation of time – Seasons – Convertion of time. **10L**

Unit II Moon – sidereal month, Lunation and relation between them – Phases of moon – Lunar Liberation - surface of moon – metonic cycle – Tides. **14L**

Unit III Eclipses – shadow cone – Minimum and maximum number of eclipses. **12L**

Unit IV Planetary Phenomena – Bode's law – Elongation – Sidereal period, synodic period and the relation between them **14L**

Unit V Phases – Stationary points – solar system**..** **10L**

Text Book:

- S. Kumaravelu and Susheela Kumaravelu – Astronomy Rainbow Printers, Nagercoil (2005)

Book for Reference :

- George - O - Abell – Exploration of the Universe (Second Edition)

L	T	P	C
4	0	0	4

SEMESTER – VI

Paper – XIX

MAJOR ELECTIVE - III

3.2 FUZZY MATHEMATICS (60 Hours) (SMMA6B)

Objectives:

-To introduce fuzzy concepts to students

-To facilitate the students to study fuzzy operations and fuzzy numbers

Unit I **Crisp Sets – Fuzzy Sets –** Basic Types – Basic Concepts – Characteristics and Significance of the Paradigm shift. **11L**

Unit II Additional properties of α-cuts – representations of fuzzy sets – Extension principle for fuzzy sets**.** **13L**

Unit III **Fuzzy set operations –** Fuzzy complements – Fuzzy intersections : t-norms – Fuzzy Unions : t-conorms – Combinations of operations – Aggregation operations. **11L**

Unit IV **Fuzzy Numbers –** Linguistic variables – Arithmetic operations on intervals – Arithmetic operations of fuzzy numbers – Lattice of fuzzy numbers – Fuzzy Equations. **13L**

Unit V Fuzzy Decision Making – Individual Decision Making – Multi-person decision making – Fuzzy linear Programming. **12L**

Text Book:

- George J. Klir and Bo Bo Yuan – Fuzzy sets and Fuzzy Logic Theory Applications, Prentice Hall of India, 2002, New Delhi.

Book for Reference:

- George J. Klir and Tina .A Folger – Fuzzy sets, uncertainty and Informations – Prentice Hall of India, 2003, New Delhi.

SEMESTER – VI

L	T	P	C
4	0	0	4

Paper – XX

MAJOR ELECTIVE - III

3.3 Mathematical Modelling (60 Hours) (SMMA6C)

Objectives:

-To study the mathematical models through ODE and difference equations

-To train the students to develop mathematical models in real life problems

Unit I **(Mathematical modelling through O.D.E (First order))**
Linear growth and Decay models – Non-linear growth and Decay models – Compartment Models – Dynamics Problems – Geometrical Problems**.** **11L**

Unit II Population dynamics – Epidemics – Compartment Models – Economics, Medicine, Arms race, Battles and International Trade. **13L**

Unit III (**Mathematical Modelling through O.D.E. (Second order))**
Planetary motion – circular motion – Motion of satellites – Modelling through linear difference equations of second order. **11L**

Unit IV **(Mathematical Modelling through difference equations)**
Basic theory of difference equation with constant coefficients – Economics and Finance – Population dynamics and genetics – Probability theory. **13L**

Unit V **(Modelling through graphs)**
Solutions that can be modelled through graphs - models in terms of directed graphs, signed graphs – weighted digraphs and unoriented graphs**.** **11L**

Text Book:

- Kapur .J.N – Treatment as in "Mathematical Modelling" – New Age International Publishes, 2004.

Books for Reference :

- Kapur .J.N – Mathematical Modelling in Biology and Medicine – East West Press – 1985.
- Singh – Mathematical Modelling, International Book house – 2003.
- Frank R. Giordano, Maurice D.Weir and William P. Fox, - A first course in mathematical modelling, Thomson Learning, London and New York, 2003.

SEMESTER-VI

L	T	P	C
4	0	0	4

PAPER-XXI
MAJOR ELECTIVE-IV
4.1 OPERATIONS RESEARCH-II (60 Hours) (SMMA6D)

Objectives:

-To introduce Games and strategies

-To understand networking problems

-To make the students solve real life problems in business and management

Unit I **Games and Strategies :** Two Person Zero sum Games – The Maximin – Minimax Principle – Games without Saddle Points – Mixed Strategies – Graphical Solution of2xnandmx2games–DominanceProperty **12L**

Unit II **Replacement** of items that deteriorate with time-replacement age of a machine taking money value into consideration-replacement of items that completely fail suddenyandStaffingProblems **13L**

Unit III **Queing models :**General concept and definitions-characteristics-properties of Poisson process Models(M/M/1: /FCFS), (M/M/1 : N/FCFS),(M/M/S : /FCFS) **11L**

Unit IV **Network scheduling by PERT / CPM :** Network and basic components – Rules of Network Construction – Time Calculation in network – Critical Path Method – PERTCalculation. **13L**

Unit V **Inventory Control :** Introductions – Types of Inventories – Inventory decisions – Deterministic inventory Problem– EOQ problems with shortages**.** **13L**

Text Book:

- KantiSwarup, P.K. Gupta and Manmohan – Operations Research – Sultan Chand & Sons – 2006, 12th edition.

Books for Reference :

- Gupta .P.K and D.S. Hira – Operations Research – S. Chand and Company.
- B.J. Ranganath and A.S.Srikantappa -Operations Research, Yesdee Publishing House,Chennai(2017)
- Hillier, F.S. and G.J. Lieberman - Introduction to Operations Research, 9th Ed., Tata McGrawHill, Singapore, 2009.
- Hamdy A. Taha, - Operations Research, An Introduction, 8th Ed., Prentice – Hall India, 2006.

. Hadley .G. - Linear Programming, Narosa Publishing House, New Delhi, 2002

L	T	P	C
4	0	0	4

SEMESTER – VI

PAPER-XXII

MAJOR ELECTIVE - IV

4.2 Coding Theory (60 Hours) (SMMA6E)

Objectives:

-To introduce coding and decoding concepts

-To develop the students in the field of coding theory

Unit I Basic assumptions – Correcting and detecting error patterns – information rate – effects of error correction and detection – finding the most likely code word transmitted. **12L**

Unit II Linear codes – two important – subspaces independence – basic, dimension – matrices – Bases for C and C^+ generating matrices on coding. **12L**

Unit III Parity check matrices – equivalent codes – distance of a linear code – Linear codes – cosets – MLD for linear codes – Reliability of IMLD for linear codes. **11L**

Unit IV Some bounds for codes – perfect codes – hamming codes – extended codes – The extended Golay code – decoding the extended Golay code – Golay code **13L**

Unit V Polynomials and words – introduction to cyclic codes – introduction to cyclic codes – Polynomial encoding and decoding – finding cyclic codes – Dual cyclic codes**.** **12L**

Text Book:

- Coding theory, the essentials – Marcel Dekker, Inc. Madtrison Avenue, Newyork.

SEMESTER – VI

L	T	P	C
4	0	0	4

Paper- XXIII
MAJOR ELECTIVE-IV
4.3 Programming in C (60 Hours) (SMMA6F)

Objective:

-To introduce the exiting world of programming to the students

-To train the students to run simple C programmes

Unit I

C Declarations:- Introduction – Character Set – C tokens – Keywords and Identifiers – Identifiers – Constants – Variables – Data types – Declaration of Variables – Declaration of Storage Class – Assigning Values to Variables – Defining Symbolic Constants – Declaring VariableasConstant**.** **11L**

Unit II

Operators and Expressions:- Introduction – Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operator – Bitwise Operators – Special Operators – Arithmetic Expressions – Evaluation of Expressions–PrecedenceofArithmeticExpressions**.**

13L

Unit III

Managing Input and Output Operations:-getchar( ) – putchar( ) – scanf( ) – printf( ). **Decision Making and Branching:-** Introduction – Decision Making with IF Statement – Simple IF statement – The IF…Else Statement – Nesting of IF…Else Statements – The ELSE IF ladder – The Switch Statement – The ?: Operator – The GOTO statement. **Decision Making and Looping:-** Introduction – The WHILE Statement – The DO Statement – The FOR statement – Jumps in Loops. **13L**

Unit IV

Arrays :- Introduction – One-dimensional arrays – Declaration of One-dimensional arrays – Initialization of One-dimensional arrays - Two-dimensional arrays – Initialization of Two-dimensional arrays – Multi-dimensional arrays. **Character Arrays and Strings:-** Introduction – Declaring and Initializing String Variables – Reading Strings from Terminal – Writing Strings to Screen–StringHandlingFunctions

12L

Unit V

User-Defined functions:- Introduction – Need for User-defined functions – Definition of functions – Return Values and their Types – Function Calls – Function Declaration – Category of functions – No Arguments and No return values – Arguments but No return Values – Arguments with return values – No arguments but a return a value – Recursion –The Scope, Visibility and lifetime of a variables. **11L**

Text Book:

Programming in ANSI C – 6th Edition by E Balagurusamy – Tata McGraw Hill Publishing Company Limited.

Reference Books:

- Programming with C, Third Edition, Byron S Gottfried, Tata McGraw Hill Education Private Limited.
- . Programming in C ReemaThareja, Oxford University press.

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES
B.Sc. Physics
(Choice Based Credit System)
(With effect from the academic year 2017 -2018)

Semester - III	**Part I**	Tamil/Other Languages	6	4	3	25	75	100	30	40
	Part I I	English	6	4	3	25	75	100	30	40
	Part III	**Core subjects** 5.Electricity	4	4	3	25	75	100	30	40
		Practical-III	2	1	3	50	50	100	20	40
		Allied Subject-II (for allied subjects with theory and practicals) 1.Theory- Paper-I	4	3	3	25	75	100	30	40
		2.Practicals-1	2	1	3	50	50	100	20	40
		Allied Subject-II (for allied subjects with theory alone) 1.Theory- Paper-I	6	3	3	25	75	100	30	40
		Skill based subject Any one a. Maintanance of Electrical appliances b. Astrophysics	4	4	3	25	75	100	30	40
	Part IV	**Non-Major Elective** Paper-I	2	2	3	25	75	100	30	40
		Common-Yoga *	2	2						
		Total	**30**	**23**						

Semester IV	Part I	Tamil/Other Languages	6	4	3	25	75	100	30	40
	Part II	English	6	4	3	25	75	100	30	40
	Part III	**Core subjects** 6. Electromagnetism	4	4	3	25	75	100	30	40
		Practical-IV	2	1	3	50	50	100	20	40
		Allied Subject-II (for allied subjects with theory and practicals) 1.Theory- Paper-II	4	3	3	25	75	100	30	40
		2.Practicals-II	2	1	3	50	50	100	20	40
		Allied Subject-II (for allied subjects with theory alone) 1.Theory- Paper-II	6	3	3	25	75	100	30	40
		Skill based subject **Any one** a. Maintanance of Electronic appliances b. Physics of Human Anatomy	4	4	3	25	75	100	30	40
	Part IV	**Non-Major Elective** - Paper-II	2	2	3	25	75	100	30	40
		Common-Computer for Digital Era *	2	2						
	Part V	**Extension activity**	-	1	-	-	-	-	-	-
		Total	**30**	**24**						

Semester -V	**Part III**	**Core subjects** 7.Basic Electronics	4	4	3	25	75	100	30	40
		8.Programming in C++	4	4	3	25	75	100	30	40
		9.Atomic Physics	4	4	3	25	75	100	30	40
		10.**Major Elective I** (any one) a. Mathematical Physics b. Spectroscopy	4	4	3	25	75	100	30	40
		11.Major ElectiveII (any one) a. Communication Electronics b. Numerical Methods	4	4	3	25	75	100	30	40
		Practical-V- Non Electronics	4	2	3	50	50	100	20	40
		Practical-VI- Electronics	4	2	3	50	50	100	20	40
	Part IV	Skill based subject(Common) -Personality development/Effective Communication/Youth Leadership	2	2	3	25	75	100	30	40
		Total	**30**	**26**						

Semester VI	**Part III**	**Core subjects** 12.Digital Electronics	5	4	3	25	75	100	30	40
		13. Quantum Mechanics	5	4	3	25	75	100	30	40
		14. Nuclear Physics	4	4	3	25	75	100	30	40
		15 Solid state Physics	4	4	3	25	75	100	30	40
		16.Major Elective (any one) a. Medical Physics b. Energy Physics	4	4	3	25	75	100	30	40
		Practical-VII-	4	2	3	50	50	100	20	40
		Practical-VIII- Computer Programming with C++	4	2	3	50	50	100	20	40
		Total	**30**	**24**						

Total credits-141 (including extension activity)

- To be conducted outside class hour
- Credits not included

SEMESTER- III
PAPER -V

L	T	P	C
4	0	0	4

ELECTRICITY

Preamble: Objective of the paper is to provide a basic knowledge about electricity and various methods of analyzing electric circuits with d.c. and a.c. sources. This paper does not require any special prerequisite except the basic ideas on electricity at the school level and learners are expected to gain knowledge to design and characterize electric circuits.

UNIT-1: ELETRIC FIELD AND POTENTIAL

Introduction-electric charge- coulomb's law-electric field-lines of force-electric flux-Gauss's law-applications-coulomb's law from Gauss's law- electric field at a point due to point charge-line charge- spherically symmetric charge distribution-sheet of charge. -electric potential- relation connecting electric field and potential- equipotential lines and surfaces -potential at a point due to point charge-collection of charges-dipole and charged spherical shell-electric potential energy (12L)

UNIT-II: THERMO ELECTRICITY

Seebeck effect- laws of thermo e.m.f-– measurement of thermo e.m.f using potentiometer-Peltier effect-demonstration—Thomson effect- demonstration -thermodynamics of thermo couple –thermo electric power diagram –uses-applications-thermopile-Boy's radio micrometre –thermo-milli ammeter (11L)

UNIT-III: CHEMICAL EFFECT OF ELECTRIC CURRENT

Introduction -Faradays laws of electrolysis- electrical conductivity of an electrolyte-specific conductivity- Kohlrausch's bridge method of determining the specific conductivity of an electrolyte -Arrhenius theory of electrolytic dissociation- –-mobility of ions- Secondary cells- Gibbs –Helmholtz equation for a reversible cell . (10L)

UNIT-IV: STEADY CURRENT AND TRANSIENT CURRENT

Current and current density-ohm's law in vector form-conversion of galvanometer into voltmeter and ammeter-kirchoff's law-application to

wheat stone's network

Growth and decay of current in a circuit containing L and R with d.c.voltages - growth and decay of charge in a capacitance ,resistance circuit-determination of high resistance by leakage –growth and decay of charge in LCR circuit-conditions for the discharge to be oscillatory –frequency of oscillation. (15L)

UNIT-V: ALTERNATING CURRENT

Alternating Current- j operator method –use of j operator in the study of AC circuits-Resistance in an AC circuit-Inductance in an AC circuit- Capacitance in an AC circuit-AC through an inductance and resistance in series- capacitance and resistance in series – LCR series resonance circuit -sharpness of resonance-parallel resonance circuit -power in an AC circuit-power factor. (12L)

Books for study

1. Electricity and Magnetism -R. Murugesan (S.Chand &Co.)

Books for Reference

1. Electricity and Magnetism -D.N.Vasudeva (Twelfth revised edition)

2. Electricity and Magnetism - K.K.Tiwari (S.Chand &Co.)

3. Electricity and Magnetism -E.M.Pourcel,Berkley Physics Cource, Vol.2 (Mc Grraw-Hill)

4. Electricity and Magnetism - Tayal (Himalalaya Publishing Co.)

5. Fundamentals of Physics, 6th Edition, by D Halliday, R Resnick and J Walker. Wiley NY 2001.

SEMESTER- IV

PAPER V

L	T	P	C
4	0	0	4

ELECTROMAGNETISM

Preamble: This course facilitates an understanding of magnetic effects of electric currents and the basics of electromagnetic waves. The paper does not need any special pre requisite except the basic ideas on electricity and magnetism at the school level and the learners are expected to know the device applications of electromagnetic induction.

UNIT-1: ELECTROMAGNETIC INDUCTION

Faraday's laws of electromagnetic induction-self induction –self inductance of a long solenoid –toroidal solenoid-determination of L by Anderson's and Rayleigh's methods-Owen's bridge-mutual induction-experimental determination of mutual inductance between a pair of coils using BG-co efficient of coupling-energy stored in a coil-eddy currents-uses (13L)

UNIT-1I: MAGNETIC EFFECT OF ELECTRIC CURRENT

Magnetic flux and magnetic induction-relation between them- Biot Savart law- magnetic induction at a point on the axis of a circular coil carrying current-amperes circuital law-magnetic field inside a long solenoid -toroid- Lorent'z force on a moving charge- direction of force-torque on a current loop in a uniform magnetic field -Moving coil Ballistic galvanometer-theory -experiment to find charge sensitivity and absolute capacity of a capacitor-De sauty bridge. (14L)

UNIT-1II: MAGNETIC FIELDS AND MAXWELL'S EQUATION

The three magnetic vectors M, B, and H –relation between them-permeability and susceptibility- relation between them -B-H curve -Hysteresis-Energy loss-Displacement current-Maxwell's equations-Boundary conditions-Poynting vector-Electromagnetic waves in free space-Hertz experiment for production and detection of EM waves. (12L)

UNIT-1V: ELECROMAGNETIC WAVES

Wave equations for Electric field and Magnetic field-monochromatic plane waves-EM waves in a matter-Reflection and Transmission at normal incidence and oblique incidence-Polarization by reflection. (10L)

UNIT-V: APPLICATIONS OF ELECTROMAGNETISM

Earth inductor-uses of Earth inductor-measurement of horizontal component of the Earth's magnetic field-measurement of vertical component of Earth's Magnetic field-calibration of BG-measurement of intense magnetic field using search coil and BG-induction coil and uses. (11L)

Books for study

1.Electricity and Magnetism -R. Murugesan (S.Chand &Co.)

Books for Reference

1. Electricity and Magnetism -D.N.Vasudeva (Twelfth revised edition)

2. Electricity and Magnetism - K.K.Tiwari (S.Chand &Co.)

3. Electricity and Magnetism -E.M.Pourcel,Berkley Physics Cource, Vol.2 (Mc Grraw-Hill)

4. Electricity and Magnetism - Tayal (Himalalaya Publishing Co.)

5. Fundamentals of Physics, 6th Edition, by D Halliday, R Resnick and J Walker. Wiley NY 2001.

SEMESTER-V
PAPER VII

L	T	P	C
4	0	0	4

BASIC ELECTRONICS

Preamble: This course facilitates an understanding of circuit analysis semiconductor diode and transistor circuits and the basics of operational amplifier. Thepaper does not need any special pre requisite except the basic ideas on Electricity and Electronics at the school level and the learners are expected to gain knowledge to analyse and design electronic circuits

UNIT-I: **LINEAR CIRCUIT ANALYSIS**

Constant voltage source, constant current source, conversion of voltage source into current source - Maximum power transfer theorem - Thevanin's theorem - Norton's theorem - hybrid parameters - determination of h parameter - equivalent circuit - the h parameters of a transistor. (12L)

UNIT-II: **SEMICONDUCTOR DIODES AND DEVICES**

PN Junction - V – I characteristics - Crystal diode as a rectifier - Zener diode - V – I characteristics -Tunnel diode- Half wave rectifier-Centre tap full wave rectifier - Full wave bridge rectifier - Comparison of Rectifiers - Filter Circuits - Types (capacitor filter, choke input filter, Π filter) -Zener diode as voltage stabilizer. (11L)

UNIT-III: **TRANSISTOR AMPLIFIERS**

Transistor action - Transistor connections - common emitter - common base -common collector - analysis of amplifiers using h- parameters - RC coupled amplifier - transformer coupled amplifier - power amplifier - classification of power amplifiers (Class A, Class B and Class C) - Push pull amplifier - FET charecteristics - JFET characteristics. (14L)

UNIT-IV: **OSCILLATORS AND WAVE SHAPING CIRCUITS**

Feedback principle and Barkhaussen criterion - Hartley , Colpitt's, and Phase shift oscillators using transistors – Astable - Monostable and Bistable multi vibrators using transistors - Schmitt trigger - clipping and clamping circuits - Differentiating circuit - Integrating circuit. (10L)

UNIT-V: **OPERATIONAL AMPLIFIER**

Op-Amp - pin diagram- characteristics of ideal Op - Amp - DC and A.C analysis - bandwidth - slew rate - frequency response - Op- Amp with negative feedback - applications - Inverting amplifier - Non inverting amplifier - Voltage follower- Adder - Subtractor - Integrator – Differentiator- Low pass, High pass and Band pass filters -Wien bridge oscillator. (13L)

Books for study

1. Principles of Electronics - V.K.Mehta & Rohit Mehta-S.Chand &Co.

Books for reference

1. Electronic fundamentals and applications - John D. Ryder –Prentice Hall
2. Electronic principles - Malvino
3. Electronic devices and circuits - David Bell- Prentice Hall
4. Basic Electronics - B.Basavaraj, H.N.Shivashankar-2 nd edition-University press
5. Physics of semiconductor devices - Dilip K.Roy - University press.

PAPER VIII

COMPUTER PROGRAMMING IN C^{++}

L	T	P	C
4	0	0	4

Preamble: Objective of the course is to provide knowledge about the basics of Computer programming in C^{++} and to solve problems by writing programs. The paper does not need any special prerequisite and the learners are expected to come out with the ability to apply the computer language **C^{++} to** solve problems .

UNIT-I: **WHAT IS C^{++}**

Introduction - tokens - keywords - identifiers and constants - declaration of variables - basic data types - user defined data types-derived data types - symbolic constants - operators in C^{++} -expressions and their type-hierarchy of arithmetic operators- scope resolution operator – declaring, initializing and modifying variables-special assignment operators - all control structures-structure of a simple C ++ program (11L)

UNIT-II: ARRAYS AND **FUNCTIONS IN C^{++}**

Introduction - one dimensional and two dimensional arrays-initialization of arrays-array of strings

Functions-introduction-function with no argument and no return values-function with no argument but return value - function with argument and no return values- function with argument and return values- call by reference-return by reference- function prototyping - inline functions - local, -global and static variables- -function overloading - virtual functions-main function-math library functions. (13L)

UNIT-III: **CLASSES AND OBJECTS**

Introduction - specifying a class - defining member functions-C^{++} program with class - nesting of member functions - private member functions - objects as function arguments - arrays within a class-array of objects-static class members-friend functions-constructors - parameterized constructors-multiple constructors - constructors with default arguments - copy constructor. (15L)

UNIT-IV: **OPERATOR OVERLOADING, INHERITANCE AND POINTERS**

Introduction -defining operator overloading - overloading unary operators - binary operators.

Inheritance - single inheritance - multiple inheritance - multilevel inheritance - hybrid inheritance - hierarchial inheritance-virtual base class-abstract class

Pointers- definition-declaration- arithmetic operations. (12L)

UNIT-V: **MANAGING CONSOLE I/O OPERATIONS**

Introduction - C^{++} stream - C^{++} stream classes - unformatted I/O Operations - formatted console I/O operations - working with files - classes for file steam operations - opening and closing a file - file pointers and their manipulations. (9L)

Books for study

1. Object oriented Programming with C^{++} - E.Balagurusamy, Tata Mc Graw-Hill publishing company Ltd. New Delhi

Books for reference

1. Programming with C^{++} - D.Ravichandran, Tata Mc Graw-Hill publishing company Ltd. New Delhi .
2. Object oriented Programming in C^{++}-4 th Edn.Robert Lafore-Macmilan publishing company Ltd.
3. Fundamentals of Programming with C^{++} -Richardl.Halterman

PAPER - IX (4X15=60 hours)

ATOMIC PHYSICS

L	T	P	C
4	0	0	4

Preamble: The course provides an introductory account about the atomic structure and the impact of X-rays. This paper does not need any special prerequisite except the basic understanding of materials at the school level and the learners are expected to know the various atom models and the importance of X-rays in exploring the atomic structure

Unit I: **BAND THEORY OF SOLIDS**

The free electron theory of metals – expressions for electrical conductivity – thermal conductivity – Wiedman-Franz's law-Hall effect-magnetoresistance-determination of electronic charge – Millikan' s oil drop method – electron microscope – Band theory of solids – classification of solids on the basis of band theory. (10L)

Unit II: **POSITIVE RAYS**:

Discovery-properties- analysis – Thomson's parabola method – Aston's mass spectrograph – Bainbridge's mass spectrograph – Dempster's mass spectrograph – Dunnington's method of determining e/m. (11L)

Unit III : ATOMIC STRUCTURE-1

Early atomic spectra-Thomson model-Alpha particle scattering-Rutherford 's nuclear model-drawbacks-Bohr atom model –Bohr's interpretation of the Hydrogen spectrum-correction for nuclear motion-evidences in favour of Bohr's theory-Ritz combination principle-correspondence principle-Sommerfield's relativistic atom model-drawbacks- the vector atom model – Quantum numbers associated with the vector atom model — the Pauli's exclusion principle – periodic classification of elements (14L)

Unit IV: ATOMIC STRUCTURE-II

Coupling schemes-L-S Coupling-j-j Coupling-Hund rules- magnetic dipole moment due to orbital motion of the electron-due to spin of the electron -Stern and Gerlach experiment-spin-orbit coupling-optical spectra-spectral terms-spectral notation-selection rules-intensity rules-interval rule-fine structure of sodium D line-hyperfine structure-Normal Zeeman effect-theory and experiment- quantum mechanical explanation -Larmor's theorem- Anomalous Zeeman effect-Paschen – Bach effect-Stark effect. (13L)

Unit V: **X-Rays**:

Production of X-rays – properties-absorption of X-rays – X-ray absorption edges- Bragg's law – Bragg's X-ray spectrometer –the powder crystal method – Laue's method – Rotating crystal method –X-ray spectra- continuous spectra-characteristic spectra-Moseley's law -importance–width of spectral lines-Doppler broadening-collision broadening-X-ray Detectors-scintillation detector-semiconductor detectors (12L)

Books for study

1.Modern Physics - R. Murugesan (S.Chand &Co.)

Books for Reference

1.Modern Physics - R.Murugesan and Kiruthiga Sivaprasath, S. Chand & Co Ltd, New Delhi.

2.Modern Physics - B.S.Agarwal, Kedarnath Ramnath, Meerut, Delhi.

3.Atomic and Nuclear Physics - N.Subrahmanyan Brijal, S. Chand & Co Ltd, New Delhi

4.Modern Physics - B.V.N Rao, Wiley Eastern Ltd, New Delhi

5. Modern Physics-G.Aruldhas and P.Rajagopal-PHI L

PAPER X .MAJOR ELECTIVE

(Any one)

a.MATHEMATICAL PHYSICS

L	T	P	C
4	0	0	4

Preamble: This course enable the students to understand the various mathematical methods used in Physics. The paper need a basic knowledge in mathematics and the learners are expected to come out with the ability to apply mathematics to solve problems in physics

UNIT I: VECTORS

Vectors and scalars-Vector algebra-The scalar product-The vector (cross or outer) product-The triple scalar product-The triple vector product-The linear vector space Vn- Vector differentiation -Space curves - Motion in a plane - A vector treatment of classical orbit theory - Vector differential of a scalar field and the gradient - Conservative vector field - The vector differential operator - Vector differentiation of a vector field - The divergence of a vector - The operator ∇^2, the Laplacian - The curl of a vector. (11L)

UNIT II: DIFFERENTIAL EQUATION

First-order differential equations - Separable variables -Exact equations- Integrating factors -Bernoulli's equation- Second-order equations with constant coefficients - Nature of the solution of linear equations - General solutions of the second-order equations - Finding the complementary function - Finding the particular integral - Rules for D operators - The Euler linear equation - Solutions in power series. (12L)

UNIT III: MATRIX

Definition of a matrix - Four basic algebra operations for matrices - Equality of matrices - Addition of matrices - Multiplication of a matrix by a number - Matrix multiplication - The commutator - Powers of a matrix - Functions of matrices - transpose of a matrix - Symmetric and skew-symmetric matrices - The matrix representation of a vector product - The inverse of a matrix - A method for finding A-1 - Systems of linear equations and the inverse of a matrix - Complex conjugate of a matrix - Hermitian conjugation - Hermitian/anti-Hermitian matrix - Orthogonal matrix (real) - Unitary matrix - Rotation matrices - Trace of a matrix.

(14L)

UNIT IV: LAPLACE TRANSFORMATION

Definition of the Laplace transform - Existence of Laplace transforms - Laplace transforms of some elementary functions - Shifting (or translation) theorems - The first shifting theorem - The second shifting theorem - The unit step function - Laplace transform of a periodic function - Laplace transforms of derivatives - Laplace transforms of functions defined by integrals - A note on integral transformations. (13L)

UNIT V: PARTIAL DIFFERENTIAL EQUATIONS

Linear second-order partial differential equations - Solutions of Laplace's equation- separation of variables - Solutions of the wave equation: separation of variables - Solution of Poisson's equation. Green's functions - Laplace transform solutions of boundary-value problems (10L)

Books for study

1.Mathematical Methods for Physicists: A concise introduction, - *TAI L. CHOW* **-CAMBRIDGE UNIVERSITY PRESS.**

Books for Reference

1.Mathematical physics- Piyoosh kumar tyagi , RBSA Publishers
2. **Mathematical physics-** Satya prakash-Sultan Chand & Co:
3.**Mechanics and mathematical physics** -R.Murugesan- Sultan Chand & Co:4.
Mathematical physics-Gupta- Sultan Chand & Co:

b.SPECTROSCOPY

L	T	P	C
4	0	0	4

Preamble: This course facilitates an understanding of atomic and molecular spectra and the instrumentations .The paper needs a basic knowledge about atomic structure and the learners are expected to gain knowledge to identify materials with the help of various spectra

UNIT I: MICROWAVE SPECTROSCOPY

Rotation of molecules – Classification of molecules – Rotation spectra of diatomic molecules – Intensities of spectral lines – Effect of isotopic substitution – Non-rigid rotator – Spectrum of a non-rigid rotator –Polyatomic molecules – Symmetric top molecules – Asymmetric top molecules -Techniques and Instrumentation – Chemical analysis by microwave spectroscopy. (14L)

UNIT II: INFRARED SPECTROSCOPY

I.R. spectroscopy – Vibrating diatomic molecules – Simple Harmonic Oscillator - Anharmonic oscillator – Diatomic vibrating rotator – IR spectrum of carbon monoxide - Interaction of rotations and vibrations – Vibration of polyatomic molecules – Analysis by IR techniques. (12L)

UNIT III : RAMAN SPECTROSCOPY

Raman effect-discovery – Quantum theory of Raman effect – Classical theory of Raman Effect –Pure rotational Raman spectra- Linear molecules – Raman spectrum of symmetric top molecules - Vibrational Raman spectra – Rule of mutual exclusion – Overtone and combinational vibrations - Rotational fine structure – Polarization of light and the Raman Effect - Structure determination from IR and Raman spectroscopy. (13L)

UNIT IV: ELECTRONIC SPECTROSCOPY

Born - Oppenheimer approximation – vibrational coarse structure- Progressions – Frank-Condon principle – Dissociation energy and Dissociation products – Rotational fine structure -Electronic vibration transitions - Fortrat diagram - Predissociation – Diatomic molecules. (11L)

UNIT V : INSTRUMENTATION

Instrumentation and techniques in Infrared spectroscopy – Sources – Monochromators – Sample cells – Detectors – Single beam Infra red spectrometer – Double beam Infra red spectrometer (10L)

Book For Study

1.Fundamentals Of Molecular Spectroscopy - Colin N Banwell Elaine- M Mccash Fifth Edition

Book For Reference

1.Molecular structure and spectroscopy - G. Aruldhas, PHI Learning Pvt. Ltd, India.

2.Hand book of Analytical Instruments -R.S. Khandpur, Tata MC Grow Hill Ltd.

3.Spectroscopy -G.R. Chatwal and S.K. Anand, Himalaya publishing House, New Delhi.

PAPER XI .MAJOR ELECTIVE-II

(Any one)

a. COMMUNICATION ELECTRONICS

L	T	P	C
4	0	0	4

Preamble: This course enable the students to understand various modulation and demodulation techniques used for communication. The paper needs a basic knowledge in electronics and mathematics and the learners are expected to come out with the ability to choose proper modulation techniques .

UNIT I: AMPLITUDE MODULATION AND TRANSMISSION

Introduction – amplitude Modulation – AM envelop – AM frequency spectrum and bandwidth – Phasor representation of AM with carrier – coefficient of modulation or percentage modulation or modulation index – degrees of modulation – AM power distribution – AM Current relation and efficiency - modulation by complex information signal - doubleside band suppressed carrier AM - single side band suppressed carrier AM – Vestigal side band amplitude modulation – AM modulator circuits – emitter modulations or low power AM – collector modulator or medium and high power AM modulator - AM transmitters – Broadcast AM transmitters – Low level of AM transmitter – High level AM transmitter. (15L)

UNIT II: AMPLITUDE MODULATION -RECEPTION

Comparison of AM system – Quadrature amplitude modulation – principles of AM detection – AM receivers – receiver parameters – Tuned radio frequency (TRF) receiver or straight receiver – principles of superhetrodyne –double frequency conversion AM receiver. (11L)

UNIT III:ANGLE MODULATION – TRANSMISSION

Introduction – Frequency modulation – Phase modulation – Phase deviation and modulation index – Multitone modulation – Transmission band width of FM – conversion of PM to FM or frequency modulator – conversion of FM to PM / phase modulators – commercial broadcast FM – phasor representation of an FM and PM – average power of an AM/FM wave – generation of FM – direct method of FM generation – reactance tube modulator – indirect method of FM wave generation – FM transmitters – indirect method – Comparison of AM and FM. (13L)

UNIT IV:FM RECEPTION

FM detectors – Balanced slope detector – Foster seely discriminator – ratio detector – FM super heterodyne receiver – FM noise suppression – threshold extension by FMFB technique. (11L)

UNIT – V: DIGITAL MODULATION TECHNIQUES

Introduction – BFSK – Binary phase shift keying – Quadrature PSK – Differential PSK – Performance comparison of digital modulation schemes - M ary FSK – correlative coding – Duobinary encoding. (10L)

Book For Study

1.Principles Of Communication Engineering-Dr. K.S. Srinivasan, Second Edition : 2010.

Book For Reference

1.Electronic communication systems – George Kennedy & Bernard Davis, Tata Mcgraw Hills, 4th edition, 2008

2.Electronic communication Systems – Blake, Joseph J. Adams ki, Sun Yifeng, Delamer publication, 2nd edition, 2012 (Rupa Publication, India).

3.Fundamentals of Electrical engineering – Wayone tomasi

b.NUMERICAL METHODS

L	T	P	C
4	0	0	4

Preamble: This course facilitates an understanding of various approximation methods. The paper needs knowledge in mathematics and the learners are expected to come out with the ability to use approximation methods to find solution to problems which do not have exact solutions.

UNIT-I: ERRORS AND ROOT OF EQUATIONS

What is Numerical analysis-numbers and their accuracy-errors-measurement of errors-round off error-truncation error-absolute error-relative error-percentage error-inherent error-accumulated error-general error formulae -convergence

Roots of equations-Iteration method-Maclaurin's series method-Newton-Raphson method-Von-Moises formula-Bisection method (12L)

UNIT-II: **MATRIX AND LINEAR EQUATIONS**

Introduction- pivotal condensation method- system of linear equations-Gauss Elimination method-Gauss Seidal Iteration method-Gauss Jordan elimination method- Matrix Inversion method (10L)

UNIT-III: **INTERPOLATION AND APPROXIMATION**

Linear Interpolation –Quadratic Interpolation - Lagrange's Interpolation – Richardson's Extrapolation –Aitken's iterated Interpolation (13L)

UNIT-IV:NUMERICAL DIFFERENTIATION AND INTEGRATION

Numerical differentiation-approximation of derivatives using interpolation polynomials-Taylor series method

Numerical Integration - trapezoidal rule-simpson's 1/3 and 3/8 rules (14L)

UNIT –V: DIFFERENTIAL EQUATIONS

Introduction-Euler's method (Adams Bashforth first order method)-backward Euler method- Taylor' s series method- Runge-kutta method - predictor corrector methods(11L)

Books for study and Reference:

1. Introductory methods of numerical analysis – S.S. Sastry, Prentice Hall of India, New Delhi (2000)
2. Numerical methods – A. Singaravelu, Meenakshi Agency, Chennai (2001).
3. Numerical method in Science and Engineering – M.K. Venkataraman, PHI – New Delhi (1997).
4. Mechanics and Mathematical methods, R. Murugesan, S. Chand & Co, New Delhi (1999).

SEMESTER-VI

PAPER XII

DIGITAL ELECTRONICS

L	T	P	C
3	2	0	4

Preamble: This course provides an understanding of Boolean algebra and digital circuits. The paper need a basic knowledge in solid state electronics and the learners are expected to gain knowledge to design electronic circuits

UNIT I: NUMBER SYSTEMS, BINARY ARITHMETIC AND CODES

Decimal, binary, octal and hexadecimal number systems and their inter-conversions -binary arithmetic-binary addition-subtraction-1's and 2's complements- BCD codes, ASCII code, Excess-3code, Gray code. (7L+5T)

UNIT II: BOOLEAN ALGEBRA AND LOGIC GATES

Boolean algebra-De Morgan's theorem –Positive logic and negative logic systems-Basic logic gates, OR, AND, NOT (symbol, Boolean equation, truth table, circuit diagram and working)-NAND, NOR, EX-OR (symbol, Boolean equation, truth table only)-NAND and NOR as universal building blocks. (8L+6T)

UNIT III:ARITHMETIC CIRCUITS, FLIP-FLOPS AND MULTIVIBRATORS

Half and full adders- Half and full subtractors-RS Flip-flop-clocked RS Flip-flop, JK Flip-flop, JK master slave Flip-flop, D Flip-flop, T Flip-flop

555 timer-Astable multivibrator, monostable multivibrator-Frequency divider(11L+7T)

UNIT IV: KARNAUGH MAP AND COMBINATIONAL CIRCUIT APPLICATIONS

Karnaugh map - 2,3and 4 variables –simplification-SOP and POS form of Boolean functions - Don't care conditions-Multiplexer, Demultiplexer, Encoder, Decoder, parity generator and checker. (10L+6T)

UNIT V : SHIFT REGISTERS AND COUNTERS

Types of registers- Serial in –Serial out-Serial in-Parallel out- Parallel in- Serial out- Parallel in- Parallel out-Asynchronous and Synchronous counters-Ring counter- Binary counter- Up- Down counter- Mod-5 counter- Mod-10 counter (decade counter)-A/D and D/A converters(9L+6T)

Books for study

1.Digital principles and applications - Albert Paul Malvino & Donald P.Leach

Books for reference

1.Digital logic and computer design-Morris Mano-Prentice Hall of India,Pvt.Ltd.

2.GothmannW.H.,Digital Electronics- Prentice Hall of India,Pvt.Ltd.

3.Metha V.K.Mehtha.R.Principles of electronics,S.Chand &Co.

4.Fundamentals of Digital Electronics and Microprocessors - Anokh singh, A.K.Chhabra, S.Chand &Co.

PAPER XIII

QUANTUM MECHANICS

L	T	P	C
3	2	0	4

Preamble: Objective of this course is to introduce wave- particle duality of matter and the formation of Quantum mechanics. The paper need a basic knowledge in Mathematics and Modern physics and the learners are expected to know the application of basic equations in quantum mechanics to various states

UNIT I: DEVELOPMENT OF QUANTUM MECHANICS

Inadequacy of classical mechanics-Black body radiation – Theoretical laws of Black body radiation (Wein's displacement law –Wein's Radiation formula – Rayleigh Jeans law) – Planck's Quantum hypothesis – photoelectric effect-Einstein's explanation for photoelectric effect-Compton effect – Einstein's quantum theory of specific heat-Quantum states of energy. (8L+5T)

UNIT II : WAVE PROPERTIES OF MATTER

Wave particle duality-Phase and Group Velocity – Analytical expression for a Group of waves – Wave packets formed by Superposition of Number of Plane waves – De Broglie Hypothesis – Derivation of De Broglie relation – Phase velocity of De Broglie Waves – Relation between De Broglie wave and Phase velocity – Davision and Germer's experiment on electron diffraction-Diffraction of Atoms and Molecules (9L+6T)

UNIT III : HEISENBERG UNCERTAINTY PRINCIPLE

Uncertainty Principle - Elementary Proof of Heisenberg's Uncertainty Relation and its Physical significance –Illustration by Thought experiments-consequences .(8L+5T)

UNIT IV: SCHRODINGER'S WAVE EQUATION:

Basic postulates of Quantum mechanics –Schrodinger's equation – 1D and 3D wave equation into the Time-dependent and Time-independent part – Physical Interpretation of the Wave Function ψ – Operators in quantum Mechanics, Eigen Function, Eigen value and Eigen Value equation – Expectation values – Orthogonality of Energy Eigen function - Schrodinger's Wave equation for the Complex Conjugate Wave function $\psi^*(x, y, z, t)$ – Probability current Density – Ehrenfest's Theorem – Momentum wave function for free particle – Momentum Eigen function – Exact statement and proof of Uncertainty principle for one dimensional wave packet (11L+8T)

UNIT V: APPLICATIONS OF QUANTUM MECHANICS

Free particle – Potential step – Rectangular Potential barrier- Tunnel effect – emission of α particles from Radioactive element - Square well potential- free states-Particle in 1D box – Particle in 3D box – Simple harmonic oscillator – 1D simple harmonic oscillator in quantum mechanics – Particle in 1 D square well potential of finite Depth. (9L+6T)

Books for Study

1. Elements of Quantum Mechanics, **Kamal Singh** & **S P Singh**-Chand &Co;

Books for Reference

1.Mathews P.M. and Venkatesh k. Quantum Mechanics Tata McGraw Hill Publishing Ltd.

2.Gipta,Kumar,Sharma -Quantum Mechanics-JaiPrakash Nath Company

3. Quantum Mechanics-G.Arul Das-PHI Private Learning Ltd.

4. Quantum Mechanics-V.Murugan-Pearson publication

5. Quantum Mechanics-Mahesh C.Jain- PHI Private Learning Ltd

PAPER XIV

L	T	P	C
4	0	0	4

NUCLEAR PHYSICS

Preamble: Objective of this course is to provide the basics of atomic nucleus and nuclear reactions. The paper needs a basic knowledge in modern physics and the learners are expected to know the impact of nuclear reactions to the environment.

UNIT I: ATOMIC NUCLEUS

General properties of the nucleus- binding energy –mass defect -packing fraction— BE/A curve and its significance -proton electron hypothesis- proton neutron hypothesis -Nuclear forces –characteristics –Meson theory of nuclear forces –Nuclear models – Liquid drop model –Binding Energy formulae– Shell Model –magic numbers(12L)

UNIT II RADIO ACTIVITY

Natural radio activity –alpha,beta and gamma rays-properties- radioactive series-laws of radioactive disintegration-half life period –mean life period –Radio carbon dating-law of successive disintegration– range of α particle – Geiger Nuttal law- α decay- theory-β- decay –neutrino theory of β decay-neutrino and its properties-electron capture. ϒ decay- nuclear isomers- Mossabauer effect - applications-radio isotopes - uses. (14L)

UNIT III: NUCLEAR REACTIONS

Kinematics of nuclear reaction-conservation of momentum - Q value of nuclear reaction-compound nucleus - nuclear energy level-Nuclear fission –energy released in fission-. Nuclear reactor-uses - Nuclear fusion –Thermo nuclear reactions-controlled thermo nuclear reaction-Principle and action of atom bomb - hydrogen bomb-fusion reactor –plasma confinement (11L)

UNIT IV: NUCLEAR DETECTORSAND PARTICLE ACCELERATORS

Detectors-G.M.Counter-scintillation counter-bubble chamber-wilson cloud chamber-Accelerators-cyclotron-synchrocyclotron-betatron-synchrotrons (10L)

UNIT V: **COSMIC RAYS AND ELEMENTARY PARTICLES**

Cosmic rays-introduction-discovery-lattitude,altitude and azimuth effects-longitudinal effect-north –south effect-seasonal and diurnal changes-primary and secondary cosmic rays-nature of cosmic rays- cosmic ray showers-Van Allen belt-origin of cosmic radiation.

Elementary particles-introduction-particles and antiparticles-antimatter-the fundamental interaction-elementary particle quantum numbers-conservation laws and symmetry-the quark model (13L)

Book for study

1. Modern Physics- R.Murugesan, S. chand & Co

Ref erence Book s

1. Modern Physics- Seghal Chopra & Seghal, Sultan chand 1998

2. Perspective of Modern Physics-Arther Beiser –Tata-Mc Graw Hill Publishing Company

3.Atomic and Nuclear Physics-Shatendra Sharma-Pearson Publications

4. Atomic Physics-Gupta and Kumar

5. Fundamental Physics-Halliday and Resnick

PAPER XV (4X15=60 hours)

L	T	P	C
4	0	0	4

SOLID STATE PHYSICS

Preamble: Objective of this paper is to introduce crystals and nanoparticles and to provide an understanding about different types of materials .The paper needs a basic knowledge of elements of modern physics and the learners are expected to get some ideas on Materials Research.

UNIT-I: **CRYSTAL LATTICES**

Introduction-seven classes of crystals - Bravais lattice in three dimensions - crystal structure - Simple cubic, Face centered cubic, Body centered cubic and Hexagonal close packed structure -Sodium Chrloride, Zinc Blende and Diamond Structures.

Miller Indices and crystal planes - procedure for finding Miller Indices - interplanar spacing - Diffraction of X-Rays - Bragg's Law - reciprocal lattices - reciprocal lattice to SCC, BCC and FCC lattices. (13L)

UNIT-II: **TYPES OF MAGNETIC MATERIALS**

Introduction -classical theory of Diamagnetism - Langevin's theory of Para magnetism - Weiss Theory of Para magnetism - Ferromagnetism - Explanation of Heisenberg's internal field and quantum theory of ferromagnetism - Domain theory of ferromagnetism - Anti ferromagnetism - ferrites - Fundamental Definitions of Dielectrics - Different types of Electric Polarizations- electronic, ionic, orientation and space charge Polarizations - Dielectric Loss - Internal Field - Clausius – Mosotti Relation(12L)

UNIT-III: **BONDING IN SOLIDS**

Types of bonds in crystals - Ionic, covalent, Metallic, Vander waal's and Hydrogen Bonding - Bond energy of sodium chloride molecule - Comparison between ionic and covalent solids - variation of inter atomic force with inter atomic spacing -cohesive energy - cohesive energy of ionic solids - application to sodium chloride crystal - evaluation of Madelung constant for sodium chloride. (11L)

UNIT-IV: **SUPER CONDUCTIVITY**

Introduction - General Properties of Superconductors - effect of magnetic field -Meissner effect - effect of current - thermal properties - entropy - specific heat -energy gap - isotope effect - London equations - AC & DC Josephson effects - applications - Type–I and Type–II Superconductors - Explanation for the Occurrence of Super Conductivity - BCS theory - Application of Superconductors - High T_C superconductors. (14L)

UNIT-V: **NANOTECHNOLOGY**

Nanomaterials-synthesis and classification -–techniques used in synthesis of nanomaterials-chemical vapour deposition-sol-gel technique-electro deposition method-ball milling method- charecterisation - properties and applications of nanomaterials- fullerence, graphine and carbon nanotubes (10L)

Books for Study

1. Solid State Physics - P.K.Palanisamy - SCITECH Publications pvt Ltd.Chennai
2. Nano-essentials and understanding - Pradeep.T.Mc-Graw-Hill Ltd.

Books for reference

1. Introduction to Solid State Physics - Kittel - Wiley and Sons,New Delhi
2. Material Science and Engineering - V. Raghavan - PHI
3. Introduction to Solids -Azaroff - TMH
4. Material Science - M.Arumugam - Anuradha Publishers
5. Solid State Physics - H.C.Gupta -Vikas publishing house pvt.Ltd.
6. Principles of Nanoscience and technology - Shah M.A.Ahmed,Narosha publishing house pvt.Ltd.

PAPER XVI: MAJOR ELECTIVE (Any one)

- **a.ENERGY PHYSICS**

L	T	P	C
4	0	0	4

Preamble: Objective of the course is to provide an understanding of the present energy crisis and various available energy sources .The paper does not need require any special prerequisite and the learners are expected to know the use of alternate energy sources

UNIT I : INTRODUCTION TO ENERGY SOURCES

World's reserve of Commercial energy sources and their availability-India's production and reserves-Conventional and non-conventional sources of energy, comparison – Coal- Oil and natural gas –applications - merits and demerits (10L)

UNIT II : SOLAR THERMAL ENERGY

Solar constant -Solar spectrum-Solar radiations outside earth's atmosphere – at the earth surface- on tilted surfaces -Solar Radiation geometry-Basic Principles of Liquid flat plate collector –Materials for flat plate collector -Construction and working- Solar distillation–Solar disinfection - Solar drying-Solar cooker(box type)-Solar water heating systems – Swimming pool heating. (12L)

UNIT III : PHOTOVOLTAIC SYSTEMS

Introduction-Photovoltaic principle-Basic Silicon Solar cell- Power output and conversion efficiency-Limitation to photovoltaic efficiency-Basic photovoltaic system for power generation-Advantages and disadvantages-Types of solar cells-Application of solar photovoltaic systems - PV Powered fan – PV powered area lighting system – A Hybrid System. (13L)

UNIT IV: BIOMASS ENERGY

Introduction-Biomass classification- Biomass conversion technologies-Bio-gas generation-Factors affecting bio-digestion -Working of biogas plant- floating and fixed dome type plant -advantages and disadvantage of -Bio-gas from plant wastes-Methods for obtaining energy from biomass- Thermal gasification of biomass-Working of downdraft gasifier- Advantages and disadvantages of biological conversion of solar energy. (11L)

UNIT V : WIND ENERGY AND OTHER ENERGY SOURCES

Wind Energy Conversion-Classification and description of wind machines, wind energy collectors-Energy storage-- Energy from Oceans and Chemical energy resources-Ocean thermal energy conversion-tidal power, advantages and limitations of tidal power generation-Energy and power from waves- wave energy conversion devices- Fuel cells- and application of fuel cells- batteries- advantages of battery for bulk energy storage- Hydrogen as alternative fuel for motor vehicles. (14L)

Books for study

1. Kothari D.P., K.C. Singal and Rakesh Ranjan, Renewable energy sources and emerging Technologies, Prentice Hall of India, 2008.

2.Solar Energy-principles of thermal collection and storage-S.P.SUKHAME-tata-McGraw-Hill publishing company ltd.

Books for References

1. Chetan Singh Solanki, Solar Photvoltaics Fundamentals, Technologies and Applications, 2ndEdition, PHI Learning Private Limited, 2011.
2. Rai G. D, Non conventional Energy sources, 4th Edition, Khanna Publishers, 2010.
3. Jeffrey M. Gordon, Solar Energy: The State of the Art, Earthscan, 2013.
4. Kalogirou S.A., Solar Energy Engineering: Processes and Systems , 2nd Edition, Academic Press, 2013.
5. Zobaa A.F.and Ramesh Bansal, Handbook of Renewable Energy Technology, World Scientific, 2011.

*b.MEDICAL PHYSICS

L	T	P	C
4	0	0	4

Preamble: This course facilitates an understanding of the basic concepts in Bio medical instrumentation and awareness regarding radiation hazards and safety.

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UNIT-I: X-RAYS

Electromagnetic spectrum - production of x-rays - x-ray spectra - Brehmsstrahlung process- Characteristic x-ray - X-ray tubes - Coolidge tube - X-ray tube design - tube cooling - stationary mode - Rotating anode X-ray tubes - Tube rating - quality and intensity of X-ray. X-ray generator circuits - half wave and full wave rectification - filament circuit - kilo voltage circuit - high frequency generator - exposure timers - HT cables. (12L)

UNIT –II: RADIATION SAFETY AND HEALTH PHYSICS

Introduction to Radioactivity-Artificial and natural - radioactivity -Physical features of radiation-units of radiation- conventional sources of radiation, Interaction of different types of radiation with matter -penetration power in living cells-radiation damage to the cell-effect of radiation on cells-measurement of ionizing radiation- measurement of biological damage-Linear energy transfer(LET)-radiation risk-radiation dosimetry-security of radio active material-radio active waste management (14L)

UNIT –III: BIO MEDICAL INSTRUMENTATION

Development of biomedical instrumentation-biometrics-introduction to the man-instrument system-components of man-instrument system-transducers for biomedical applications-biomedical computer applications-computer analysis of ECG-computerized axial tomography(CAT) Scanners (11L)

UNIT-IV: MEDICAL IMAGING PHYSICS

Radiological imaging - Radiography - Filters - grids - cassette - X-ray film - film processing - fluoroscopy - computed tomography scanner - principle function -display - generations – mammography- ultrasound imaging - magnetic resonance imaging - thyroid uptake system - Gamma camera (Only Principle, function and display) (11L)

UNIT-V LASERS IN MEDICINE

Introduction to laser-principle and production of laser- effects of laser radiation on tissues - photo thermal effects- photochemical effects –photodynamic therapy-Laser applications in therapy and diagnosis-opthalmology-Fibreoptic endoscopy and dentistry-Laser as a beautician's tool-laser hazards-biological effects. (12L)

Books for study and Reference

1. Basic Radiological Physics Dr. K. Thayalan - Jayapee Brothers Medical Publishing Pvt. Ltd. New Delhi (2003)

2. The essential physics of Medical Imaging: Bushberg, Seibert, Leidholdt and Boone Lippincot Williams and Wilkins, Second Edition (2002)

3..Biomedical instrumentation-Leslie Cromwell,Fred J.Weibel-Erich A.Pfeiffer-Pearson Publications

4.Lasers in Medicine-R W Wayanant, Plenum Publishing Co

5.Nuclear medicine physics: Chandra - Lippincot Williams and Wilkins (1998)

*** A visit to the related places is preferred for better understanding of these two papers.**

PRACTICAL-III

L	T	P	C
0	0	2	1

Preamble: To learn physical concepts through experiments

(8 experiments compulsory)

1. Ballistic Galvanometer- Figure of merit
2. Ballistic Galvanometer – Comparison of Capacitance (C1/C2)
3. Field along the axis of a coil carrying current– Deflection magnetometer- dipole moment of a bar magnet
4. Comparison of Magnetic Moments – Deflection Magnetometer (Tan A and Tan B position)
5. Series Resonance Circuit
6. De Sauty Bridge
7. Potentiometer- Calibration of Ammeter
8. Potentiometer-Calibration of low range Voltmeter
9. Carey Foster's Bridge – Specific Resistance
10. Spectrometer- i-d curve

PRACTICAL-IV

L	T	P	C
0	0	2	1

(8 experiments compulsory)

1. Field along the axis of a coil carrying current– Vibration magnetometer
2. Potentiometer – Specific resistance
3. Potentiometer – EMF of a thermocouple
4. Ballistic Galvanometer – Comparison of EMF's – E1/E2
5. Ballistic Galvanometer – High resistance by leakage
6. Magnetic Moment of a bar Magnet – Tan C Position
7. Parallel Resonance Circuit
8. Owen's Bridge-inductance in series and parallel
9. M and B_H-Deflection and Vibration magnetometer
10. Spectrometer- critical angle of the prism and refractive index

PRACTICAL-V

NON ELECTRONICS

(8 experiments compulsory)

L	T	P	C
0	0	4	2

1. Conversion of Galvanometer into Voltmeter and Ammeter
2. Ballistic Galvanometer – Absolute Capacity of a Condenser
3. Ballistic Galvanometer – Absolute Determination & Comparison of Mutual Inductance.
4. Spectrometer – Cauchy's Constants
5. Young's Modulus and Poisson's ratio of glass – Elliptic Fringes
6. Potentiometer - Calibration of Volt meter (High Range)
7. Potentiometer-Temperature Coefficient of Resistance
8. Spectrometre- Biprism
9. Thevanin's and Nortan's theorem – Verification
10. Self inductance-Rayleigh's DC bridge method

PRACTICAL-VI

L	T	P	C
0	0	4	2

ELECTRONICS

(8 experiments compulsory)

1. V-I Characteristics of Junction diode and Zener diode

2. Transistor characteristics

3. Colpitt's and Hartley Oscillator

4. Single stage amplifier-with and without feedback

5. Full wave rectifier with filters and regulated using zener diode (Study the variation of output voltage without filter, with filter and with zener diode)

6. Astable multivibrator using transistor

7.OPAMP-Adder&Subtractor

8. OPAMP-Differentiator & Integrator

9. OPAMP -Low Pass And High Pass Filter

10. FET charecteristics

PRACTICAL- VII

(8 experiments compulsory)

L	T	P	C
0	0	4	2

1. Spectrometre-Hartmann's interpolation formula
2. Spectrometre- i_1-i_2 curve
3. Mirror Galvanometer -Thermo EMF
4. Anderson's bridge-self inductance
5. Hyperbolic fringes
6. Arithmetic and Logic Units (ALU)
   - i.Half Adder
   - ii. Full Adder
   - iii. 4-bit Binary Adder.
7. Astable and Monostable multivibrator using 555 Timer
8. Combinational Logic

a) To design a combinational logic system for a specified Truth Table.

b) To convert a Boolean Expression into Logic Gate Circuit and assemble it using logic gate IC's

9. Analog/Digital Conversion

a) To design an analog to digital converter of given specifications.

b) To design a digital to analog converter of given specification

10. To build Flip-Flop Circuits using elementary gates (RS, Clocked RS, D-type, and JK Flip-Flop).

PRACTICAL – VIII

L	T	P	C
0	0	4	2

COMPUTER PROGRAMMING WITH C++

1. a.Arithmetic operations--use do while loop

b.To test the validity of any entered character whether it belongs to the alphabetical set or a number or a special character.

2.To find the sum of series using for loop.

a. Sum = 1+3+5+……+n.

b. Sum = $x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \ldots\ldots\ldots\ldots\frac{x^n}{n!}$

c. Sum = $1^2 + 2^2 + 4^2 + \ldots\ldots\ldots\ldots + n^2$

3.To find the factorial of a number by using function declaration with/without using the return statement.

4.To read a set of numbers from a standard input device and to find out the largest number in the given array using function declaration. Also sort them in the ascending or the descending order.

5.To read the elements of the given two matrices of order m*n and to perform the matrix addition and display the transpose of the result.

6.a.To display the name of the day in a week depending upon the number entered through key board using Switch-Case statement

b)To read the data variables (such as Day, Month and Year) of the class by the member function and display the contents of class objects on the screen in the format DD/MM/YYYY.

7. To generate a series of Fibonacci numbers using constructor

8. To read the following information from the keyboard in which basic class consists of Name, Roll No. and Sex. The derived class contains the data members Height and weight. Display the contents of the class. Use inheritance concept.

9. a. An OOP to find the period of a pendulum of given length L, in a gravitational field. Accept the required values using the keyboard. Also display the results.

b. Develop a program in C++ to calculate the Young's modulus of a material from the data obtained from uniform bending method.

10. Solve Quadratic equation.

11. Matrix multiplication

12. Define a class to represent a bank account details

Data members

1. Name of the depositor
2. Account name
3. Type of account
4. Balance amount in the account

Member function

1. To assign initial values
3. To withdraw an amount
4. To display name and balance

SKILLED BASED ELECTIVE
SEMESTER-III
(For Physics major students only)
(Any one)

PAPER 1.a

MAINTANANCE OF ELECTRICAL APPLIANCES

L	T	P	C
4	0	0	4

Preamble: This course enable the students to understand the operations and safety handling of certain commonly used domestic appliances. The paper needs a basic knowledge in electricity and magnetism and the learners are expected to gain knowledge to design and trouble shoot electrical circuits .

UNIT-I:

Resistance - capacitance - inductance and its units - electrical charge - current - potential - units and measuring meters - Ohm's law - Galvanometer, ammeter, voltmeter and multimeter. Electrical energy - power - watt - kWh - consumption of electrical power. (12L)

UNIT-II:

Transformer - principle and working - classification of transformers - testing of transformers - Core, Shell and Berry types, auto transformer - construction and uses. Cooling of transformers - Losses in transformer.(10)

Unit-III:

Electric bulbs – Fluorescent lamps - Street Lighting - Electric Fans - Wet Grinder - Mixer - Water Heater - Storage and Instant types-electric iron box-microwave oven - Washing Machine - Stabilizer, Fridge and Air conditioner. (13L)

UNIT-IV:

AC and DC- Single phase and three phase connections - RMS and peak values-house wiring - Star and delta connection - overloading - earthing - short circuiting - colour code for insulation wires (13L)

UNIT-V:

Electrical protection - Relays - Fuses - Electrical switches - Circuit breakers- ELCB - overload devices - ground fault protection - Inverter - UPS - generator and motor(12L)

Books for study and Reference

1. A text book in Electrical Technology - B L Theraja - S Chand & Co.

2. A text book of Electrical Technology - A K Theraja

3. Performance and design of AC machines - M G Say ELBS Edn.

4. Semi conductor physics and opto electronics by P K Palanichamy

5. Basic Electronics - B L Theraja - S Chand & Co.

6. Principles of Communication Engineering - Arokh Singh and A K Chhabra - S Chand & Co.

PAPER1.b.

ASTROPHYSICS

L	T	P	C
4	0	0	4

Preamble: This course provides an understanding of Astrophysics, Astronomical instruments and the Origin of the universe.. The paper needs a basic knowledge in optics and modern physics and the learners are expected to know celestial objects.

UNIT-I : ASTRONOMICAL INSTRUMENTS

Optical telescope - reflecting telescope - types of reflecting telescope - advantages of reflecting telescope - Radio telescopes - astronomical spectrographs – photographic- photometry - photo electric photometry - detectors and image processing. (12L)

UNIT-II: SOLAR SYSTEM

The sun-physical and orbital data - Photosphere - Chromosphere - corona - solar prominences - sunspot - sunspot cycle - theory of sunspots - solar flare - mass of the sun - solar constant - temperature of the sun - source of solar energy - solar wind. other members of the solar system - Mercury - Venus - Earth - Mars - Jupiter - Saturn - Uranus - Neptune - Pluto - Moon - Bode's law - asteroids - comets - meteors. (14L)

UNIT-III: STELLAR EVOLUTION, BINARY AND VARIABLE STARS

Birth of a star - Death of a star - Chandrasekhar limit - white dwarfs - Neutron stars - black holes - Quasars - Nebulae - Supernovae

Binary stars - Origin of binary stars-variable stars - cepheid variables - RV Tauri variables - long period variables - irregular variables - flare stars. (10L)

UNIT-IV: MAGNITUDES, DISTANCE AND SPECTRAL CLASSIFICATION OF STARS

Magnitude and brightness - apparent magnitude of stars - absolute magnitude of stars - relation between apparent magnitude and absolute magnitude of stars - Luminosities of stars - measurement of stellar distance - Geometrical parallax method - distance from red shift measurement - Harvard system of spectral classification . (11L)

UNIT-V: THEORIES OF THE UNIVERSE, GALAXIES AND STAR CLUSTERS

Origin of the universe - the big bang theory - the steady state theory - the oscillating universe theory - Hubble's law.

Galaxies - types of galaxies - Milky Way - star clusters - open clusters - globular clusters. (13L)

Books for study and reference:

1. K.S. Krishnasamy, 'Astro Physics a modern perspective,' Reprint, New Age International (p) Ltd, New Delhi,2002.

2. Baidyanath Basu, 'An introduction to Astro physics', second printing, prentice - Hall of India Private limited, New Delhi,2001.

3. R. Murugesan, ' Modern Physics', Eleventh revised edition, S. Chand & Company Ltd, New Delhi, 2003.

4. S. Kumaravelu, 'Astronomy, Janki calendar corporation, Sivakasi, 1993

5. Baker and Fredrick, 'Astronomy, ninth edition, Van No strand Rein hold, Co, New York - 1964.

6. Illustrated World of Science Encyclopedia - Vol I and Vol VIII - Creative world publication - Chicago.

SKILLED BASED ELECTIVE
SEMESTER-IV
(Any one)
PAPER 2.a
MAINTANANCE OF ELECTRONIC EQUIPMENTS(4x15=60 hours)

L	T	P	C
4	0	0	4

Preamble: Objective of this course is to provide a basic understanding of the commonly used electronic equipments .

UNIT-I: ELECTRONIC COMPONENTS

Study of electronic components - resistors - types - characteristics - colour coding – wattage rating-potential divider arrangement-capacitors - type - characteristics -–working voltage-star and delta connection of resistors and capacitors -soldering and desoldering techniques-Groove board,bread board and printed circuit board (11L)

UNIT-II: MEASURING INSTRUMENTS

Practical uses of Multimeter (analog and digital) - CRO - Block Diagram - measurement of voltage, frequency and phase - waveforms and Lissajoue's figures- Digital Storage Oscilloscopes-LCD display for instruments -A/F and R/F oscillators. (10L)

UNIT-III: TRANSDUCERS

Classification of transducers-basic requirements/characteristics of Transducers-active and passive transducers, resistive (Potentiometer -Theory, temperature compensation &applications), Capacitive (variable air gap type), Inductive (LVDT) &piezoelectric transducers.

Measurement of temperature (RTD, semiconductor IC sensors)-Light transducers (photo resistors & photovoltaic cells). (13L)

UNIT-IV: COMMUNICATION DEVICES

Basic concepts of radio transmitter and receiver - TV antennas-resonance antennas and their characteristics - Dipole antenna - Folded dipole - Yagi antenna - Yagi antenna design - Dish antenna - DTH system - Mobile communication system - MODEM.

Telephone systems-cellular Telephone systems-mobile phone-principle of operation-integrated services-digital networks(ISDN) (15L)

UNIT-V: Photography

Introduction to cameras-parts of camera and accessories—lens shutter-aperture-flash photography-filters-battery-tele and wide angle lens

Digital formats-data transfer to computer-ISO speed-resolution(11L)

Books for Study and Reference

1. Principles of Electronics by V K Mehta, S Chand & Co., 5th edition 2001.

2. Functional Electronics by Ramanan.

3. Elements of Electronics by Bagde and Singh

4. Monochrome and Colour TV by Gulati

5. Basic Electronics, 6th edition by B Grob, McGraw Hill NY 1

6.Integrated electronics-Millman and Halkias

7. Electronic principles-Malvino 6 th edition

8.Operational amplifier-Gyakwar

9.Basic electronics-B.Basavaraj,H.N.Shivasankar-University press

PAPER 2.b

PHYSICS OF HUMAN ANATOMY(4x15=60 hours)

L	T	P	C
4	0	0	4

Preamble: Objective of this course is to provide an understanding of the physics of human anatomy

UNIT-I: PHYSICS OF LIGHT AND ITS MEDICAL APPLICATION TO HUMAN BODY

Properties of light – Measurement of Light – Energy of light – medical Application of Visible light, UV, IR and Laser in Human body. (12L)

UNIT-II: PHYSICS OF BREATHING:

Pressure – Typical pressure in Normal body – Gas transport in respiratory system – Definition of pressure-Volume in Lung-Thorax system – Resistance of air passage – Timing of breathing process – Work required for Breathing(14L)

UNIT-III: ENERGY OF HUMAN BODY

Heat loss of the body due to conduction, convection, evaporation, radation-Wind chill – Mechanism to decrease body temperature – Medical implication of high temperature. (13L)

UNIT-IV:THE ACOUSTICS OF BODY

Sound – unit – wave equation – Unit of sound intensities for auditory system – production of speech – Physics of ear – outer ear – inner ear – ear drum – middle ear (10L)

UNIT-V: PHYSICS OF EYE

Optical system of the body structure of Eye – Refraction focusing of the eye system – Geometrical optics of the Eye – Structure of receptor system – Diffraction effects of Eye – Eye defects. (11L)

REFERENCES:

1. web.**khu**.ac.kr/~bil/lecture/MedicalPhysics/**Ch14**.PDF
2. http://www.edb.utexas.edu/petrosino/Legacy_Cycle/mf_jm/Challenge2/physicsbreathing.pdf
3. http://web.khu.ac.kr/~bil/lecture/MedicalPhysics/Ch8.PDF
4. https://www3.nd.edu/~nsl/Lectures/mphysics/Medical%20Physics/Part%20I.%20Physics%20of%20the%20Body/Chapter%203.%20Pressure%20System%20of%20the%20Body/Chapter%203.%20Pressure%20System%20of%20the%20Body.pdf
5. https://www3.nd.edu/~nsl/Lectures/mphysics/Medical%20Physics/Part%20I.%20Physics%20of%20the%20Body/Chapter%204.%20Acoustics%20of%20the%20Body/Chapter%204.%20Acoustics%20of%20the%20Body.pdf
6. https://www3.nd.edu/~nsl/Lectures/mphysics/Medical%20Physics/Part%20I.%20Physics%20of%20the%20Body/Chapter%205.%20Optical%20System%20of%20the%20Body/Chapter%205.%20Optical%20System%20of%20the%20Body.pdf
7. https://www3.nd.edu/~nsl/Lectures/mphysics/Medical%20Physics/Part%20I.%20Physics%20of%20the%20Body/Chapter%202.%20Energy%20Household%20of%20the%20Body/2.3%20Heat%20losses%20of%20the%20body/Heat%20losses%20of%20the%20body.pdf
8. https://www3.nd.edu/~nsl/Lectures/mphysics/Medical%20Physics

NONMAJOR ELECTIVE

(for those who do not study Physics as Major/Allied Subject)

L	T	P	C
2	0	0	2

SEMESTER-III

(Any one)

PAPER 1.a

BASICPHYSICS-1

Preamble: Objective of the paper is to provide a basic knowledge in Physics for students who do not study physics as major/allied subject

UNIT I: MECHANICS

Motion-speed, velocity, acceleration- force –equations of motion- Newton's laws - momentum - work, power and energy -conservation of energy and momentum. (5L)

UNIT II: PROPERTIES OF MATTER

Three states of matter - binding forces - fluid pressure and thrust - applications - Pascal law - Archimedes principle – surface tension-capillary action - Bernoulli's principle – Viscosity-venturimeter-pitot's tube. (7L)

UNIT III: HEAT AND SOUND

Measurement of heat and temperature - clinical thermometer - heat transfer - thermos flask - change of state - effect of pressure on boiling point and melting point - heat engines - steam engine and diesel engine-sound and music - reverberation - acoustics of building - recording and reproduction of sound in film. (7L)

UNIT IV: OPTICS

Reflection and refraction-concave and convex mirrors and lenses-dispersion-spectra- rainbow- interference-diffraction-polarization-concepts with examples-uses-double refraction-optical activity-quartz crystal(6L)

UNIT V: ELECTRICITY

Electric field - potential - Ohm's law - electrical energy and power - resistance - types of resistance - fixed resistance - variable resistance.- resistance in series and parallel -Kirchoff's laws(5L)

Books for study and Reference

1. Properties of matter by Murugeshan R, S Chand & Co. Pvt. Ltd., New Delhi

2. Text book of sound by Brij Lal & Subramaniam, Vikas Publishing House, New Delhi, 1982

3. Electricity and Magnetism - R. Murugesan. (S.Chand &Co.)

4. Heat and thermodynamics - Brijlal and Subramaniyam, S Chand & Co.

5.Optics by Subramaniam N & Brij Lal, S Chand & Co. Pvt. Ltd., New Delhi,1990

PAPER 1.b.

APPLIED PHYSICS(2x15=30 hours)

Preamble: This paper enables the students to understand variable energy sources and the need for finding alternate energy source.

L	T	P	C
2	0	0	2

UNIT-I: Conventional energy sources

Conventional energy sources –world's reserve of conventional energy sources–various forms of energy-renewable and conventional energy systems-comparison (5L)

UNIT-II: Fossil fuels

Fossil fuels – coal, oil and natural gas-availability-statistical details-applications-merits and demerits(7L)

UNIT-III: Biomass energy: Biomass energy-biomass classification-biomass conversion process-biogas plants-Deena bandhu model gas plant-wood gasification-advantages and disadvantages of biomass (6L)

UNIT-I V: Renewable energy sources

Renewable energy sources-solar energy - importance - storage of solar energy - applications of solar energy -solar pond - solar water heater-solar crop dryers-solar cookers- solar green house - solar cell (7L)

UNIT-V: Geothermal energy

Geothermal energy-Geothermal power plant-wind energy and wind farms-wind mills - types – ocean thermal energy conversion - energy from tides-energy from waves(5L)

Books for study and Reference

1. Non-conventional energy sources - G.D Rai - Khanna Publishers, New Delhi

2. Solar energy - M P Agarwal - S Chand & Co. Ltd.

3. Solar energy - Suhas P Sukhative Tata McGraw - Hill Publishing Company Ltd., New Delhi.

NONMAJOR ELECTIVE **SEMESTER-IV**

PAPER 2.a

Preamble: Objective of the paper is to gain knowledge on Basic principles of Physics

L	T	P	C
2	0	0	2

BASICPHYSICS-II

UNIT I: Nuclear Physics

Introduction-nuclear structure-properties of nucleus-packing fraction-binding energy-nuclear forces- Radio activity-properties of alpha, beta and gamma rays-radio carbon dating-nuclear fission-nuclear fusion (7L)

UNIT II: Magnetic Materials

Classification of magnetic materials-para-dia and ferromagnetic materials-properties –applications-crystalline and amorphous materials-conductors-insulators-superconductors- properties –applications (5L)

UNIT III: Lasers

Introduction-absorption-spontaneous emission-stimulated emission-population inversion-general laser system-He-Ne laser-CO_2 laser-applications. (6L)

UNIT IV: Relativity

Introduction -reference frames-postulates of the special theory of relativity-length contraction-time dilation(no derivation)

Quantum mechanics-dual nature of wave and radiation-de-Broglie waves(5L)

UNIT V: Number Systems

Number systems in digital electronics-binary, decimal and hexadecimal numbers –inter conversions- binary addition and subtraction—binary coded decimal-logic gates(7L)

Books for study and Reference

1. Modern Physics- R.Murugesan, S. Chand & Co
2. Electricity and Magnetism -R. Murugesan (S.Chand &Co.)
3. Digital principles and applications - Albert Paul Malvino & Donald P.Leach
4. Mechanics and mathematical physics- R.Murugeshan-S Chand & Co. Pvt. Ltd., New Delhi

PAPER 2.b

L	T	P	C
2	0	0	2

SPACE PHYSICS

Preamble: This course provides an understanding of celestial objects.

UNIT I : Universe

Planets - interior planets - exterior planets - crust, mantle and core of the earth - different region of earth's atmosphere - rotation of the earth - magnetosphere - Van Allen belts - Aurora. (7L)

UNIT II: Comets, Meteors, Asteroids

Composition and structure of comets - periodic comets - salient features of asteroids, meteors and its use. (5L)

UNIT III : Sun

Structure of photosphere, chromosphere, corona - sunspots - solar flares - solar prominence - solar plages - satellites of planets - structure, phases and their features of moon. (6L)

UNIT IV : Stars

Constellations - binary stars - their origin and types star clusters –

Globular clusters - types of variable stars - types of galaxies. (7L)

UNIT V: Origin of Universe

Big bang theory - pulsating theory - steady state theory - composition of universe expansion(5L)

Books for study and Reference

1. K.D. Abyankar, Astrophysics of the solar system, University press, India.

2. Baidyanath Basu, An introduction to Astrophysics, Prentice Hall of India, New Delhi.

3. Prof. P. Devadas, The fascinating Astronomy, Published by Devadas Telescopies, 2, Charkrapani Road, Guindy, Chennai.

4. Elements of Space Physics – R.P. Singhal, PHI.

Table : CS-03 : Common Course Structure for other **UG Degree Programmes in Sciences-B.Sc., in Zoology Major**

(with effect from the academic year 2017-2018 onwards)

Sem.	Pt.I/ II/III IV/V	Subject Status	Subject title	Course /paper	Contact Hrs./ Week	C Credits
I	I	Language	Tamil/Other Language	1	6	4
	II	Language	English	1	6	4
	III	Core	Animal Diversity-I Invertebrata	1	4	4
	III	Core	Animal Diversity-II Chordata	1	4	4
	III	Major Practical-I	Animal Diversity-I Invertebrata & Animal Diversity-II Chordata	1	2	1
	III	Allied-I	Cell Biology, Genetics and Bio-Technology/Industrial Fish and Fisheries-Biology of Fish	1	4	3
	III	Allied Practical-I	Cell Biology, Genetics and Bio-Technology/Industrial Fish and Fisheries-Biology of Fish	1	2	1
	IV	Common	Environmental Studies	1	2	2
			Sub total	**8**	**30**	**23**
II	I	Language	Tamil/Other Language	1	6	4
	II	Language	English	1	6	4
	III	Core	Developmental Zoology	1	4	4
	III	Core	Ecology & Toxicology	1	4	4
	III	Major Practical-II	Developmental Zoology & Ecology & Toxicology	1	2	1
	III	Allied-II	Developmental Zoology, Ecology, Animal Physiology & Evolution/Industrial Fish and Fisheries-capture Fisheries	1	4	3
	III	Allied Practical- II	Developmental Zoology, Ecology, Animal Physiology & Evolution/Industrial Fish and Fisheries-capture	1	2	1

			Fisheries			
	IV	Common	Value based education/Social harmony	1	2	2
			Sub total	**8**	**30**	**23**
III	I	Language	Tamil/Other Language	1	6	4
	II	Language	English	1	6	4
	III	Core	Cell and Molecular Biology	1	4	4
	III	Major Practical-III	Cell and Molecular Biology	1	2	1
	III	Allied-III	Cell Biology, Genetics and Bio-Technology	1	4	3
	III	Allied Practical-III	Cell Biology, Genetics and Bio-Technology	1	2	1
	IV	Skilled based-core	(Any one) 1.Home aquarium 2. Nutrition and Dietetics	1	4	4
	IV	Non- Major Elective	(Any one) 1. BeeKeeping 2. ClinicalBiology	1	2	2
		Common	YOGA*		2	2
			Sub total	**8**	**30**	**25**
IV	I	Language	Tamil/Other Language	1	6	4
	II	Language	English	1	6	4
	III	Core	Genetics	1	4	4
	III	Major Practical-IV	Genetics	1	2	1
	III	Allied-IV	Developmental Zoology, Ecology, Animal Physiology and Evolution	1	4	3
	III	Allied Practical-IV	Developmental Zoology, Ecology, Animal Physiology and Evolution	1	2	1
	III	Skilled based	Biophysics and Bioinstrumentation OR Vermitechnology	1	4	4
	IV	Non-Major Elective	(Any one) 1.Public Health and Hygiene 2. Community and Social preventive Medicine.	1	2	2
	V	Extension Activity	NCC/NSS/YRC/YW/PE			1

		Common	Computer for Digital Era*		2	2
			Sub total	**8**	**30**	**26**
V	III	Core	Animal Physiology	1	5	4
	III	Core	Animal Biotechnology	1	5	4
	III	Elective	(Any one) 1. sericulture 2. Economic Entomology 3. Dairy farming	1	5	4
	III	Elective	(Any one) 1. Apiculture 2. Food and Food Processing Technology 3. Poultry Science	1	5	4
	III	Major Practical-V	Animal physiology	1	3	4
	III	Major Practical-VI	Animal Biotechnology	1	3	
	III	Major Practical-VII	Corresponding Electives	1	2	
	IV	Skill based common	Personality Development/Effective Communication	1	2	2
			Sub total	**8**	**30**	**22**
VI	III	Core	Evolution	1	5	4
	III	Core	Immunology and Microbiology	1	5	4
	III	Core	Biostatistics, Computer applications & Bioinformatics	1	5	4
	III	Major Practical-VIII	Evolution	1	3	4
	III	Major Practical-IX	Immunology and Microbiology	1	3	
	III	Major Practical-X	Biostatistics, Computer applications & Bioinformatics	1	2	
	III	Project Group		1	7	7
			Sub total	**7**	**30**	**23**

All practical examinations are at end of each semester

*Extra credit for extra hours

Total number of hours: 180

Total number of Credits : 142

SEMESTER I

Core Subject: Course 1.1. ANIMAL DIVERSITY - I – INVERTEBRATA
4 Hrs. /Week 4 Credits

OBJECTIVE:

To elucidate the importance of taxonomy, to know the methods of nomenclature, to realize the differences between Protozoa and Metazoa and to study the structure, functional organization, adaptations and the economic importance of lower and higher Invertebrates.

OUTCOME:

Students can identify the animals.

UNIT I

Introduction to Principles of taxonomy – Binominal nomenclature.
Protozoa: General Characters and classification up to classes with the examples.
Type study:-*paramecium:* morphology – nutrition – Osmoregulation – Excretion – Reproduction(binary fission and conjugation)
General structure, life cycle, Pathogeny and Control Measures of the following:
(a) *Entamoeba histolytica (b) plasmodium*
Porifera: General Characters and classification up to classes with the names of the examples.
Type study:- *Leucosolenia* – External morphology – Body wall – Reproduction.
General topic: Canal system in sponges.
(12L)

UNIT II

Coelenterata: General characters and classification up to classes with the names of the examples.
Type study:- Obelia – External Characters (structure of the colony) – life history.
General Topics: Corals, Coral reefs and their significance.
Platyhelminthus: General characters and classification up to classes with the names of the examples.
General topic: (i) External morphology and life cycle of fasciola hepatica.
(ii) Parasitic adaptations of platyhelminthes.
(12L)

UNIT III

Aschelminthes (Nematoda): External morphology, life cycle, pathogeny, Parasitic adaptations and control measures of the following:

- Ascaris lumbricoides (Round worm)
- Dracunculus medinensis (Guinea worm)
- Wuchereria bancrofti (Filarial worm)

Annelida: General characters and classification up to classes with the names of the examples.
External characters
General topics: (i) Metamerism in Annelida.
(ii) Biological significance of Earthworm.
(12L)

UNIT IV

Arthropoda: General Characters and classification up to class with the names of the examples.
Type study: Penaeus: External characters–Appendages–compound eye -Reproductive system and Life cycle.

General topics: (i) social life in insects – Honey Bees
(ii) Beneficial insects – Honey bee, Lac insects and silk moth
(iii) External Characters, economic importance and control measures of the pests of agricultural crops (Coconut – Paddy)

(a) Oryctes rhinoceros (b) Leptocorisa acuta
(12L)

UNIT V

Mollusca: General characters and classification up to classes with the names of the examples.
Type study: Pila globosa: External characters – shell – mantle cavity – Anatomy of Digestive system and reproductive system.
General topics: (i) Pearl culture and Pearl Industry in India.
(ii) Cephalopods as advanced Molluscs.
Echinodermata: General characters and classification up to classes with the names of the example.
Type study : Star fish: External Characters – Water vascular system.
General topic:- Larval forms of Echinodermata and their Phylogenetic significance.
(12L)

(TOTAL : 60L)

REFERENCE BOOKS:

Animal Diversity – I : Invertebrata

1. Arora, M.P.Non – Chordates ,Himalaya Publishing House, Ramdoot, Dr.Bhalero Marg (Kelewadi) Gurgan, Mumbai-400004.
2. Barrington, E.J.W.,Invertebrate structure and function.Boston – Houghton. Miffin and ELBS, London.
3. Bhamrah,H.S.et.al. A text book of Invertebrates. Alilnol Publications Private Limited,4374/4B.Ansari Road, Dayaganj,New Delhi – 110002.
4. Brusca, Invertebrates, ANE Books, Avantika,Niwas,19 Doraiswamy Road, T.Nagar,Chennai-600 017.
5. Ekambaranatha Iyer,M.: A Manual of Zoology Part I. Invertebrata, S. Viswanathan (printers and Publishers)Pvt.Ltd,Chennai.
6. Jan,A. Pechenik, Biology of the Invertebrates, Tata McGraw-Hill Publishing Company Limited,No.444/1 Sri Ekambara Naicker Industrial state,Alalpakkam, Porur,Chennai-600 016.
7. Jordan,E.L.and P.S. Verma. Invertebrate Zoology (Edition).S. Chand and Company Limited,7361 Ram Nagar,Qutab Road,New Delhi-110055.
8. Kotpal R.L. Modern Text Book of Zoology, INVERTEBRATES (Edition). Rastogi Publications, Gangotri, Shivaji Road, Meerut-250 002.
9. Mahanta Rita and I.K. Bhattacharyya. Invertebrate Zoology. Kalyani Publishers, B1/1299, Rajaendar Nagpur, Ludhiana-141008.
10. Parker and Haswell. A text Book of Zoology, Invertebrates Volume I. AITBS Publishers and Distributors,J5/6 Krishna Nagar, Delhi-110051
11. Verma, A. Invertebrates: Protozoa to Echinodermata. Naros Publishing House Private Limited.35-36 Greams Road, Thousand Lights, Chennai - 600006

SEMESTER –I
Course 1.2 ANIMAL DIVERSITY –II: CHORDATA
4 Hrs/week 4 Credits

OBJECTIVE: To exemplify the intermediary position of Prochordates between invertebrates and vertebrates, and to study the structure, functional organization, adaptations and the economic importance of lower and higher chordates

OUTCOME: To understand the knowledge of habits and habitats of vertebrates

UNIT I:**Introduction to chordata**: General characters(Diagnostic characters and additional characters)and Classification up to classes with the name of the examples.

Prochordata: General characters and classification up to orders with the name of the examples.

Type study: Amphioxus-External features-Digestive and Excretory system

External features and biological significance of the following

(a) Ascidian (b) Balanoglossuss

Agnatha: Petromyzon- External morphology; Ammocoetes Larva

(12L)

UNIT II:Pisces: General characters and classification up to sub-classes with the names of the examples

Type study: scoliodon (shark) -External characters- Placoid scales-Digestive system-Respiratory system-Receptor Organs- Urinogenital system.

General topics: (i) Accessory respiratory organs in fishes (ii) Migration of fishes
(iii) Parental care in fishes

(12L)

UNIT III: Amphibia: General characters and classification up to orders with the name of the example.

External features and biological significance of the following Examples:

(a) Rhachophorus (b) Ambystoma (c) Axolotl Larva.

General topic: Parental care in Amphibia

Reptilia: General characters and classification up to orders with the name of the examples

External features and Biological significance of the following Examples:

(a) Chelone mydas (b) Chamaeleon (c) Draco (d) Cobra

General Topics:

(i) Identification of poisonous and non-poisonous snakes of South India

(ii) Poison apparatus- Biting mechanism- venom- First aid for snake bite-Antivenom.

(12L)

UNIT IV:Aves:- General characters and classification up to subclasses with the names of the examples.

Type study: Columba livia (Pigeon)-External characters-Flight muscles-Digestive system-Respiratory system-Urinogenital system
General topics: (i) Migration of Birds (ii) Flight adaptations in Birds
(12L)
UNIT V:Mammalia: General characters and classification up to subclasses with the names of the examples.
Type study: Rabbit –External morphology – Digestive system – Respiratory system- Heart-Structure of Brain- Reproductive system.
General topics:(i) Egg laying mammals (ii) Adaptations of aquatic mammals
(iii) Dentition in mammals

(12L)

(TOTAL: 60L)

REFERENCE BOOKS: Animal Diversity II – Chordata

1.Alexander, R.M. The Chordates Cambridge University Press.

2.Bhamrah, H.S. et al. A text book of chordates.Anmol publication Limited, 4374/4B Ansari Road,Daryaganj, New Delhi 110002.
3.Ekambaranatha Ayyar,M. and T.N.Ananthakrishnan. A Manual of Zoology Vol.II(chordate).S.Viswanathan (Printers and Publishers)Pvt.Ltd.,Chennai.
4.Jordan E.L. and P.S Verma.Chordata Zoology (11th Edition).S.Chand and Company Limited, 7361 Ram Nager,Qutab Road,New Delhi-110 055.
5.Kardong, K. Vertebrates:Comparative Anatomy,Function,Evolution.Tata Mc Graw Hill publishing Company Limited,444/1.Sri Ekambara Naicker Industial estate,Alapakkam,Porur,Chennai-600 116.
6.Kotpal.R.L.Modem Text Book of Zoology-vertebrates.Rastogi Publications, Gangotri,Shivaji Road,Meerut-250 002.
7.Kulshrestha,S.K.Comparative Anatomy of Vertebrates,Anmol Publishers a.Private limited,4374/14B,Ansari Road,Daryaganj.New Delhi-110 002.
8.Mahanta Rita and I,K.Bhattacharyya.Vertebrate Zoology,Kalyani publishers,B-1/1299,Rajinder Nagar,Ludhiana-141008.
9.Nigam,H.C.Biology of Chrodates.Vishal Publishing Company,Books Market,Old Railway Road,Jalandhar-144008.
10.Pough,R.H., C.M.Janis and J.B. Heiser. Vertebrate life.Pearson Education (Singapore) Pvt.Limited;Indian Branch-482 FIE Patpaganj,Delhi-110092.
11.Prasad, S.N.and Kashyap Vasantika,P.Text Book of Vertebrate Zoology,New Age International publishers,4835/24 Ansari Road,Daryaganj,New Delhi-110002.
12.Young,J.L.Life of Vertebrates.Oxford at the clarendon press,London.

SEMESTER II
COURSE 2.1 DEVELOPMENTAL ZOOLOGY
(4 Hrs /Week) Credits 4

OBJECTIVE:

To understand the sequential changes from cellular grade of organization to organ grade of organization in the development of multicellular organisms.

OUTCOME:

To know the developmental processes of animals particularly man

UNIT I

Definition and Scope of Developmental Zoology – Gametogenesis – Spermatogenesis – Oogenesis – Vitellogenesis – Structure of Sperm and Egg in Chick. Fertilization: Pre and Post fertilization events – significance; Parthenogenesis.
(12L)

UNIT II

Cleavage in chick – Fate map of Chick – Gastrulation in Chick – Chick Embryo 48, 72 Hrs. Manipulations of reproduction in Human: Infertility (male and female) – IUI - Invitro fertilization –Artificial insemination - Test tube babies – Amniocentosis.
(12L)

UNIT III

Organogenesis : Development of brain and heart in chick.
Organizer : Primary and secondary organizers.
Morphogentic fields and gradient hypothesis.

(12L)

UNIT IV

Hormonal control of Amphibian metamorphosis.

Extra-embryonic membranes in chick – Development, Types and Physiology.

Placenta in Mammals – Types and Physiology.

(12L)

UNIT V

Nuclear Transplantation in Acetabularia - Regeneration – Types – Regeneration in Amphibians – Regeneration in Planaria. Birth control : Contraceptive devices: Surgical method – Hormonal methods – Physical barriers – IUCD.

(12L)

(TOTAL: 60L)

REFERENCE BOOKS: Developmental Zoology

1. Arora, M.P. Embryology. Himalayan Publishing House, Ramdoot, Dr. Bhalero Marg (Kelewadi) Girgaon, Mumbai – 400004.
2. Arumugam, N.Developmental Biology. Saras Publications, 114/35G, A.R.P camp Road, Nagercoil.
3. Balinsky, B.J.Introduction to Embryology, W.B.Saunders, Philadelphia,USA.
4. Berry,A.K. An Introduction to Embryology,EMKAY Publications,Post Box No.9410, B – 19 East Krishna Nagar,Swami Payanand Marg,Delhi – 110 051.
5. Beryl, N.J. Developmental Biology,Tata McGraw Hill Publishing Company Limited, 444/1 Sri Ekambara Naicker Industrial Estate, Alapakkam, Porur, Chennai -600 116.
6. Developmental Biology: R.M.Twyman.Bios scientific publishers, Ltd. New Delhi (2001).
7. Diwan, A.P. Mammalian Embryology, Anmol Publications Private Limited,4374/4B Ansari Road , Daryaganj, New Delhi-110 002.
8. Diwan,A.P.Avian Embryology, Anmol Publications Private Limited,4374/4B Ansari Road , Daryaganj, New Delhi-110 002.
9. Gilbert,Developmental Biology,ANE Books India, Avantika Niwas, 19,Doraiswamy Road,T.nager,Chennai-600 017.
10. Goel,S.C.Principles of Animal Developmental Biology,Himalaya Publishing House,Ramdoot,Dr.Bhalerao Marg (Kelewadi)Girgaon,Mumbai – 400 004.
11. Jain,P.C. Elements of Developmental Biology (Chordate Embryology).vishal Publishing Company,Books Market,Old Railway Road,Jalandhar – 144 008.
12. Jangir, O.P.Developmental Biology – A Manual.Agrobios (India),Behind Nasrani Cinema,Chopasani Road,Jodhpur – 342 002.
13. Nelson, E.Comparative Embryology of Vertebrates.Tata McGraw Hill Publishing Company Limited,No. 444/1 Sri Ekambara Naicker Industrial Estate, Alapakkam,Porur, Chennai – 600 116.

14. Ramesh Mathur and Meenakshi Metha. Embryology.Anmol Publications Private Limited,4374/4B,ansari road,Daryaganj,New Delhi – 110 002.
15. Rao, K.V. Developmental Biology. A Modern Synthesis.Oxford & IBH Publishing company Private Limited, S-155 Panchshila Park, New Delhi 110017.
16. Sastry.K.V. and Vineeta Shukal, Developmental Biology Rastogi Publications Gangotri, Shivaji Road, Meerut-250 002.
17. Slack,Essential Developmental biology. ANE Books India. Avantika Niwas, 19,Doraiswamy Road,T.Nager,Chennai-600 017.
18. Subramomam, T.Developmental Biology. Narosa Publishing House Private Limited, 35 – 36 Grams Road, Thousand Lights, Chennai – 600 006.
19. Verma.P.S. and V.K. Agarwal. Chordate Embryology (Edition).S. Chand & Company Ltd.7361 Ram Nagar,Qutab Road,New Delhi – 110055.

SEMESTER II

COURSE 2.2 ECOLOGY & TOXICOLOGY

(4 Hrs. / Week) Credits 4

OBJECTIVE:

To study the interaction and interdependence among environmental factors and living organisms – To enumerate the ill-effects and the health hazards of toxic agents released to the environment – To discern the evolutionary significance of animals, theories origin of species and significance.

OUTCOME: To understand the ecosystems such as marine, freshwater and terrestrial.

UNIT I

- **Abiotic factors :** Biological Effect of temperature and light.
- **Biotic factors:** Producer, Consumers and Decomposers.
- **Ecosystem:** Pond,Forest

(12L)

UNIT II

Food chain, Food web, Trophic levels, Energy flow, Ecological Pyramids

Animal Relationships: Mutualism, Commensalism, Antagonism (Antibiosis, Parasitism, Predation and Competition)

(12L)

UNIT III

Population Ecology: Definition – Density – Natality – Mortality – Age – Distribution – Age pyramids –Population growth – Population fluctuations – Regulation of Population density - Animal Dispersion.

Community Ecology: Definition - Community stratification-Periodicity – Community interdependence – Ecotone - Edge effect- Ecological niche- Concept of community –Ecological Succession.

Adaptation:

- Desert Adaptation
- Cave Adaptation

(12L)

UNIT IV

Wild life Conservation: Definition- Endangered Species – Causes for Depletion, Necessity for conservation – Methods of conservation – Sanctuaries – National Parks.

Remote sensing: Its application in agriculture, Fisheries, Forest management and Flood Management.

Urbanization: Reasons for urbanization, Urban problems, Methods to control urban growth.

(12L)

UNIT V

Introduction to Toxicology, Definition, Outline classification of Toxicant.
Toxic agents and mode of action of Pesticides, metals, solvents, carcinogens, poisons
Environmental toxicology and public health.

(12L)

(TOTAL: 60L)

REFERENCE BOOKS: ECOLOGY

1. Agarwal, A.K. Ecology and Environmental Biology. Student Edition, Agrobios (India) Behind Nasrani Conema, Chopasani Road, Jodhpur -342 002.
2. Arora, M.P. Ecology. Himalaya Publishing House, Ramdoot, Dr.Bhalerao Marg, Girgaon, Mumbai- 400 004.
3. Clarke, G.L. Elements of Ecology, John Wiley & sons Inc. New York.
4. Junega, Kavita. Ecology. Anmol Publications Private Limited, 4371/4B Ansari Road, Daryagani, New Delhi – 110002.
5. Kotpal, R.L and N.P. Bali. Concepts of Ecology Vishal Publishing Company,Books Market, Old railway road, Jalandhar – 144 008.
6. Madhab, C.Dash. Fundamentals of Ecology. Tata McGraw Hill Publishing Company Limited,No.444/1.Sri Ekambara Naicker Industrial Estate, Alapakkam, Porur, Chennai – 600 116.
7. Odum , E.P. Fundamentals of Ecology. International Student Edition, W.B. Saunders Company, Philadelphia, USA.
8. Purohit, S.S. A Text book of Environmental Science, Student Edition, Agrobios (India), Behind Nasrani Cinema, Chopasani Road, Jodhpur – 342 002.
9. Singh, H.R. and Neeraj Kumar. Ecology and Environmental Science, Vishal Publishing Company, Books Market, Old Railway Road,Jalandhar – 140 008.

10. Singh, S.P.Animal Ecology,6th Edition, Rastogi Publications, Gangotri, Shivaji Road, Meerut – 250 002.
11. Verma, P.S. and Agawal 1986, Environmental Biology, S. Chand & Co Ltd.,

TOXICOLOGY:

1. Omkar. Concepts of Toxicology, Vishal Publishing Company, Books market, Old Railway Road,Jalandhur-144 008
2. Sharma, P.D.Toxicology .Rastogi Publications, Shivaji Road,Meerut-250 002.
3. Subramanian, M.A.Toxicology, Principles and Methods.MJP Publishers, Tamil Nadu Book House,47 Nallathambi Street,Triplicane,Chennai-600005.
4. Shukla, J.P. and S.P.Trivedi, Fundamentals of Toxicology, New Central Book Agency(P)Limited, 8/1 Chintamoni Das Lane,Kolkata-700 009.

MANONMANIAM SUNDARANAR UNIVERSITY
B.Sc ZOOLOGY (CHOICE BASED CREDIT SYSTEM – CBCS)
MAJOR PRACTICAL SYLLABUS
(FOR THOSE WHO JOINED THE COURSE IN THE YEAR 2017-2018 ONWARDS)
PRACTICAL - I
SEMESTER I
(2HRS / WEEK) Credits 1

Paper 1.1. Animal diversity I- Invertebrata

1. **Dissection and mountings:**
   Cockroach- Nervous system, Digestive System, Trachea, Salivary apparatus.
2. **Museum specimens, slides , models and charts:**
   Paramecium entire, Obelia colony, Ascaris male and female, Earthworm, Honey Bee, Leptocorisa, Nauplius, larva, Sepia, Pinctada, Star fish.

Paper 1.2. Animal Diversity II – Chordata

1 Dissection and Mountings :

- Shark – Placoid Scales.
- Frog – Arterial system (Demonstration only) – model / chart / CD – students have to draw the diagram and write detailed account of the arterial system in the observation note book.
- Frog – Brain (demonstration only) – model / chart / CD – students have to draw the diagram of dorsal and ventral view and write detailed account of the brain in the observation note book.

2. Museum Specimens, slides, models and charts

Amphioxus, Balanoglossus, Ascidian, Petromyzon,Narcine,Hippocampus,Rhacophorus, Ambystoma, Chameleon, Cobra, Kingfisher, Bat.

SEMESTER II

2HRS / WEEK Credits 1

PAPER 2.1. DEVELOPMENTAL ZOOLOGY

- Mounting and observation of live sperms of a vertebrate
- Mounting and observation of egg of a frog.
- Temporary mounting and observation of chick embryo – 24,48,72,96 Hrs.
- Museum specimens, slides, models and charts

  Sperm of a vertebrate, chick embryo – 24,48,72,96 Hrs.

  Condom, Mala – D, Placenta in mammals, Discoidal, Cotyledonary, Zonary placenta, Diffuse placenta.

PAPER 2.2 ECOLOGY AND TOXICOLOGY

Ecology

I. Plankton mounting-any two fresh water/marine

II. Museum specimens, slides, models and charts

Secchi disc, Mutualism (Hermit crab and sea anemone),commensalism (Echeneis and shark), Parasitism (Sacculina on crab),Cyclomolphosis (Daphnia)

Predation (Snake and Rat)

Effect of light Protective Colouration(Leaf insect)

Effect of light Colour changes (chamaeleon)

Pond Ecosystem (Chart)

Food Chain – Forest Ecosystem

Food Web – Grass land.

III Compulsory Study Tour

- A one day study tour is compulsory to visit an ecologically important place such as sea shore, sanctuary, forest area etc., to observe and study the animals in their natural habitat.
- The students should write an illustrated, study tour report and the same is to be submitted for evaluation at the time of practical examination (5 marks).

SYLLABUS FOR B.SC ZOOLOGY

Under Choice Based Credit system (CBCS)
(For the candidates admitted to the course in the academic year 2017 – 2018 and afterwards)
SEMESTER – I
I B.Sc. – ALLIED SUBJECT I – ZOOLOGY THEORY SYLLABUS
Course – 1.1 Cell Biology, Genetics and Biotechnology
4 Hrs/Week Credits – 3

OBJECTIVE:

To elucidate the structure and functions of the cell organelles; to exemplify the concept of genetics, the principles of imheritance and the role of genes in determining characters; to understand the application of the innovative technology to manipulate living organisms or parts of organisms to make products useful to human.

CELL BIOLOGY

UNIT I Ultra structure and functions of (a) Plasma membrane (b) Mitochondria (c) Nucleus,Chromosomes – Structure, types and functions; Giant Chromosomes (Polytene and Lampbrush Chromosomes)

(12L)

UNIT II DNA: Structure (Watson and Crick Model), Replication.

RNA: Different types – r RNA – mRNA – tRNA; Protein synthesis.

Cancer cells and carcinogenesis – Definition, Types, Causes, Properties, Diagnosis and Treatment.

(12L)

GENETICS

UNIT III Simple Mendelian traits in man; Multiple alleles – ABO blood groups in man – problems.

Rh-factor in human – Erythroblastosis foetalis. Multiple gene inheritance.

(12L)

UNIT IV Sex determination in man; Sex linked inheritance in man – Haemophilia, Colour blindness and Hypertrichosis.

Non disjunction and Syndromes in man – Klinefelter's syndrome, Turner's syndrome and Down's syndrome.

Inborn errors of metabolism in man – Phenylketonuria, Alkaptanuria and Albinism.

(12L)

BIOTECHNOLOGY

UNIT V Definition, scope and importance of Biotechnology, Basic concepts of genetic engineering.

Restriction and modification system – Cloning vectors – (Plasmids, pBR 322, Lambda phage)

Introduction of cloned genes into host cells – Transgenesis – Transgenic animals and its application.

(12L)

(TOTAL: 60L)

REFERENCE BOOKS:

CELL BIOLOGY

- Ambrose, E.J & Dorothy, M.E: Cell Biology (ELBS CAMLOTPRESS)
- De Robertis & De Robertis: Cell & Molecular Biology. (W.B. Saunders &co, Philadelphia).
- De Robertis, E.D.P, Nowinski, W.N & Saez, F.A : Cell Biology (W.B. Saunders &co, Philadelphia).
- Dupraw, EJ : Cell & Molecular Biology (Academic Press, NewYork)
- Dyson, R.D :Essentials of Cell Biology (Allyn & BaconInc. Boston). Giese.A.C: Cell Physiology (W.B. Saunders & co,Philadelphia).

GENETICS

1. Strickberger : Genetics(MacMillan).
2. Farnsworth : Genetics (harper andRow).
3. P.K.Gupta: Genetics (RastogiPublications)
4. P.S. Verma and Agarwal: Genetics (S.Chand &Co.Ltd.)
5. Altonburg,E: Genetics (Oxford & IBH publishing company)
6. Burns G.W.: The Science of Genetics (MacMillan)
7. A.C.Pai: Foundations of Genetics (Mc Gaw –Hill)

BIO-TECHNOLOGY

- Prof.V. Kumaresan,"Animal Biotechnology", Saras Publication, A.R.P. Camp Road, Periavilai, Kottar P.O.,Nagercoil, K.K.Dist., - 629002.
- Kumar H.D." A text book of Biotechnology,Affiliated East – West Press(P) Ltd., NewDelhi.
- Animal Biotechnology,2006,R.Sasidhara,MJPPublishers,Chennai.
- Dubey R.C "A text book of Biotechnology"S.Chand & Co.,Ltd.,NewDelhi.

ALLIED PRACTICALS

2 Hrs/week **Credits 1**

FOR 1.1.CELL BIOLOGY, GENETICS AND BIOTECHNOLOGY

- Mounting of Giant Chromosome in Chironomous larva / onion root tip
- Observation of simple mendelian triats among the students

Study of the following through Charts, Slides and Figures:
Mitochondria, Interphase Nucleus, DNA, tRNA, ABO Blood group.
Colour Blindness, Haemophilia, Klinefelter's syndrome, Down's syndrome.
pBR 322, Lanmbda Phage, Recombinant DNA.
Allied practical examination at the end of each semester

SEMESTER II

I B.Sc., - ALLIED SUBJECT I – ZOOLOGY

COURSE 2.1. DEVELOPMENTAL ZOOLOGY, ECOLOGY, ANIMAL PHYSIOLOGY AND EVOLUTION

4 Hrs/Week Credits-3

OBJECTIVES:

To understand the sequential changes from cellular grade of organization to organ grade of organization in the development of multicellular organisms. To study the interaction and the interdependence among environmental factors and living organisms; To understand the functional significance of various organs and organ systems of animals. To discern the evolutionary significance of the animals, origin of species, effects of mutation.

OUTCOME: To understand the behaviour and physiology of organisms

UNIT I

Early development in Man: Structure of sperm and ovum; Fertilization – Cleavage, Morula, Blastocyst, Implantation and gastrulation – Fate map. Placenta in mammals – types and functions. Test tube babies – Twins – Amniocentosis.

Nuclear Transplantation in Acetabularia.

(12L)

UNIT II

Abiotic factors: Biological effects of Temperature and Light; Biotic factors: Symbiosis, Commensalism, Mutualism, Parasitism, Prey-predator

Relationship; Adaptations: Desert adaptations.

Community: Ecosystem – Structure and dynamics of a pond.

(12L)

UNIT III

Nutrition: Food constituents – Carbohydrates, Proteins and Fats.

Digestion: Role of enzymes in carbohydrate, protein and fat digestion.

Absorption: Absorption of digested food.

Metabolism: Carbohydrate metabolism: Glycogenesis, Glycogenolysis, Glycolysis. Respiration: Transport and exchange of oxygen and carbon dioxide. Haemoglobin.

(12L)

UNIT IV

Excretion: Structure of Nephron – Urine formation – Dialysis Nervous Co-ordination: Structure and types of neurons – Nerve impulse, conduction of nerve impulse through neuron and synapse.

Reproduction: Structure of human testis and ovary, Graafian follicle, Menstrual cycle and its hormonal control.

(12L)

UNIT V

Theories of Evolution: Darwinism, Mutation theory of De Vries.
Adaptive radiation in birds.
Mimicry and Colouration.
(12L)

(TOTAL: 60L)

REFERENCE BOOK:

DEVELOPMENTAL ZOOLOGY

1.Arora,M.P.Embryology.HimalayaPublishing House,Ramdoot, Dr. Bhalerao Marg, Girgaon, Mumbai- 400 004.
2. Arumugom, N. Developmental Biology, Saras Publication, 114/35G,A.R.P camp Road, Nagercoil.

Ecology:

1. Agrawal. A.k. ecology and environmental biology, student edition agrobios (india), behind nasrani cinema. Chopasani road. Jodhpur-342 002
2. Odum, E.P. Fundementals of Ecology International Student Edition W.B. Sounders Company, Philadelphia, London.

Animal Physiology:

1. Agarwal, R.A., A.K. Srivastava and Kaushal Kumar. Animal Physiology and Biochemistry (3rd Edition). S. Chand & Company Limited, 7361 Ram Nagar, New Delhi-110 055.
2. Arora,M.P Animal Physiology (6th Edition). Himalaya Publishing House, Ramdoot, Dr. Bhalerao Marg, Girgaon, Mumbai 400 004.

Evolution:

1.Arora, M.P. Evolutionary Biology. Himalaya Publishing House, Ramdoot, Dr. Bhalerao Marg, Girgaon, Mumbai 400 004.
2. Tomar, B.S. and S.P. Singh. Evolutionary Biology. Rastogi Publications, Gangotri, Shivaji Road, Meerut-250 002.

ALLIED PRACTICALS

2 Hrs/Week **Credits 1**

FOR 2.1.DEVELOPMENTAL ZOOLOGY, ECOLOGY, ANIMAL PHYSIOLOGY AND EVOLUTION.

1. Mounting and observation of live sperms of a vertebrate.
2. Estimation of dissolved oxygen in two water sample and discuss the result
3. Qualitative test for glucose, protein and lipid.
4. Effect of temperature on the opercular movement of fish; Calculation of Q_{10}.
5. Museum specimens, slides, models and charts:

Developmental Zoology: Human sperm, Human ovum, Cleavage, Diffuse Placenta,Zonary Placenta,Discoidal placenta,Cotyledonary Placenta (any two)

Ecology: Identification of any two plankton either Fresh water OR marine samples.

Echeneis and Shark, Hermit crab and Sea anemone, Sacculina, Secchi disc.

Animal Physiology: Intestinal villi, Nephron, Heart of mammal.

Evolution: Ancon sheep.

Allied Practical Examination at the end of each Semester.

ALLIED SUBJECT FOR I YEAR B.SC ZOOLOGY MAJOR STUDENTS FROM THE YEAR 2017 – 2018 ONWARDS

INDUSTRIAL FISH AND FISHERIES – ALLIED

SEMESTER I

PAPER I BIOLOGY OF FISH

4 Hrs/Week Credits-3

OBJECTIVE:

To help the students taking Industrial Fish and Fisheries as a subject to have a through knowledge of the various aspects of the Biology of Fish

OUTCOME:

To understand the marketing of fishes and fishery products.

UNIT I

Introduction: Fish Biology – Definition and basic concepts of biosystematics. Importance of classification – Theories of biological classification. Variations in structure, Form, Skin, Coloration, Scales, Mouth, Jaws, Teeth, Fins, Spines and other structures used in taxonomic studies. Induced breeding techniques – Hatching methods – Seed and Brood transport.

(12L)

UNIT II

Study of external morphology and internal organization of a typical elasmobranch and teleost. Alimentary Canal and Associated Structures – Gills – Swim Bladder – Accessory Respiratory organs – Lateral line system – Sound and Light producing organs. Morphological and anatomical characters of Prawn, Crab, Lobster, Bivalve, Gastropod and Cephalopod (one example each)

(12L)

UNIT III

Natural food of fishes – Feeding habits in various groups of fresh water and marine fishes, Prawns, Crabs, Lobsters and Cephalopods. Qualitative and Quantitative estimation of food consumption based on experimental studies and stomach content analysis – Seasonal changes in food availability and food preference – Food and Feeding in relation to age – Food selectively – Feeding intensity. Nutrition of fishes and utilization of food, Feeding strategies and energies. Artificial feeding – Nutritional requirement.

(12L)

UNIT IV

Growth of fish – Absolute, Relative, Isometric and Allometric growth. The Cube Law – Methods for determination of growth – Length frequency analysis – Analysis of growth checks on hard parts like Scales, Otolith and Vertebrae – Estimation of growth by direct methods – Marking and tagging of fish for growth studies – Aging of fish and shell-fish based on length data and growth checks – Length weight relationships, Ponderal index, Relative condition factor and Gonado – Stomach index.

(12L)

UNIT V

Types of reproduction, Sex differences – Sexual maturity, Classification of maturity stages, Size at first maturity. Estimation of fecundity – Ova diameter frequency – Fecundity in relation to length, Weight, Age and food supply. Spawning habits – Factors affecting Spawning, Spawning seasons and frequency. Embryonic and early development – Types of egg and Larvae – Metamorphosis of larva – Larval life and feeding habits. Reproductive behaviour and parental care – Social behaviour – Aggregation and Shoaling. Migrations – Anadromous and Catadromous. **(12L)**

(TOTAL: 60L)

PRACTICALS

1. Methods for Collection, Handling, Identification and Preservation of fish for taxonomic purposes.
2. Study of external morphology of fish. Specific identification of important fresh water and marine fishes, prawns, crabs, Bivalves and Cephalopods of India.
3. Identification of scales of fishes – Placoid, Cycloid and Ctenoid scales.
4. Study of food and feeding habits of fishes – Plankton feeder, Herbivore feeder, Carnivore feeder, Omnivore feeder, Detritus feeder. Study of Structural Adaptations for Diet.
5. Qualitative and Quantitative methods for Stomach content analysis.
6. Estimation of Oxygen, Carbon dioxide, Salinity content in water samples.
7. Plankton analysis in the water samples – any two.
8. Identification of Anadromous and Catadromous fishes.

REFERENCES

1. The Biology of Fishes, Kyle, H. M., T.F.H. Publication, Hong kong 366 P.
2. The Life of Fishes, Marshell,N.B.1965,Weidenfeld & Nicolson, London 402 P.
3. The Marine and Freshwater Fishes of Ceylon,Munro I.S.R,1982.Soni Reprints Agency, New Delhi 351 P.
4. Inland Fishes of India and Adjacent Countries., Vol I & Vol II,Talwar, P.K. and A.G.Jhingran,1991,Oxford & IBH Publishing Co Pvt Ltd.,New Delhi 1958 P.
5. Fisheries Ecology, Pitcher, T.J. & P.J.E. Hart,1992,Room Helm,London 414 P.
6. Introduction to the Practice of Fisheries Science.Royce,W.F.1984,Academic Press 438 P.
7. Fisheries Science its methods and application,1993,Rounsfell,G.A. and W.H.Everheart, John William & Sons New York,444

ALLIED SUBJECTS FOR I YEAR B.SC ZOOLOGY MAJOR STUDENTS FROM THE YEAR 2017 - 2018 ONWARDS

INDUSTRIAL FISH AND FISHERIES – ALLIED

SEMESTER II

PAPER 2 CAPTURE FISHERIES

4 Hrs/Week **Credits-3**

OBJECTIVE:

To highlight the recent trends and types of capture fisheries to students studying industrial fish and fisheries.

OUTCOME: To understand the knowledge of techniques about fish capture and culture.

UNIT I

Capture Fisheries – Inland Capture Fisheries – Scope and importance of Capture Fisheries in India and World. Present yield and Estimates of Potential. Inland capture fishery resources of Indian Fisheries of major and minor carps. Cat fishes and other groups. Problems and management.
(12L)

UNIT II

Cold water fishery resources – Fisheries of trout, Mahaseer and other Cold water Species. Lacustrine fisheries – Species, Catch, Fishing gears, Potential and Problems of Development and management. Estuarine fisheries. Fisheries of Brackish water lakes and back waters – Problems and Management.
(12L)

UNIT III

Salient features of cultivable species of fishes and shell fishes.Marine fishery resources of India – Fisheries of Sardine, Lesser Sardine, Anchovies, Other Clupeoids, Mackerel, Ribbon fishes, Tunnies, Carangids and Cephalopods.
(12L)

UNIT IV

Mid water and Demersal fisheries – Fisheries of Elasmobranches, Bombay duck, Cat fishes, Silver Bellies, Sciaenids, Pomfrets,Thread fins,Thread fin breams and Perches,Flat fishes,Prawns lobsters,Crabs,Mussels Oysters and Clams,Culture of edible Oyster.
(12L)

UNIT V

Biological aspect of fishery managements,Principles of Conservation,Development and Management Concept and practice.Population dynamics – Concept of recruitment and yield,problems of over fishing,MSY,MEY and OSY
(12L)

(TOTAL: 60L)

PRACTICALS

1. Identification of commercial fresh water and marine prawns.
2. Visit to a Prawn farm.
3. Visit to a fish processing industry.
4. Visit to a Landing centers.
5. Raceway culture system.
6. Field visit to observe fishing and to collect field data regarding species composition,Craft, Gear and Field problems regarding riverine, esturine,reservoir and cold water fisheries.
7. Study of fishery development programmes.
8. Study of fishery management problem – Laws,Acts and Field problems.

REFERENCE BOOKS

1. Fish and Fisheries of India Jhingran V.G. 1982 Hindustan Publishing Corporation India Delhi Rev.Ed.
2. Prawns and Prawn fisheries of India Kurian C.V and V.C Sebastian 1982.Hindustan Publishing corporation (India) Delhi Rev.Ed.
3. Marine Fisheries.Bal D.V and K.V Rao 1990.Narendra Publishing House Delhi Rev.Ed.
4. Cold water fisheriesof India.Jhingran V.G and K.L Sehgal 1979.Barrackpore Inland fisheries soceity of India.
5. Fisheries Development in India.Srivastava U.K and Dharma Reddy 1983.Concept publishing co.,New Delhi.
6. Introduction to the practice of fishery science,Royce 1984 Academic press,London.
7. Fishery Science its methods and Applications,Rounsefell,G.A and W.H Everhart 1953 John.Wiley, New York.

SYLLABUS FOR B.SC ZOOLOGY
(For the candidates admitted to the course in the academic year 2017 – 2018 and afterwards)
SEMESTER III
PAPER3.1 CELL AND MOLECULAR BIOLOGY
(4 Hrs /Week) Credits-4

OBJEVTIVES:
To understand the ultrastructure and functions of various cell organells..
OUTCOME:
To inculcate the techniques of cell and molecular biology.

UNIT I

Cell types – prokaryotic & Eukaryotic, Microscopy – detailed study of compound microscope, phase contrast & electron microscopes, Cytological techniques – Fixation & Fixatives – types of stains.
(13L)

UNIT II

Ultrastructure & functions of the following cell organelles: Plasma membrane, mitochondria. Golgi apparatus, endoplasmic reticulum, ribosomes, lysosomes, centriole.
(12L)

UNIT III

Nuclear components: Ultrastructure & functions of nucleus, nuclear membrane, nucleolus, chromosomes&theirtypesLampbrushchromosomeandPolyteneChromosome,Cancercells& Carcinogenesis: Definition, types, causes, properties, treatment, Oncogenesis. CellSignaling.
(14L)

UNIT IV

Nucleic acids – DNA: Components of DNA, DNA structure & Replication, Hybridization, DNA finger print, DNA as genetic material. RNA - Types, Protein Synthesis – Lac Operon
(11L)

UNIT V

Cell Division – Mitosis, Meiosis, & synaptonemal complex, functional unit of gene, Genetic code – codon, anticodon & control of gene expression.
(10L)

(TOTAL: 60L)

PRACTICALS

- Mitosis in Onion root tip cells./ Garlic rootcells.
- Meiosis in Grasshopper testis – Demonstrationonly.
- Giant chromosome in Chironomouslarva.
- Preparation of a) Squamousepithelium
- Preparation of human bloodsmear
- Preparation of frog bloodsmear
- **Spotters:**Models & charts: DNA, t-RNA, Ribosomes, Nucleus, Mitochondria,Golgi apparatus, Endoplasmic reticulum, Proteinsynthesis.

REFERENCE BOOKS:

- Ambrose, E.J & Dorothy, M.E: Cell Biology (ELBS CAMLOTPRESS)
- De Robertis & De Robertis: Cell & Molecular Biology. (W.B. Saunders &co, Philadelphia).
- De Robertis, E.D.P, Nowinski, W.N & Saez, F.A : Cell Biology (W.B. Saunders &co, Philadelphia).
- Dupraw, EJ : Cell & Molecular Biology (Academic Press, NewYork)
- Dyson, R.D :Essentials of Cell Biology (Allyn & BaconInc. Boston). Giese.A.C: Cell Physiology (W.B. Saunders & co,Philadelphia).
- Gupta P.K. – Cell and Molecular Biology, Rastogi Publication,Meerut.
- Norman.S. Cohn : Elements of Cytology (Freeman Book co, Kamia Nager, NewDelhi).
- Swanson, C.P & Webster. B : The Cell (Prentice Hall Inc., Engle Wook Cliffs, New Jersey)
- Verma, P.S. and Agarwal, V.K. Cytology eighth edition S. Chand andCo.

SEMESTER III
SKILL- BASEDSUBJECTS
Paper 3.2A HOME AQUARIUM
(4 Hrs / Week) Credits-4

OBJECTIVESTo understand the construction and maintenance of aquarium, selection , culture and breeding techniques**.**

OUTCOMETo gain knowledge about the culture practices of aquarium fishes**.**

UNIT I
Construction of Home Aquarium.
Materials needed – Wooden and metal frames – Frameless tanks – Sealants and Gums. Design and Construction of Public Freshwater and Marine Aquaria.
Aerators and Filters – Hand net and other equipment.
Water quality requirements – Temperature control and Lighting.
(13L)

UNIT II
Setting up aquarium – gravel/pebbles – Plants – Ornamental objects and fishes – Selection. of species – Introducing fishes to the aquarium. Nutritional requirements of aquarium fishes. Different kinds of feeds. Culture of food organisms. Preparation of dry feeds. Feeding methods
(11L)

UNIT III
Species of ornamental fishes – Taxonomy and biology of Gold fish, Guppies, Swordtails, Marine fishes – Angels and Butterfly fishes.
Fresh water species – live bearers and egg layers, one example each – Common Community fishes – Freshwater and marine, any two examples each.
(12L)

UNIT IV
Reproductive biology of gold fish and angel fish – Maturation, Secondary sexual characters, Breeding habits, Spawning, Parental care, Fertilization and Development of eggs.
Common diseases of freshwater and marine aquarium fishes – Parasites, Fungal, Bacterial-symptoms – Treatment – Prevention and control.
(13L)

UNIT V
Fresh water plants – their taxonomy and morphology, any three of aquarium plants – provision of nutrient and optimum environmental condition for their growth.
Other Ornamental organisms – Anemones, Lobsters, Shrimps, Octopus, Star fish etc
(11L)

(TOTAL: 60L)

REFERENCE BOOKS:

1. Guide to tropical fish keeping, 1967, Braymer, J.H.P.ILiffe.
2. Tropical Marine aquaria, 1974. Cox, J.F.Hamlyn.
3. Tropical Fish: Setting up and maintaining fresh water and Marine aquaria,1972. Dussa Octopus BookLtd.
4. Aquarium systems, 1981. Hawkins, A.S.(Ed.) Academicpress.
5. Living Aquarium, 1981. Hunnam, P. WardLock.
6. Aquarium Fishes and Plants, 1971, Rataj, K. and R. Zukal –Hamlyn.
7. Ornamental Fish for Garden and Home Aquariums, 1956, R and C.P Home Aquariums.
8. Sea Water Aquariums, 1979.Spotte, S. JohnWiley.
9. Collins Guide to Aquarium Fishes and Plants, 1969.Schiotz, A.Collins.
10. Complete Aquarium, 1963.Vogt,D. and H. WermuthThames.

SEMESTER III

PAPER 3.2B NUTRITION AND DIETETICS

(4Hrs./WEEK) Credits-4

OBJECTIVE:

To understand the importance of the various food stuff on one side and to study malnutrition, nutrition related diseases and special diets for persons suffering from diseases on the other.

OUTCOME: To understand the food we have to take and to maintenance of health practices.

UNIT I

Macronutrients and their function – Carbohydrates – Fats – Proteins -Water.

Micronutrients and their function - Vitamins andMinerals.

Nutritive value of the foodstuff – Cereals – Pulses – Vegetables – Fruits – Milk – Egg – Meat – Fish.

(11L)

UNIT II

Parboiling of rice – process of parboiling and uses of parboiledrice.

Germination of cereals – process of germination and uses of sprouts & its nutritivevalue.

Metabolism of foodstuffs – protein, carbohydrate and lipid.

Food choice and preparation methods.

Effect of cooking on protein, carbohydrate and fatcontent.

Menu planning and meal pattern – vegetarian and non – vegetarian.

(13L)

UNIT III

Role of fibres innutrition.

Determination of energy content of food – Bombcalorimeter.

BMR – Determination of BMR – using direct caloriemeter and Benedict Methods, Roth basal metabolic apparatus – Factors affecting BMR.

(11L)

UNIT IV

Balanced diet – Nutritional requirements of different age groups – Pre schoolers- schoolers – Adolescents – Pregnant, lactating women and Agedpeople.

Nutritional diseases – causes and prevention and dietary management of malnutrition, under nutrition and obesity.

Common nutritional deficiency diseases in India – Kwashiorkor – Marasmas –Anaemia – Goitre.

(15L)

UNIT V

Therapeutic diet and its importance, dietplanning.

Symptoms, causes, prevention and dietary management for diabetes mellitus, ulcer, renal diseases, hepatitis, hypertension, atherosclerosis, gastro-intestinal disorders,constipation.

(10L)

(TOTAL: 60L)

REFERENCE BOOKS:

- Ann Louise Gittleman. The Fat Flush Plan. Tata Mc Graw Hill Publishing Company Limited,444/1,Sri Embara Naicker Industrial Estate, Alapakkam, Porur,Chennai
- Hellen Kowtaluk. Food for Today, Tata Mc Graw Hill Publishing Company Limited, 444/1,Sri Embara Naicker Industrial Estate, Alapakkam, Porur,Chennai
- Shubhangini A. Joshi, Nutrition and Dietetics.T Tata Mc Graw Hill Publishing Company Limited, 444/1,Sri Embara Naicker Industrial Estate, Alapakkam, Porur,Chennai.
- Swaminathan, M. Food Science, Chemistry andExperiment.
- Swaminathan, M. Principles of Nutrition andDietetics.
- You and Your food and its utilization, Manuscript.IGNOU.
- Rajalakshmi, R. AppliedNutrition.
- Sumathi, R. Mudambi and M.V. Rajagopal. Fundamentals of Food andNutrition.
- Stanley Davidson, Passmore, R. Nutrition andDietetics
- Poggy, S., Stanfield. Nutrition and Diettherapy.
- Fergos Clydesdate, M. Food Nutrition AndHealth.

SEMESTER III

PAPER 3.3A BEE KEEPING (NON MAJORELECTIVE)

(2 Hrs/week) Credits-2

OBJECTIVE:

To know the knowledge of rearing of honey bees and extraction of honey.

OUTCOME:

To encourage the students to develop self employment.

UNIT I

Comparative study of Rock bee, Indian bee, Little bee and Dammer bee – Life history of Apis indica. Queen, Drones and Workers – Identification, Salient features and Functions.

(6L)

UNIT II

Food of the bee – honey and pollen. Relationship of plants and Bees. Arranging an apiary position – space – direction.

(6L)

UNIT III

Acquiring bees – Care of newly captured colonies. Different kinds of cells. Swarming.

(6L)

UNIT IV

Primitive hives – Different types. Advantages and Disadvantages of primitive hives. Newton's bee hive and its architecture. Appliances used in Apiaries.

(6L)

UNIT V

Honey – Collection and Extraction of honey , preservation, storage, Physical properties, chemical composition, Nutritive value, medicinal values, Honey as Daily Food.

(6L)

(TOTAL: 30L)

REFERENCES:

1. Bee Keeping in India – Sardar Singh- KAR,Delhi.
2. Bee keeping in South India – Cherian M.C. & Ramachandran, Govt.Press,Chennai.
3. Handbook of bee keeping – Sharma P.L. & Singh S.,Chandigarh.
4. Apiculture – J. Johnson and Jeyachandra, Marthandam, TamilNadu.

SEMESTER III

CLINICAL BIOLOGY

(2HRS. /WEEK) Credits-2

OBJECTIVE:

To understand the methodology of collection, analysis and preservation of samples related to various diseases.

OUTCOME:

To understand various preventive measures

UNIT I

Introduction- Normal and Abnormal conditions of body – Symptoms – Samples to be collected for analysis – diagnosis – Instruments used in the analysis - Sterilization .

(6L)

UNIT-II

Urine Analysis –Collection and preservation of sample and chemical estimation. Protein, Urea, Glycemia sediments and casts, impaired renal function and clearance test.

(6L)

UNIT-III

Estimation of Gastro intestinal contents –Saliva constituents, Collection and estimation of Gastric juice, Secretion of liver, Duodenal contents and Pancreatic function tests.

(6L)

UNIT-IV

Clinical Haematology – Ways of obtaining blood, Haemoglobin estimation. Cell counting (DC/ TC), Estimation of Erythrocytesedimentation test (ESR) ,pathological ,physiological and hereditary disorders, Blood banking ,Blood grouping ,and typing ,Glucose ToleranceTest (GTT), Impaired Glucose Tolerance Test , Elisa test.

(7L)

UNIT-V

Fertility test-semen analysis and pregnancy test, RIA test- Agglutination test- Morphological variations – Types- Count and Abnormalities.

(5L)

(TOTAL: 30L)

REFERENCE BOOKS:-

1. Medical laboratory techniques-R.Sood
2. Text book of preventive medicine-J.E Park, BenansidarBhalot
3. Introduction of medical laboratory technology-Baker, F.J.Silverton
4. Medical laboratorytechnology-Lynch.

SEMESTER IV
PAPER 4.1 – GENETICS
(4 Hrs. /WEEK) Credits-4

OBJECTIVE
ToUnderstand the inheritance of parental characters and hereditary diseases
OUTCOME
To gain knowledge of Mendelian traits of human traits

UNIT I
Introduction to Genetics. Mendel- Reason for Mendel's experiment, Alleles, Backcross, testcross- Mendellian laws of heredity. Monohybrid cross and Dihybrid cross.

Interaction of genes – complementary, supplementary, Duplicate genes, lethal genes in man, epistasis, complete and incomplete dominance, co-dominance.

Multiple alleles – A,B,O blood groups- Rh factors in man Problems related to blood groups - Erythroblastosis foetalis. Multiple genes (polygenic inheritance) skin colour in man.
(12L)

UNIT II
Linkage – complete, incomplete, crossing over – coupling and repulsion – Mechanism of Meiotic crossing over – chromosomes map; Sex determination in man, Drosophila. Genic Balance Theory. Sex linked Inheritance in man – Haemophilia, colour Blindness, Holandric genes - hypertrichosis- sex limited genes. Non disjunction inman
Extra chromosomal inheritance in paramecium, maternal predetermination in coiling of shell. Animal breeding: – Inbreeding and out breeding, heterosis.
(12L)

UNIT III
Mutation – types of mutation- gene mutation – genome mutation – mutagens – mode of action of chemical mutagens and ionizing mutagens – detection of mutation by ClB method.
Chromosomal abnormalities – autosomal and sex chromosomes – klinefelters syndrome, Turner's syndrome and Down's syndrome.
(12L)

UNIT IV
Human genetics – twins. Human chromosome, karyotypes, idiogram, Simple Mendelian traits in man.Inborn errors of metabolism – phenylketonuria, Alkaptonuria, Albinism, Sickle – Cell anaemia. Improvement of human race – Eugenics, Euthenics, Pedigree Analysis. Genetics Prognosis – genetic counselling – family history – preventive measures.
(13L)

UNIT V
Bacterial genetics – structure of E-coli, bacterial recombination – transformation conjugation, transduction and sexduction. Genetic application of bacteria, structure and life history of T_4phage. Genetic application of virus.
(11L)

(TOTAL: 60L)

PRACTICALS

- Breeding Experiment: Chi Square test to be illustrated with beads

a) Monohybridand

b) Dihybrid.

- Observation of simple Mendelian traits in man – to berecorded.
- Observation and study of polygenic inheritance of quantitative traits to be interpreted in graphs:-a)height of student b) weight of students / length of shells / length ofpods.
- Blood group to be analyzed in a population with a minimum of 30students.
- Spotters: models of genetic significance to be studied E-coli, T_4phage. Down's syndrome, Klinefelters syndrome, Turner's syndrome, sex linked inheritance (colour blindness, hemophila, hypertrichosis, and webbedtoes).
- Culture and Observation of Drosophila lifecycle.

REFERENCE BOOKS:

1. Strickberger : Genetics(MacMillan).
2. Farnsworth : Genetics (harper andRow).
3. P.K.Gupta: Genetics (RastogiPublications)
4. P.S. Verma and Agarwal: Genetics (S.Chand &Co.Ltd.)
5. Altonburg,E: Genetics (Oxford & IBH publishing company)
6. Burns G.W.: The Science of Genetics (MacMillan)
7. A.C.Pai: Foundations of Genetics (Mc Gaw –Hill)
8. J.A.Serra: Modern Genetics (3 volumes)
9. Sinnot,Dunn and Dobzhansky: Principles of Genetics (McGrawHill)
10. Gardener: Principles of Genetics.

SEMESTER IV
PAPER 4.2A BIOPHYSICS AND BIOINSTRUMENTATION
SKILL BASED SUBJECTS(Any One)
(4Hrs / Week) Credits-4

OBJECTIVES
To know the methods of various instrumentations related to biological systems.
OUTCOME
To gain knowledge about the establishment of clinical laboratory and also useful for research purposes

UNIT I
Biophysics – Scope and Method – Atoms – Molecules – Molecular Interactions – Chemical bonds – Primary chemical bonds – Secondary chemical bonds. Principles of Thermodynamics – Laws of Thermodynamics – Enthalpy – Entropy – Living systems and energy changes.
(12L)
UNIT II
Bioenergetics – Energy and Work – Energy Transformation – ATP – Bioenergetics – Structure of ATP – Formation of ATP – NADP – Structure – NADP / NADPH Redox couple – Mitochondrial bioenergetics – Chloroplast bioenergetics. Membrane Conductivity – Diffusion – Active transport – Osmosis – Electric conductivity.
(12L)
UNIT III
Photobiology – Nature of light and its properties – Absorption and Emission Spectra – action spectrum, Refractive index – Huygen's Principle – Polarized light – Solar radiation – UV – Infrared – De- excitation- Bioluminescence – Fluorescence – Phosphorescence.
(11L)
UNIT IV
Instrumentation – Microscopy – Principle and application of Electron Microscope. Basic Instruments – Principle and applications of pH meter and Colorimeter Centrifugation – Principle and Types – Chromatography – Principle – Types – Paper, Ion exchange, HPLC and applications
(11L)
UNIT V
Labeling Techniques: Isotopes, Radioactivity, Radioactive decay, half – life, autoradiography, biological use of radioactivity, radioactivity Counter – Principle – Types – Geiger Muller – Scintillation Counter.
Electrophoresis – Principle – Types – Agarose Gel electrophoresis, Polyacrylamide gel – Sodium Dodecyl Sulphate Polyacrylamide gel – Applications
PCR Technology: Working mechanism of PCR
Gel Doc. – Principle – Working mechanism – Lyophiliser – Pinciple – Working mechanism – applications.
(14L)

(TOTAL: 60L)

REFERENCE BOOKS:

1. Saleel Bose: Elements of Biophysics.
2. Casey: Biophysics – Concepts & Mechanism.
3. Vasantha pattabhi N. Gautham: (Narosa publishing House) – Biophysics.
4. Jeyaraman, K. : Laboratoy Manual in Biochemistry. New Age International publishers.
5. Kalaichelvan, P.T: A Laboratory Manual, MJP Publishers,47, Nallathambi Street, Triplicane,Chennai 600 005.
6. Gurumani, N: Research Methodology for Biological Sciences.MJP 47, Nallathambi Street, Triplicane, Chennai 600 005.
7. Palanivelu, P.Analytical Biochemistry and Separation Techniques.A Laboratory Manual for B.SC and M.SC Students.Department of Molecular Biology,M.K.University, Madurai-625 021.
8. L.Veerakumari,Bioinstrumentation MJP Publishers,47, Nallathambi Street, Triplicane,Chennai 600 005

SEMESTER IV PAPER
4.3B VERMITECHNOLOGY
SKILL BASED SUBJECT
(4Hrs / Week) Credits-4

OBJECTIVE

To get the thorough knowledge of making vermicompost and vermiculture

OUTCOME

To encourage the self employment practice and save the human being by the way of minimizing the use of chemical fertilizers.

UNIT I

Earthworm taxonomy – Morphological and anatomical – Classification of earthworms – Food habits – Digestive system – Excretion – Reproduction and Life cycle – Earthworm as farmer's friend.

(11L)

UNIT II

Types of earthworm – Exotic and native species – South Indian and North Indian species used in Vermicomposting – Collection and Preservation of earthworms for vermicomposting – Culture techniques of earthworms.

(11L)

UNIT III

Vermicompost production – Requirements – Different methods of Vermicomposting – Heap method – Pot method and Tray method – changes during Vemicomposting.

(11L)

UNIT IV

Role of Earthworms in soil fertility – Use of Vermicompost for crop production – Use of earthworms in land improvement and land reclamation – Economics of Vermicompost and vermiwash production. Earthworms as animal feed – Medicinal value of earthworm meal – Role of Earthworms in Solid Waste, Sewage and faecal waste management and Vermifilters. Earthworms as bioreactors.

(15L)

UNIT V

Interaction of earthworms with other organisms – Influence of chemical inputs on earthworm activities – Large scale manufacture of Vermicompost, packaging of vermicompost and its marketing – Financial supporting – Government and NGOs for vermiculture work.

(12L)

(TOTAL: 60L)

REFERENCE BOOKS :

1. Invertebrate Zoology – Ekambaranatha Ayyar.
2. Earthworm in Agriculture – S.C. Talashikar and Dosani, Agrobios Publications, Near Nasarani Cinema, Jodhpur, 342 002.
3. Vermicompost for sustainable Agriculture – P.K. Gupta Agrobios 2nd Edition.
4. Organic Farming for sustainable Agriculture – A.K.Dahama,Agrobios.
5. A Hand book of Organic farming – A.K.Sharma.Agrobios publication.
6. Earthworm ecology – Clive A. Edwards St. Lucie press – CRC Press Washington DC.
7. Biology of Earthworm - Edward and Lofti – Chapman and Hall Publication.
8. Vermicology – Sultan A. Ismail – Orient Longman Press.
9. Vermiculture Biotechnology – U.S. Bhawalkar BERI, PUNE.

SEMESTER IV

PAPER 4.3A PUBLIC HEALTH AND HYGIENE

(Non Major Elective)

(2 Hrs / Week) Credits-2

OBJECTIVES

To understand the physical, mental and social health and also know the safer disposal of various wastes

OUTCOME

To gain the knowledge about the preventive measures

UNIT I

Physical, Mental,Social – Positive health – Quality of life Index. Nutrition and Health – Food hygiene – Food toxicants.

Population explosion in India – Birth control measures.

(6L)

UNIT II

Environment and health – Water – Sources of water – Uses of water. Water borne diseases – Cholera – Ascariasis.

Standards of Housing – Ventilation.

(6L)

UNIT III

Excreta disposal – Importance – Methods of excreta disposal. Sanitary health measures during fares and festivals.

First aid with reference to accident.

(6L)

UNIT IV

Communicable disease – Viral diseases – AIDS, Rabies. Bacterial diseases – Tuberculosis, Typhoid.

Protozoan diseases – Amoebiasis. Helminth diseases – Filariasis.

(6L)

UNIT V

Health situation in India – Health problems – Primary health care in India – PHC – National Programmes – National AIDS control – National Malaria Eradication Programme – National Tuberculosis.

(6L)

(TOTAL: 30L)

REFERENCE BOOKS:

1. Anderson R.Cliford. Your Guide toHealth.
2. Basu, S.C. Preventive and SocialMedicine.
3. Goel, S.O.L. Public HealthAdministration.
4. Harold Shoryock and Hubert O. Swartout. You and Your Health illustratedDealing with Diseases.
5. Park, K.Park's Text Book of Preventive and Social Medicine.BanarsidasBhanot Publishers,1167 Prem Nager,Jabalpur – 482001.
6. Ramarao, V.First Aid in accidents. Sri Krishna brothers, Thambu Chetty Street,Chennai.
7. Sanitarians Hand Book. Theory and Administrative Practice.PearlesPublications, New Orleans, USA.

SEMESTER IV PAPER

4.3B COMMUNITYAND SOCIAL PREVENTIVEMEDICINE

(Non Major Elective)

(2hrs/week) Credits-2

OBJECTIVES

To understand the knowledge of epidemic and endemic diseases

OUTCOME

To gain the knowledge about the maintenance of hygienic conditions, various diseases and their preventive measures

UNIT-I

Community and Health

Meaning and concept- Biomedical, Ecological, Psychological, Social and holistic. Determinants of health & Indicators of health. Concept of community health, Role of primary health centers.

(6L)

UNIT-II

Drug Addiction:

In India today –incidence among college students-common drugs in vogue-their side effects, control and management of drug addiction.

Alcoholism:

Its effect on various organs like heart, lungs, liver, pancreas, brain and intestine-chronic alcoholism – alcoholic withdrawal syndrome - its control and treatment.

(6L)

UNIT-III

Sexually transmitted diseases:

Gonorrhoea- Syphilils – AIDS - Causative agent, causes - symptoms-diagnosis - treatment and controlmeasures.

(6L)

UNIT-IV

Child abuse:

Definition-causes-effects-Legal measures for eradication.

(6L)

UNIT-V

Problems of old age:

Concept of ageing. H**o**using and health care of the aged. Problems – Cardiovascular - alimentary –Locomotion and joints-welfare service provided to the aged by the Government.

(6L)

(TOTAL: 30L)

PRACTICALS:

- Simple staining of bacteria.
- Gram staining of bacteria.
- Visit to primary health centres.
- Health survey report of a rural community.
- Museum specimens, slides, models and charts- Treponema pallidum, Neisseria gonorrhoeae, AIDS virus , Liver cirrhosis and illustrations related to theory syllabus.

REFERENCE BOOKS:

1. Social Problems in India – Ram Akuja.
2. Social Preventive Medicine – Park & Park.
3. Ageing and Aged – Paul Chowthry.
4. Indian Social Problem –G.R. Madan.

SEMESTER V

PAPER 5.1 – ANIMAL PHYSIOLOGY

5 Hrs. /Week Credits-4

OBJECTIVE

Carving an integrated approach to chemistry related to the functional significance of the various organs and organ systems of animals.

OUTCOME

Students learned about various physiological systems and their activates

UNIT I

- Introduction – Animal physiology and Biochemistry
- Carbohydrates – Classification – Structure and functions of glucose, fructose, sucrose and glycogen
- Proteins – classification – structure and function of albumin and glycoproteins.
- General structure of amino acids – essential, non essential aminoacids.
- Lipids – classification – structure and functions of lecithin, Cephalin, glycol lipids and cholesterol
- Prostaglandins – Introduction – Structure – Classification –Functions.

(16L)

UNIT II

- Enzymes – classification – Nomenclature and properties – Mechanism of enzymeaction.
- Digestion – Role of enzymes in carbohydrate, Protein and Fat Digestion in man absorption of digested food materials inman.
- Metabolism – Carbohydrates – Glycogenesis, glycogenolysis, glycolysis – Krebs's cycle.
- Protein's – Deamination – Transamination – Urea cycle.
- Lipids –β-Oxidation.

(15L)

UNIT III

- Respiration – respiratory pigments – Distribution – composition – properties –Functions -Transport and exchange of oxygen and carbon-di-oxide - Anaerobiosis - Respiratory Quotient.
- Circulation – Origin and conduction of heat beat – cardiac cycle – ECG – Blood pressure -Heart diseases – Artherosclerosis, Angiogram.
- Excretion – kinds of excretory products – structure of kidney – Nephron – Mechanism of urine formation in man – composition of urine – Nephritis –Dialysis.

(16L)

UNIT IV

- Muscle Physiology – types of muscles - Ultra structure of skeletal muscle – properties – mechanism of muscle contraction – Tetanus – Muscle fatigue
- Nerve Physiology – structure, types and functions of neuron.
- Nerve impulse – Definition – Conduction of nerve impulse through nerve – Saltatory conduction – Synapse – Synaptic transmission of impulses – Neurotransmitters – Neuromuscular junction.

(15L)

UNIT V

- Endocrine system – Fine structure and functions of Pituitary, thyroid, Parathyroid, Adrenal, Islets of Langerhans – Testis,Ovary.
- Reproductive Physiology - Ovary, Graafian follicles, menstrual cycle, pregnancy, lactation, menopause - the role of hormones.

(13L)

(TOTAL: 75L)

PRACTICALS

- Rate of Oxygen consumption in a fish.
- Effect of temperature on the opercular movement of fish – Calculation ofQ10.
- Action of salivary amylase in relation to enzyme concentration.
- Qualitative test for carbohydrate (glucose), protein and lipid.
- Demonstration of blood pressure using sphygmomanometer.
- Estimation of Haemoglobin – demonstration only.
- Counting of different kinds of blood cells using haemocytometer – demonstration only.
- Qualitative test for ammonia, Urea and Uric acid.

Spotters
Slides, models and charts – glucose, fructose, glycogen, sucrose, Amino acid, Cholesterol, Intestinal Villi, Haemoglobin, myoglobin, ECG, Sphygmomanometer, Haemometer, Haemocytometer, Kymograph, Cardiac Muscle, Striated and Non – Striated Muscle, Simple MuscleTwitch.

REFERENCE BOOKS: ANIMAL PHYSIOLOGY

1. Agarwal, R.A, A.K. Srivastava and Kaushal Kumar. Animal Physiologyand Biochemistry (third edition).S.Chand & Company Limited, NewDelhi.
2. Arora, M.P. Animal Physiology (sixth edition) Himalaya Publishing house, Ramdoot,Dr. Bhalerao Marg, Girgaon,Mumbai.
3. Berry, A.K. A Text Book of Animal Physiology with related Biochemistry(6th
4. Edition). EMKAY Publications, Post box No.9410. B – 19 East Krishna Nayar, Swami Dayanad Marg, Delhi.
5. Das, A.K. Medical Physiology, Vol. I and Vol. II Books and allied (P) Limited, No.1 E/2 Shubam Plaza (1st Floor), 83/1 Beliaghata Main Road,Kolkata.
6. Goyal, K.A and K.V. Sastry, Animal Physiology,6th Revised Edition, Rastogi Publication, Gangotri, Shivaji Road,Meerut.
7. Guyton, A.C. (1981).Text Book of Medical Physiology, W.B. Saunders co.
8. Hill. Animal Physiology, ANE Books India, Anantika Niwas,19 Doraiswamy Road, T-Nagar,Chennai.
9. Hoar, W.S.(1975). Text Book Of Medical Physiology, W.B.SaundersCo.
10. Juneja, Kavita, Animal physiology. Anmol Publications Pvt. Ltd, 4374/4B AnsariRoad, Daryaganj. NewDelhi
11. Nagabhushanam, R.M.S. Kodarkar and R. Sarogini. Text Book of Animal Physiology2nd Edition. Oxford & IBH Publishing Company Private Limited, S – 155, Panchshila Park, New Delhi.
12. Nigam, H.C. Animal Physiology. Vishal Publishing Company, Books Market Old Railway Road,Jalandhaar.
13. Prosser, L. and A. Brown Comparative Animal Physiology. Saunders & Co.Philadelphia.
14. Prosser,C.L.(1978). Comparative Animal Physiology. W.B. Saundersco.
15. William, S. Hoar, General and Comparative Physiology. Prentice – Hall of India,M-97 Connaught Circus, NewDelhi.

SEMESTER V
PAPER 5.2 ANIMAL BIOTECHNOLOGY
(5 Hrs/Week) Credits-4

OBJECTIVES

- ✓ To introduced various concepts, principles of biotechnology
- ✓ To introduced the concepts of isolation, cloning and insertion of various genes into a prokaryotes
- ✓ To describe the utilization of biotechnology in various biological fields

OUTCOME

- ✓ Students learned about the advancement in biological techniques and their utilization in biological fields

UNIT: I

Definition, History old and new Biotechnology, Scope and importance of biotechnology. Biotechnology in India. Research promotions and priorities in India, Restriction enzymes; enzymes useful for genetic engineering.

Steps in Gene cloning – preparation of desired DNA, Isolation of Plasmid vector, Insertion of desired gene into vector DNA, Introduction of recombinant DNA into host cells - prokaryotic and Eukaryotic animal cells. (Transformation, Transfection, Transduction, Microinjection, Biolistics, Electroporation, Liposome fusion). Screening and selection of recombinants. (Insertional inactivation, blue-white selection, Direct selection), Hybridization techniques (Colony hybridization), Blotting techniques (Southern, Northern and Western).

(15L)

UNIT: II

Genomic library, DNA probe, cloning vectors: Plasmids – types, characteristic features, properties of an ideal gene cloning vector. Plasmid vector ($_{p}$BR 322,$_{p}$UC8, Ti plasmid), Bacteriophage vector (Lambda phage and M13), cosmid, phagemid, plant viral vector (CaMV), Animal Viral Vector (SV40); Yeast artificial chromosome, Transposons as vectors. Gene Amplification through PCR.

(15L)

UNIT: III

Animal cell and Tissue culture: Requirements for animal cell culture laboratory, substrate, liquid media and gases; Maintenance of aseptic condition, Explant, Isolation of Explant, culture of Explant, disaggregation of Explants; Primary culture, secondary culture, subculture, prevention of contamination storage of animal cells (cryopreservation) Large scale culture – (Mono layer culture), Bioreactors – (CSTB and Air lift Bioreactor), Organ Culture: Techniques, advantages, applications Artificial skin & Cartilage. Stem cell culture. Hybridoma technology / Monoclonal antibody production.

(16L)

UNIT: IV

Transgenic animal technology – Introduction, Methods of trans genesis (Any 3 methods), Dolly, applications.

Gene therapy – Definition, classification, Bone marrow and Liver transplantation. Enzyme technology: Definition, Production of β Galactosidase enzyme, Enzyme immobilization and their application.

Bioethics: Intellectual property right, patenting of Biotech products. Bio safety – definition, Biosafety guidelines in India.

(14L)

UNIT: V

Applied Biotechnology:-

Biotechnological methods of sewage water treatment – primary, secondary and tertiary treatment.
Bioremediation: Definition, types, Role of genetically engineered organisms in bioremediation (Super bug, phyto remediation)
Biofuel: - Ethanol, Biogas.
Aqua culture technology: - DOT-ELISA, Gene probe PCR.
Human genome project; DNA finger printing techniques and its application in forensic medicine, Microarrays, Biochip, Bioweapons.
(15L)

(TOTAL: 75L)

PRACTICALS

- Isolation of genomic DNA –Demonstration.
- Isolation of plasmid –Demonstration
- Protoplast preparation and fusion –Demonstration
- Estimation of Co_2in any three effluent / sewage water samples –(Individual)
- Isolation of Protein by PAGE –Demonstration.
- **Models / charts / photos:** PBR 322, PUC 8, Ti plasmid, Lambda Phage, M13 Phage, SV40, CaMv, Restriction enzyme, recombinant DNA, Gene cloning, Electroporation, Microinjection, Lipofection, Southern blotting, Monoclonal antibody, stem cells, Dolly, Trans genesis, Animal cloning, organ culture, Anaerobic digester,Fermentor.

REFERENCE BOOKS:

- Prof.V. Kumaresan,"Animal Biotechnology", Saras Publication, A.R.P. Camp Road, Periavilai, Kottar P.O., Nagercoil, K.K.Dist., - 629002.
- Kumar H.D." A text book of Biotechnology, Affiliated East – West Press(P) Ltd., NewDelhi.
- Animal Biotechnology,2006,R.Sasidhara, MJP Publishers, Chennai.
- Dubey R.C "A text book of Biotechnology" S.Chand & Co., Ltd., NewDelhi.

SEMESTER V
ELECTIVE: (Any One)
PAPER:5.4A SERICULTURE
(5Hrs/Week) Credits-4

OBJECTIVE

To explore the scope for students adopting sericulture as a vocation after their graduation as it is rural based and welfare oriented agro based industry.

OUTCOME

Students learned how to rear, maintain and uses of silk

UNIT I

Importance of sericulture, sericulture industry in India, sericulture as cottage industry, role of Central Silk Board, Moriculture, Mulberry varieties – High yielding varieties – Varieties for rainfed conditions. Morphology of mulberry plant, methods of propagation, irrigation, manuring – Biofertilizers – Green manuring – Triacontanol for increased mulberry productivity – Seriboost, pruning, harvesting and storing of mulberry leaves, package of practices for mulberry cultivation.
(15L)

UNIT II

Diseases of mulberry – fungal diseases – fungal root diseases, fungal shoot diseases, Bacterial diseases – leaf blight disease, rot disease, Viral disease – mulberry leaf mosaic disease, dawn disease, Neamatode disease - root knot disease, Deficiency diseases – nitrogen deficiency, phosphorus deficiency, potassium deficiency, magnesium deficiency and calcium deficiency. Pests of mulberry – leaf eating insect pests and borer pests one example each.
(15L)

UNIT III

Classification of mulberry silkworm, habit and habitats of silkworm, voltinism, races of silkworms, life cycle of mulberry silkworms, structure of egg, larva, pupa and adult, sexual dimorphism digestive system, circulatory system, excretory system, respiratory system, nervous system and reproductive system, endocrine glands, glands of silkworm.
(15L)

UNIT IV

Rearing of silkworm: Rearing house – Rearing appliances – Rearing operation – Disinfection – Brushing – Maintenance of optimum conditions, Feeding – bed cleaning – spacing. Rearing of young ages – Chawki rearing - Rearing of late age larva: Shelf rearing. Floor rearing, shoot rearing. Application of sampoorna. Mounting: Methods – precautions, Cocoon marketing: Characteristics of cocoon – defective cocoons – methods of harvesting.
(15L)

UNIT V

Diseases of silkworms; Protozoan – pebrine, Viral – Flacherie, gattine, grasserie Bacterial – Flacherie, septicemia, sotto, court, Fungal – Muscardine, Pests – Uzy fly, dermestid beetle of silkworm. Silk reeling: cocoon stifling – types, storage of stifled cocoons, sorting, cocoon, boiling and deflossing – brushing, Process of reeling: Different methods, silk waste and byproducts of silk reeling. Raw silk and marketing.
(15L)

(TOTAL: 75L)

PRACTICALS:

1. Dissection of silk glands, digestive and nervoussystems.
2. Dissection of male and female reproductivesystem.
3. Selection of mulberry leaves according to differentstages.
4. Life history – egg, larva, pupa andadult.
5. Sexual dimorphism in larva, pupa andadult.
6. Mulberry varieties such as MR2, S30, S36,V2.
7. Chandrike.
8. Rearing tray and rearingstand.
9. Raw silk.
10. Report on field visit to sericulturefarm.

REFERENCE BOOKS:

1. Ganga, G. and I. Sulochana Chetty, An introduction to Sericulture.Oxford & IBH Publishing Company Private Limited,S -155,Panchshila Park,NewDelhi.
2. Ganga,G. Comprehensive Sericulture,Volume – 2 Silkworm Rearing and Silk Realing. Oxford & IBH Publishing Company Private Limited, S -155,Panchshila Park,New Delhi.
3. Dandin, S.B, Jayant Jayaswal and K. Giridhas, Hand Book of Sericultural Technologies, Central Silk Board, Madivala, Bangalore –68.
4. Kamile Afifa. S and Masoodi M. Amin, Principles of Temperate Sericulture,Kalyani Publishers, B – 1/1292,Rajinder Nagar,Ludhians.
5. Kesary, M and M.Johnson, Sericulture, Department of Zoology,N.M.Christian College, Marthandam.

SEMESTER V
PAPER 5.4B ECONOMIC ENTOMOLOGY
(5Hrs/Week) Credits-4

OBJECTIVES

- ✓ To introduced various breeds of chicks, layers and broilers
- ✓ To describe construction, maintenance of poultry keeping and also introduce the rearing and maintenance of poultry
- ✓ To describe how to prevent and manage various diseases of poultry

OUTCOME

- ✓ Students learned about selection, culturing and maintenance of poultry

UNIT I

Structure and salient features

Brief account of external morphology of head, thorax and abdomen; Classification and development (metamorphosis) of insects; Salient features (up to order) and economic important of Thysanura, Orthoptera, Odonata, Thysanoptera, Isoptera, Coleoptera, Lepidoptera, Hemiptera, Diptera, Hymenoptera, Dermaptera

(15L)

UNIT II

Productive insects

Sericulture- Types of Silkworm, Life cycle and rearing of mulberry silkworm, *Bombyx mori*; Economic importance of silkworms

Apiculture – Types of honey bees, Life cycle and culture methods, bee product and its economic importance

Lac culture – Lac insect, *Laccifer lacca* - Life cycle, Lac processing, Lac products and Economic Importance.

(15L)

UNIT III

Beneficial insects

Biological control agents – Characters and different between parasitoids and predators (common Indian insects); General characters and beneficial role of scavengers, pollinators, weed killers; Medicinal and Aesthetic value of insects; Insect as human food (general account only)

(15L)

UNIT IV

Insects of medical importance

General account on Personal Pests (Lice, Fleas, Bedbugs, Ticks, Scabies mites), Housefly, Cockroach, Biting insects (Mosquitoes, Biting Midges, Sandflies, Black flies, Horse Flies, Stable flies), Major insect-born disease and their management; Recent development in Forensic entomology.

(15L)

UNIT V

Pest management

Components of pest control – physical, mechanical, cultural, chemical and biological control; Pesticide applicators; Pesticide poisoning and first aids; Banned pesticides; General Principles, advantages and disadvantages of Integrated Pest Management; Recent advances in pest control – sterilization techniques, liquid vaporizers, pheromones, RNA interferences, kairomones.

(15L)

(TOTAL: 75L)

PRACTICALS:

1. Head sclerites, thoracic segments, abdominal segments of cockroach
2. Types of antennae. Filiform, Moniliform, Aristate, Capitate, Clavate, Clubbed, Plumose, Pilose, Pectinate, Bipectinate, Setaceous and Geniculate, Lamellate, Serrate. (Any two mountings and rest for study with photo/permanent slides) (Preferablypests)
3. Halter and wing of housefly
4. Types of legs- Typical, Cursorial, Fossorial, Saltatory, Natatorial and Scansorial (Mountings of any two and rest for study with photo/permanentslides).
5. Abdominal appendages- Styles, cerci of cockroach.
6. Mouthparts of Cockroach
7. Malpighian tubules(cockroach)
8. Collection, preservationanddisplayof5insecttypes(Collection and preservation of insects other than pests be discouraged)
9. Common Insecticide formulations (display of samples)
10. Field visit / Assignment / Play and ponder. Give actual handling of bees/ silk moth / lac insect or visit to any one of these units.

REFERENCES BOOKS

1. Abhishek Shkula, 2009. A Handbook on Economic Entomology, Daya Publishing House, India
2. Ganga, G. & Sulochana Chetty, J. 1997. An introduction to Sericulture. Oxford & IBH Publ. Co. pvt. Ltd., India.
3. David, B.V.& Ramamurthy, V.V. 2016. Elements of Economic Entomology, 8th Edition, Brillion Publishing, India.

SEMESTER V

PAPER5.4C DAIRY FARMING

(5 Hrs/Week) Credits-4

OBJECTIVES

- ✓ To introduced various breeds of Indian cows
- ✓ To describe construction, maintenance of sheds and also introduce the growing and maintenance of diary animals
- ✓ To describe how to prevent and manage various diseases of diary animals

OUTCOME

- ✓ Students learned about selection, growing and maintenance of diary animals

UNIT I

Importance of the study – Live stock in India – Live stock reproduction – Organs – Fertilization – Artificial Insemination – Inheritance – Hybrids – Hybrid Vigor – Grading – Pure breeds – Inbreeding.

(15L)

UNIT II

Nutrition – Nutritive values of common feeds – Commercial and mixed feeds – Balance ration.

(15L)

UNIT III

Dairy animals – Cattle – Cow – Buffaloes – Goat – Their economic importance – Productivity.

(15L)

UNIT IV

Live stock diseases – Common parasites in India – Treatment.

(15L)

UNIT V

Marketing the diary products – Milk and other dairy products – Nutritive values of fresh and preserved products – Combating spoilage of milk – Souring – Gassy Curdling – Robiness – Sweet curdling – Pasteurization.

(15L)

(TOTAL:75L)

PRACTICALS:

1. Visit to pasteurization plant andreporting.
2. On the spot tests of pure milk – Specific gravity,total soilds and adulteration ofmilk.
3. Demonstration of Dairy products – Cream,Butter,Ghee,Khoa, and Icecream.
4. Identification of cattle diseases – Prevention and Cure-Method of taking temperature incows.
5. Preparation of Cattle Feed-Balanced food – Identification of different feedplants.
6. Artificial insemination – Common Surgical Instruments and theiruses.
7. Periodical visit to a Good Dairy Farm andReporting.

REFERENCE BOOKS:

1. Principles of Dairy Chemistry. Janness, Robert and Sturte Patton; WielyEastern.
2. Artificial Insemination in Farm animals: Perry Enos (Eds.) Oxford &IBH.
3. Breeding and Improvement of Farm animals: Rice, Victor, Arthur; Tata MCGraw Hill.
4. Livestock and Poultry Production: Singh, Herbans and Earl Moore; Prentice Hallin India.

SEMESTER V

ELECTIVE: (ANY ONE) PAPER 5.5A APICULTURE

(5 Hrs. / Week) Credits-4

OBJECTIVE

To examine the scope for self employment opportunities after their graduation account of the rural based and welfare oriented nature of this vocation.

OUTCOME

Students learned about selection, rearing and maintenance of apiary

UNIT I

Definition, Scope, Classification of bees, Rock bee, Indian bee, Little bee and Dammer bee- their identification and habits, choice of species in Apiculture.

Bee colony-Distinctive features, Identification and Functions of queen, drones and workers, Structure and functions of Legs, mouth parts and sting of worker bee.

Development of Honey bee-egg, larva and pupa-time taken for the development of queen, drone and worker. Food of the bee- honey and pollen-royal jelly.

Artificial feeding. Behaviour of bees-dances.

(17L)

UNIT II

Principles of apiculture, Arranging an apiary, position-space-direction,acquiring bees-care of newly captured colonies-handling the bees.

Bee keeping-Primitive methods and their Advantages and Disadvantages. The bee comb and its architecture-Different kinds of cells-Burr comb.

Different types of Modern hives – Architecture - Parts of artificial hive and its advantages - other appliances used in apiaries.

(15L)

UNIT III

Honey bee products.

Honey- Collection and Extraction, Preservation and storage –Physical properties,Chemical composition,nutritive value, medicinal values-honey as daliy food.

Bee wax-Production , method of extraction-characteristics and uses. Bee venom-method of collection - composition of venom- its uses.

(15L)

UNIT IV

Enemies of bees-Greater wax moth, lesser wax moth, ants, wasps, lice, beetles, birds and their management.

Diseases of bees-adult and brood diseases- Bacterial, Fungal, Viral & Protozoan; Prevention and Control measures.

(14L)

UNIT V

Swarming-Prevention and control.

Robbing and Fighting-Prevention and control. Uniting stocks-Different methods.

Queen rearing.

Supersedure.

Foraging, inter-relationships of plants and bees.

(14L)

(TOTAL: 75L)

PRACTICALS

1. Mountings of Legs, mouth parts and sting.
2. Spotters:
   Queen, worker, Drone, Artificial hive, Queen excluder, smoker, honey extractor, honey, Bee comb and Comb foundation sheet.
3. Report on field visit to apiary.

REFERENCE BOOKS:

1. Mishra,R.C. and R. Garg. Perspectives in Indian Apiculture. Agrobios (India)behind Nasrani Cinema, Chopasani Road, Jodhpur-342002.
2. Abrol,D.P. Bee Keeping in India. Kalyani Publishers, B-1/1292, Rajinder Nagar,Ludhiana-141 008.
3. Cherian, M.C. and Ramachandran. Bee Keeping in SouthIndia.
4. Philips, E.F. Bee Keeping,Agrobios (India) behind Nasrani Cinema,Chopasani Road,Jodhpur-342 002.
5. Sadar Singh, Bee Keeping in India KarDelhi.
6. Sharma P.L and Singh, S.(controller) Hand Book of bee Keeping, printingand Stationery,Chandigarh.
7. Webb,A. Bee Keeping for profit and Pleasure, Agrobios (India), Behind Nasrani Cinema, Chopasani Road, Jodhpur-342002

SEMESTER V

PAPER 5.5B FOOD AND FOOD PROCESSINGTECHNOLOGY

(5Hrs/ week) Credits-4

OBJECTIVE:

To understand the physical and chemical properties of food stuff, the methods of preparation of palatable diets and the techniques employed to increase their shelf – life.

OUTCOME

Understood various value added food products and their marketing strategies

UNIT I: FOOD CHEMISTRY

Food chemistry: Definition and importance, water in food, water activity and shelf life of food. Carbohydrates: Chemical reactions, functional properties of sugars and polysaccharides in foods. Lipids: Classification and use of lipids in foods, physical and chemical properties, effects of processing on functional properties and nutritive value. Protein and amino acids: physical and chemical properties, distribution, amount and functions of proteins in foods, functional properties. Effects of processing- Losses of vitamins and minerals due to processing. Pigments in food, food flavours, browning reaction in foods. Enzymes in foods and food industry, Bio-deterioration of foods, food contaminants, additives and toxicants.

(15L)

UNIT II: PRINCIPLES OF FOODPROCESSING

Scope and importance food processing – National and International perspectives.

Principles and methods of food preservation – freezing, heating, dehydration, canning, additives, fermentation, irradiation, extrusion cooking, hydrostatic pressure-cooking, dielectric heating, microwave processing, aseptic processing, hurdle technology.

Storage of food, modified atmosphere packaging. Refrigeration , freezing and drying of food, Minimal processing, Radiation processing.

(14L)

UNIT III:

Definition of milk, composition, physical and chemical properties of milk Constituents and nutritive value of milk, Factors affecting composition of milk, Types of milk.Fluid Milk Processing. Receiving, Filtration Clarification, Straining, Standardization, Homogenization and its Effects, Pasteurization and various systems of pasteurization ; LTLT, HTST , UHT methods, Pasteurizes(Heating and Cooling systems ,Flow controller regenerator,Flow division valve) sterilization, packaging of fluid milk. Coagulated Milk Products.

Channa, Paneer, Classification and manufacturing process of cheese, butter and ghee and its storage.

Condensed Milk - Types and factors affecting the quality of Condensed Milk , Storage of condensed milk - Methods of drying milk.(Drum and Spray drying) factors affecting the quality of dry milk. Introduction to instant non-fat dry milk, packaging of dry milk products.

(16L)

UNIT IV : FRUITS AND VEGETABLESTECHNOLOGY

Cleaning, sorting, grading, peeling, and blanching methods and their Equipments, Ingredients and Processes for the manufactures of jam, jellies, marmalade, preserves, pickles and chutneys. Defects and factors affecting the quality of above. Thermal Processing of Fruits and Vegetables: History, definition, various techniques of thermal processing and their effects on the quality of fruits and vegetable products, thermal process time, introduction to concept of thermal process calculations, types of containers and their selection, spoilage of canned food. Dehydration of fruits and vegetables, equipment and process for dehydration of plums, apricot, apple, fig, grapes, peach, cauliflower, potato, mushroom, tomato. Freezing process of selected fruits and vegetables: Peas, beans, cauliflower, apricot and mushroom.

(14L)

UNIT V :TECHNOLOGY OF MEAT,FISH AND POULTRY PRODUCTS

Slaughter of meat animals, different cuts of lamb and their uses, post-mortem inspection – post mortem changes- Loss of homeostasis, post-mortem glycolysis and pH decline, Rigor mortis. Preparatory operations of meats and meat products: Abattior- definition and construction, Basic preparatory procedures (commintion, emulsification, preblending). Cured and smoked meats, sausage products- classifications, processing steps and canned meat, meat pickles. Handling and Dressing of poultry: Inspection of poultry birds, dressing and preparation of ready to cook poultry, factors affecting the quality- Egg and Egg products- structure, chemical composition and nutritive value, spoilage of eggs and preservation of whole eggs and egg products, preparation of egg powder. Fish and fish products: Types of fish, composition and nutritive value, judging and freshness of fish, fish grading and cooking of fish, smoking, pickling, salting and dehydration , preservation of fish and processed fish products. Frozen storage of fresh and processed meat, fish and poultry. Byproducts of fresh and processed meat, fish, poultry and egg industry.

(16L)

(TOTAL: 75L)

PRACTICALS:

1. Determination of Protein, Starch, Sugar, Amino acids, Crude fibers, Total minerals, Crude fat in food stuff.
2. Estimation of Vitamins – Ascorbic acid, Thiamine.
3. Browning reaction in food, Analysis of lipid-saponification value, acid value & Iodine Value.
4. Determination of Tannins-chemical residues and Aflatoxins, Estimation of Preservative and Antioxidants.
5. Platform test of Milk.
6. Determination of SNF, Specific gravity and total solids of milk.
7. Determination of moisture and fat content of milk powder.
8. Determination of adulterants in milk like Water, Urea, Neutralizes, Preservatives and Starch.
9. Preparation of Channa and Paneer.
10. Preparation of different types of milk products and their evaluations.
11. Preparation of fish, Meat, Egg and Vegetable pickles –Demonstration.
12. Estimation of iron sulphide formation in cooked egg.
13. Visit to a Dairy Unit, Different fruit and vegetables processing unit, Slaughter house and observation of different types of cuts made and demonstration of slaughtering, fish processing unit and submit are port.
14. Equipments and appliances used in various food processing industries-observation.

REFERENCE BOOKS:

1. Food processing and nutrition – Bender A.E. – 1978 Academic Press, London.
2. Food processing technology: Principles and Practices. Fellows, P. and Ellis, A.1990,New York.
3. Introduction to food processing – Jelen,P.-1985.Prentice Hall, Reston Virginia, USA.
4. Food Chemistry – Awrand. W andWoods, A.E.1973.AVI,Westport.
5. Food Chemistry – Meyer, L.H.-1973.East West Press Pvt. Ltd, New Delhi.
6. Outlines of Dietary technology –Woarnes.
7. Preservation of fruits and Vegetables – Vijayakhaderkalyani.
8. Preservation of fruits and Vegetables Srivastava, IBD Co. Lucknow.
9. Fish Preservation – S.K. Kulsherestha.
10. Fish Processing and Preservation –C.L.Cutting.
11. Processed Meat- Pearson and Glite – CBS publishes.
12. Poultry, Meat and Egg Products – Parkursht and Mountney.CBS Publishers

SEMESTER V
PAPER 5.5C POULTRYSCIENCE
(5HRS/WEEK) Credits-4

OBJECTIVE:

To know about poultry farming and to get deep knowledge about poultry manure, nutrition and various diseases

OUTCOME :

Students can get self employed after their graduation

UNIT I

Poultry industry in India – a brief introduction.
Choosing a commercial laying stock –sexing in one day old chicks. Poultry housing – General principles of building poultry house.
Deep litter system – Droppings pit – Feeders , Waters – Nest boxes. Laying cages – Californian cages – Management of cage birds.
(15L)

UNIT II

Poultry manure – Volume, Composition and values. Nutritional content of eggs.
Management of Chicks, Growers, Layers and Broilers. Lighting for Chicks, Growers, Layers and Broilers.
Summer and winter management. Debeaking –Forced moulting.
(14L)

Unit III

Poultry nutrition : Protein and Amino acid requirements for chicks , growers ,layers and broilers – Symptoms of excessive dietary levels and deficiency.
Carbohydrates and Fat requirements for Chicks, Growers, Layers and Broilers– Symptoms of excessive dietary levels and deficiency.
Fibre requirement for poultry feeds.
Requirements of vitamins and inorganic minerals for Chicks, Growers and Layers – Deficiency Symptoms.
(16L)

UNIT IV

Importance of feed additives in a poultry feed.
Preparation of supplementary feed for poultry- South Indian feed ingredients in relation to M.E level, Protein level, Amino acid, Minerals (ca & p) and Fiber content.
(14L)

UNIT V

Poultry diseases – Causes, Symptoms, Transmission, Treatment, Prevention and Control of the following diseases : Viral diseases - Ranikhit disease, Fowl pox, Infection and control bronchitis and Gumboro disease. Bacterial disease – Fowl typhoid, Paratyphoid, Pullorum, fowlcholera, Coryza and Mycoplasmosis. Fungal diseases – Aspergillosis and Aflatoxicosis. Parasitic disease- Coccidiosis. Nematode infections. Tape worm infections. External parasites of chicks – Ticks, mites and lice.
(16L)

(TOTAL: 75L)

PRACTICALS :

1. Identification of Ectoparasites of poultry studied in the theory.
2. Identification of Endoparasites.
3. Feeders – Different types.
4. Waterers – Different types.
5. Cage house –Model
6. New castel disease, Fowl pox, Coryza, Coccidiosis - Diagrams or models
7. Debeaking
8. Visit to a poultry farm and reporting.

REFERENCES :

- Poultry keeping – M.R. Gnanamani
- The Rearing of pullets – Bulletin No. 54, Her majesty's stationary office,London
- Intensive Poultry management for egg production. Bulleting No. 152. Her majesty 's stationary office ,London.
- Nutrition of Chicken - M.L Scott et al.,
- Disease of Poultry – Biester Oxford &IBH

SEMESTER VI
PAPER 6.1 EVOLUTION
(5Hrs/Week) Credits-4

OBJECTIVES
To know how the life originated in our planet and related theories
OUTCOME
Students learned relationships between abiotic and biotic factors

UNIT I ORIGIN OF LIFE
Chemical origin of life – Biological experimental evidences. Evidences in favour of evolution :
-Homologous organs and Analogous structures.
-Embryological evidences – palaeontology - geologicalscale – biochemistry and physiology.
(15L)

UNIT II
Lamarckism and Neo – Lamarckism Darwinism and Neo – darwinism.
Mutation theory of De vries
Modern concept of evolution : Natural selection – types and mechanism.
(15L)

UNIT III :
Variations and Sources of Variability. Isolation and Isolating mechanisms. Population genetics and evolution :
- Hardy – weinberg law
- Species concept and speciation – types and mechanism.

(15L)

UNITIV:
Mimicry and Protective Colouration .
Adaptations : Cursorial , Fossorial , Arboreal, Volant , Aquatic , Desert , Cave.
(15L)

UNIT V :
Evolution of Horse.
Evolution of man- Ancestry of man-Salient features of Apes and Man- Trends in Human Evolution – Causes for Human Evolution- Evolution of man as seen in the fossil record.
Cultural Evolution of Man.
Animal distribution (Geographical) – Patterns of Distribution - Zoogeography of Palaearctic , Nearctic , Neotropical , Ethiopian , Oriental and Australian region.
(15L)
(TOTAL: 75L)

PRACTICALS:

- Museum specimens, slides, models and charts.
- Animals of evolutionary significance: Peripatus, Archeopteryx, Limulus.
- Colouration: Mimicry- Lycodon and Krait; Mutation-Peppered Moth, Ancon sheep, Stick insect, Leaf insect
- Variations : variation and finger prints
- Gene Frequency : Hardy Weinberg law- probability Experiment.

REFERENCE BOOKS

- Organic Evolution- N. Arumugam
- Evolution- M. P. Arora
- Moody, Introduction To Evolution.
- Dobzhansky, Th.: Genetics And The Origin Of Species 1951,Columbia Uty. Press.
- Dodson, Evolution – Process and Product.

SEMESTER VI

PAPER 6.2- IMMUNOLOGY AND MICROBIOLOGY

(5 hours/ week) Credits-4

OBJECTIVES:

To study the immune system and their role of our body.

OUTCOME:

To know the life cycle of microbes and their control measures.

UNIT I

History and Scope of Immunology.
Immunity-Type of Immunity - Innate & acquired, passive & active.
Lymphoid organs –primary & secondary (Thymus, Bone marrow, Bursa of fabricius , Spleen, Tonsil, Lymph node, Peyer's patches) – Structure and Functions.
(15L)

UNIT II

Immunoglobulin-Structure, Function, Biological properties of Ig classes. Interaction of Antigen and antibody.
Salient features of antigen- antibody reaction.
Types of antigen-antibody reaction – Agglutination, Precipitation, Opsonization, Cytolysis.
(15L)

UNIT III

Immune response-Lymphocyte as unit of immune system, stem cells - Structure and lineage, T cells, B cells & Macrophages.
Humoral immune response - primary & secondary responses - B cell activation. Cell - Mediated immune response - Type of T cells & functions.
Tumour immunology.
(15L)

UNIT IV

Introduction : History & Scope of microbiology. General structure of microbes (Bacteria, virus).
Bacterial growth : Culture media & selective media; Continuous & batch culture techniques, growth curve.
(14L)

UNIT V

Food microbiology :Food poisoning ; Food spoilage & preservation.
Industrial microbiology : production of Antibiotic penicillin.
Soil microbiology : Role of soil microbes in N2 fixation.
Medical microbiology : Diseases caused by bacteria in different systems of man as given below**:**
Dermal – Streptococcal inflammation : - Tuberculosis;
Gastro-intestinal-dysentery**:**Reproductive – Gonorrhea.
Viral diseases with reference to causative organisms, symptoms, impact on the host & control measures, AIDS , Rabies, Chicken pox, Measles, Influenza & polio.
(16L)

(TOTAL: 75L)

PRACTICALS:

I .IMMUNOLOGY:

ABO blood grouping and Rh blood grouping. 2.Lymphoid organs in Rat(Demonstration only)

Spotters:

Charts, slides and figures: Stem cells, Phagocytes, Thymus, Bone marrow, Spleen, Lymph node, Immunoglobulin.

II.MICROBIOLOGY:

1. Simple staining ofbacteria.
2. Gram-Staining of bacteria.
3. Serial dilutiontechniques.
4. Microscopic examination of living bacteria - hanging dropmethod.
5. Microscopic counting of microbes using haemocytometer (Demonstration only)
6. Measurement of microbes using ocular & stage micrometers (Demonstrationonly)
7. Preparation of culture media formicrobes.
8. Distribution of microorganisms in nature-soil, water, &air.
9. Aseptic transfer of microbes & pure culture of bacteria and cultural characteristicsof Micro-organisms.

Spotters:

Charts, slides and figures-Autoclave, Hot air oven, Agar plate, Agar stab, Agar slant, Inoculation needle.

REFERENCE BOOKS:

IMMUNOLOGY

1. Roitt, I. : Essential Immunology(ELBS).
2. Kuby : Immunology(W.H.Freeman)

MICROBIOLOGY

1. Pelczar, Reid & Chan:Microbiology.
2. Philip, L. Carpenter :Microbiology.
3. Powar : GeneralMicrobiology.
4. Salle,A.J: Fundamental Principles ofBacteriology.
5. Alexander, M : Introduction to SoilMicrobiology.
6. Frazier,A.C. & Westhoff,D.C: FoodMicrobiology.
7. Burrows : Text Book ofMicrobiology.
8. Lakshmanan,M : Laboratory manual inMicrobiology.
9. Moat & Foster : MicrobialPhysiology.
10. Rangaswami,G : Diseases of crop plants inIndia.
11. Patel,A.H.:Industrial Microbiology (MC . MillanIndia).

SEMESTER VI

PAPER6.3 BIO STATISTICS, COMPUTER APPLICATIONSAND BIOINFORMATICS

(5 Hrs / Week) Credits-4

OBJECTIVES.

To study the descriptive and non descriptive methods of mathematics and their application in biology incorporating computer systems.

OUTCOME.

To understand the mathematical principles of biological systems. And bioinformatics

UNIT I

Definition and scope; Data – Types & collection; Sampling methods – Variables – Discrete and continuous; Presentation of Data , Classification and Tabulation ; Parts of table. Diagrams and Graphs: Line diagrams, Bar Diagram, Pie diagrams, Histogram, Frequency polygon, Frequency poly curve. Measures of Central Tendency – Calculation of Mean, Mode and Median (Grouped and Ungrouped Data)

(15L)

UNIT II

Measures of dispersion: Variance , Range , Standard Deviation and standard Error, Coefficient of variation. Chi – square test – Calculation and application, students't' Test. Correlation: Introduction , Types , Perfect positive and negative, Linear and Non-Linear methods Scatter diagram, Karl Pearson's correlation coefficient ; Interpretation of the Correlation coefficient.

(14L)

UNIT III

Introduction to computer, Generation of computer – Components of computer, Input devices and Output devices – CPU – Primary and Secondary Memory operating system. Introduction to M.S. Office software, covering, word processing, spread sheet and presentation software. MS Word basics : Creating word document – File, edit, Format, Save menus, adding bullets, numbering and symbols – printing. MS Excel – entering and editing cell entries – adjusting row and column height – Pie-bar-line chart preparation. Uses of Internet – Email, Internet Browsing, World Wide Web(WWW), M.S Power point.

(16L)

UNIT IV

Bioinformatics : Introduction – Definition of Bioinformatics – History – Importance of Bioinformatics – Scope and application of Bioinformatics – Components of Bioinformatics - Bioinformatics in life science. Biological sequence analysis – Sequence alignment – Pair wise sequence comparison – multiple sequence alignment.

(15L)

UNIT V

Major Data bases in Bioinformatics – Nucleic acid sequence databases – EMBL – Genbank – Protein sequence database – SWISS – PROT .

Databases similarity search Tools: BLAST FASTA – Application of bioinformatics tools. Database Retrieval Tools: ENTREZ – Locus link – Pub Med (Publishers on Medicine) SRS . Protein structure visualizing tools – RasMol, Swiss PDB viewer.

(15L)

(TOTAL: 75L)

PRACTICALS:

1. Find out Mean, Median, Mode, Standard deviation, Standard error and co-efficient of variance using Neemleaf.
2. Calculation ofcorrelation.
3. Bar diagram, Histogram, Pie diagram and frequencycurve.
4. Models, Chart and Photos: Computer Mouse, CPU, Keyboard,Monitor.
5. Visit to a Computer centre to learn internet browsing and email sending – Compulsory for eachstudent.
6. Take printout from NCBI, EMBL and PubMed and keep it forspotters.
7. Write some of the file commands and keep forspotters.

REFERENCE BOOKS:

BIO STATISTICS

1. Arora and Mathan. Bio Statistics (5th Edition). Himalaya Publishing House, Ramdoot, Dr.Bhalerao Marg,Girgaon,Mumbai – 400004.
2. Daha, T.K. Biostatitics in Theory and Practics. EMKAY Publications, Post Box No.9410, B-19, East Akrishna Nagar, Swami Dayanand Marg, Delhi-110051.
3. Gurumani. N, An Introduction to Biostatistics (computer Application included) 2nd Edition M.J.P. Publishers, Tamilnadu Book House, 47 Nallathambi street,Triplicane- 600 005.
4. Jasra, P.K. and Gurdeef Raj. Biostatistics, Krishna Prakashan Media(P) Limited, 11, Shivahi Road, Meerut – 250001
5. Parihar and Parihar. Biostatistics and biometry, Student Edition, Agrobios(India) Behind Nasrani Cinema,Chopasani Road,Hodhpur-342002.
6. Pranab Kumar Banergee. Introduction to Biostatistics (2nd Edition). S. chand & Company Limited, 7361, Ram nager,New Delhi-110055
7. Prasad, S. Elementa of Biostatistics. Rastogi Publications, Gangotri, ShivajiRoad, Meerut 250002.
8. Satguru Prasad – Fundamentals of Biostatistics (Biometry). EMKAY Publication,Post Box No.9410 B-19, East Akrishna Nagar, Swami Dayanand Marg, Delhi-110051.
9. Pagano, M. and K. Gauvreau. Principles of Biostatistics. Thomas Learning,Alps Building,1st floor,56,Janpath,NewDelhi.
10. Satgurau Prasad, Elements of Biostatistics, Rastogi Publications Gangotri,Shivaji Road, Meerut 250002.

COMPUTER APPLICATIONS:

- Krishnamoorthy, R. Computer Programming andapplications.
- Rajaram, V. Fundamentals of computers.

BIOINFORMATICS:

1. Bal, H.P. Bioinformatics principles and Applications, Tata Mc Graw Hill Publishing company Limited, No. 444/1 Sri Ekambara Naicker Industrial Estate, Alkapakkam, Porur, Chennai – 600116
2. Dan, E. Krane and Michael L. Raymer.Fundamental concepts of Bioinformatics. Pearson Education (Singapore) PTE Limited, Indian Branch, 482 FIE Patparganj,Delhi-110 092.
3. Ignacimuthu, S. Basic Bioinformatics. Narosa Publishing House Private Limited,35- 36 Greams Road, Thousand Lights, Chennai-600006
4. Ranga, M.M. Bioinformatics, Agrobios (India) Behind Nasrani cinema,Chopasani Road, Hodhpur – 342002.
5. C.S.V. Murthy Bioinformatics- Himalaya PublishingHouse.

ALLIED ZOOLOGY 2017 –2018 ONWARDS

SYLLABUS FOR B.SC ZOOLOGY
Under Choice Based Credit system (CBCS)
(For the candidates admitted to the course in the academic year 2017 – 2018 and afterwards)
SEMESTER – III
Cell Biology, Genetics and Biotechnology
4Hrs/Week Credits – 3

OBJECTIVE:

To elucidate the structure and functions of the cell organelles; to exemplify the concept of genetics, the principles of imheritance and the role of genes in determining characters; to understand the application of the innovative technology to manipulate living organisms or parts of organisms to make products useful to human.

CELL BIOLOGY

UNIT I

Ultra structure and functions of (a) Plasma membrane (b) Mitochondria (c) Nucleus. Chromosomes – Structure, types and functions; Giant Chromosomes (Polytene and Lampbrush Chromosomes)
(12L)

UNIT II

DNA: Structure (Watson and Crick Model), Replication.
RNA: Different types – r RNA – mRNA – tRNA; Protein synthesis.
Cancer cells and carcinogenesis – Definition, Types, Causes, Properties, Diagnosis and Treatment.
(12L)

GENETICS

UNIT III

Simple Mendelian traits in man; Multiple alleles – ABO blood groups in man – problems.
Rh-factor in human – Erythroblastosis foetalis. Multiple gene inheritance.
(12L)

UNIT IV

Sex determination in man; Sex linked inheritance in man – Haemophilia, Colour blindness and Hypertrichosis.
Non disjunction and Syndromes in man – Klinefelter's syndrome, Turner's syndrome and Down's syndrome.
Inborn errors of metabolism in man – Phenylketonuria, Alkaptanuria and Albinism.
(12L)

BIOTECHNOLOGY

UNIT V

Definition, scope and importance of Biotechnology, Basic concepts of genetic engineering.
Restriction and modification system – Cloning vectors – (Plasmids, pBR 322, Lambda phage)
Introduction of cloned genes into host cells – Transgenesis – Transgenic animals and its application.
(12L)

(TOTAL: 60L)

REFERENCE BOOKS:

CELL BIOLOGY

1. Ambrose, E.J & Dorothy, M.E: Cell Biology (ELBS CAMLOTPRESS)
2. De Robertis & De Robertis: Cell & Molecular Biology. (W.B. Saunders &co, Philadelphia).
3. De Robertis, E.D.P, Nowinski, W.N & Saez, F.A : Cell Biology (W.B. Saunders &co, Philadelphia).
4. Dupraw, EJ : Cell & Molecular Biology (Academic Press, NewYork)
5. Dyson, R.D :Essentials of Cell Biology (Allyn & BaconInc. Boston). Giese.A.C: Cell Physiology (W.B. Saunders & co,Philadelphia).

GENETICS

1. Strickberger : Genetics(MacMillan).
2. Farnsworth : Genetics (harper andRow).
3. P.K.Gupta: Genetics (RastogiPublications)
4. P.S. Verma and Agarwal: Genetics (S.Chand &Co.Ltd.)
5. Altonburg,E: Genetics (Oxford & IBH publishing company)
6. Burns G.W.: The Science of Genetics (MacMillan)
7. A.C.Pai: Foundations of Genetics (Mc Gaw –Hill)

BIOTECHNOLOGY

1. Prof.V. Kumaresan,"Animal Biotechnology", Saras Publication, A.R.P. Camp Road, Periavilai, Kottar P.O.,Nagercoil, K.K.Dist., - 629002.
2. Kumar H.D." A text book of Biotechnology,Affiliated East – West Press(P) Ltd., NewDelhi.

3.Animal Biotechnology,2006,R.Sasidhara,MJPPublishers,Chennai.

4. Dubey R.C "A text book of Biotechnology"S.Chand & Co.,Ltd.,NewDelhi.

ALLIED PRACTICALS

2Hrs/week **Credits 1**

CELL BIOLOGY, GENETICS AND BIOTECHNOLOGY

- Mounting of Giant Chromosome in Chironomous larva / onion root tip
- Observation of simple mendelian triats among the students
- **Study of the following through Charts, Slides and Figures:**
- Mitochondria, Interphase Nucleus, DNA, tRNA, ABO Blood group.
- Colour Blindness, Haemophilia, Klinefelter's syndrome, Down's syndrome.
- pBR 322, Lanmbda Phage, Recombinant DNA.

SEMESTER IV
DEVELOPMENTAL ZOOLOGY, ECOLOGY, ANIMAL PHYSIOLOGY AND EVOLUTION

4Hrs/Week **Credits-3**

OBJECTIVES:

To understand the sequential changes from cellular grade of organization to organ grade of organization in the development of multicellular organisms. To study the interaction and the interdependence among environmental factors and living organisms; To understand the functional significance of various organs and organ systems of animals. To discern the evolutionary significance of the animals, origin of species, effects of mutation.

UNIT I

Early development in Man: Structure of sperm and ovum; Fertilization – Cleavage, Morula, Blastocyst, Implantation and gastrulation – Fate map. Placenta in mammals – types and functions. Test tube babies – Twins – Amniocentosis.
Nuclear Transplantation in Acetabularia.
(13L)

UNIT II

Abiotic factors: Biological effects of Temperature and Light; Biotic factors: Symbiosis, Commensalism, Mutualism, Parasitism, Prey- predatorRelationship; Adaptations: Desert adaptations.Community: Ecosystem – Structure and dynamics of a pond.
(13L)

UNIT III

Nutrition: Food constituents – Carbohydrates, Proteins and Fats. Digestion: Role of enzymes in carbohydrate, protein and fat digestion. Absorption: Absorption of digested food.
Metabolism: Carbohydrate metabolism: Glycogenesis, Glycogenolysis, Glycolysis. Respiration: Transport and exchange of oxygen and carbon dioxide.Haemoglobin.
(13L)

UNIT IV

Excretion: Structure of Nephron – Urine formation – Dialysis Nervous Co-ordination: Structure and types of neurons – Nerve impulse, conduction of nerve impulse through neuron and synapse.
Reproduction: Structure of human testis and ovary, Graafian follicle, Menstrual cycle and its hormonal control.
(13L)

UNIT V

Theories of Evolution: Darwinism, Mutation theory of De Vries. Adaptive radiation in birds. Mimicry and Colouration.
(8L)

(TOTAL: 60L)

REFERENCE BOOK:

DEVELOPMENTAL ZOOLOGY

1. Arora, M.P. Embryology. Himalaya Publishing House,Ramdoot, Dr. Bhalerao Marg, Girgaon, Mumbai- 400 004.
2. Arumugom, N. Developmental Biology, Saras Publication, 114/35G,A.R.P camp Road, Nagercoil.

Ecology:

1. Agrawal. A.k. ecology and environmental biology, student edition agrobios (india), behind nasrani cinema. Chopasani road. Jodhpur-342 002
2. Odum, E.P. Fundementals of Ecology International Student Edition W.B. Sounders Company, Philadelphia, London.

Animal Physiology:

1. Agarwal, R.A., A.K. Srivastava and Kaushal Kumar. Animal Physiology and Biochemistry (3rd Edition). S. Chand & Company Limited, 7361 Ram Nagar, New Delhi-110 055.
2. Arora,M.P Animal Physiology (6th Edition). Himalaya Publishing House, Ramdoot, Dr. Bhalerao Marg, Girgaon, Mumbai 400 004.

Evolution:

1.Arora, M.P. Evolutionary Biology. Himalaya Publishing House, Ramdoot, Dr. Bhalerao Marg, Girgaon, Mumbai 400 004.
2. Tomar, B.S. and S.P. Singh. Evolutionary Biology. Rastogi Publications, Gangotri, Shivaji Road, Meerut-250 002.

ALLIED PRACTICALS

2Hrs/Week **Credits 1**

DEVELOPMENTAL ZOOLOGY, ECOLOGY, ANIMAL PHYSIOLOGY AND EVOLUTION.

1. Mounting and observation of live sperms of a vertebrate.
2. Estimation of dissolved oxygen in two water sample and discuss the result
3. Qualitative test for glucose, protein and lipid.
4. Effect of temperature on the opercular movement of fish; Calculation of Q_{10}.
5. Museum specimens, slides, models and charts:

Developmental Zoology: Human sperm, Human ovum, Cleavage, Diffuse Placenta,Zonary Placenta,Discoidal placenta,Cotyledonary Placenta (any two)
Ecology: Identification of any two plankton either Fresh water OR marine samples.
Echeneis and Shark, Hermit crab and Sea anemone, Sacculina, Secchi disc.
Animal Physiology: Intestinal villi, Nephron, Heart of mammal.
Evolution: Ancon sheep.

Allied Practical Examination at the end of each Semester

Manonamaniam Sundaranar University , Tirunelveli – 12

B.B.A. (CBCS) – 2017 – 2018

Part III	**Principles of Management**	Core 5	6	4
	Business Law	Core 6	5	4
	Financial Accounting	Core 7	5	4
	Organisational Behaviour	Core 8	5	4
	Advertising	Allied – III	3	3
Part IV	**Introduction to Banking**	Skill Based core-I	4	4
	1. Banking and Finance **(OR)** **2. Introduction to Consumer Behaviour** **(CHOOSE ANY ONE)**	Non- Major Elective I	2	2
	YOGA * **(*-Hours Excluding from 30hrs)**	Common	2	2
	Total		30	25

IV SEMESTER				
Part III	**Cost Accounting**	Core 9	6	4
	Industrial Law	Core 10	5	4
	Financial Services	Core 11	5	4
	Salesmanship	Core 12	5	4
	Secretarial Practice	Allied- IV	3	3
Part IV	**Managerial Skill Development**	Skill Based core -II	4	4
	1.Entrepreneurial Development **(OR)** **2. Service Marketing** **(CHOOSE ANY ONE)**	Non- Major Elective II	2	2
Part V	**Extension Activity (NCC, NSS, YRC, YWF)**		-	1
Part IV	**Computers for Digital Era*** **(*-Hours Excluding from 30hrs)**	Common paper	2	2
	Total		30	26

V SEMESTER				
Part III	Case Analysis	Core 13	4	4
	Marketing Management	Core 14	5	4
	Management Accounting	Core 15	5	4
	Research Methodology	Core 16	4	4
	1. Production Management(OR) 2. Consumer Behaviour (CHOOSE ANY ONE)	Major Elective-I	4	4
Part IV	Personality Development	Skill Based Subject (Common)	2	2
	Mini Project		6	3
	Total		30	25
VI SEMESTER				
Part III	Retail Management	Core 17	4	4
	Financial Management	Core 18	4	4
	Human Resource Management	Core 19	4	4
Part IV	1. Entrepreneurship (OR) 2. International Business (CHOOSE ANY ONE)	Major Elective-II	4	4
	Major Project	-	14	7
	Total		30	23

- **For problem papers : 50% theory and 50% problems.**
- **Proportion of marks between internal evaluation and external evaluation for subjects - 25:75.**
- **Internal – 20 marks for theory and 5 marks for Assignment.**

Total Hours: 180
Total Credits: 141 (Excluding YOGA and COMPUTER FOR DIGITAL ERA)
Core Subjects: 19
Non-Major Elective: 02
Skill Based Core: 02
Skill Based Subject (Common): 01
Major Elective: 02
Allied: 04

III SEMESTER

CORE 5 – PRINCIPLES OF MANAGEMENT

No. of Credits : 4
No. of instructional Hours : 6 Hours per week
Course Objectives :

- The objective is to familiarize the students with concepts and principles of Management
- To develop an understanding of terms, facts, concepts pertaining to functions of management
- To acquaint the student with principles of business decisions in Managerial Decision-making
- To help them acquire the skills needed to become a successful manager
- To enable them to understand the various processes of the management.

UNIT –I

Definition – Nature, Principles Functions And Levels – Features Of Management – Administration Vs. Management – Management: A Science Or An Art Or A Profession - Pioneers Of Modern Management - F.W.Taylor – Hendry Fayol – Elton Mayo –M.P.Follet.

UNIT – II

Planning – Meaning- Characteristics – Planning Process – Types Of Plans – Forecasting – Elements – Techniques – Decision Making- Definition – Nature - Type Of Decisions – Process.

UNIT – III

Organising- Meaning –Principles Of Organising – Forms Of Organisational Structure- Departmentation - Factors Determining Departmentation – Methods –Span Of Management .

UNIT – IV

Directing – Definition – Characteristics - Importance - Principles and Techniques - Communication - Types and Methods – Controlling – Steps In Controlling – Essentials – Techniques.

UNIT –V

Co-ordination – Need and Importance – Process – Authority And Responsibility - Concepts – Delegation Of Authority – Centralisation Vs. Decentralisation.

Reference books:

1. Principles of Management- T.Ramasamy.
2. Principles and Practices of Management- L.M. Prasad.
3. Essentials of Management – KOONTZ AND O'DONNEL
4. Principles of Management – SHERLEKAR S. A.
5. Business Management – DINKAR PAGARE
6. Principles of Management – TRIPATHI AND REDDY

CORE 6 - BUSINESS LAW

No. of Credits : 4
No. of instructional Hours : 5 per week

Course Objective :

- To acquaint the students with the legal framework influencing Business Operations
- To enlighten the students on the basic principles and legal aspects of business laws
- To promote the understanding of various legislations relating to business
- To make them acquire knowledge on the legal aspects in the business environment.

UNIT – I:

Contracts – Offer – Acceptance, Consideration, Capacity to Contract.

UNIT – II:

Mistake, Misrepresentation, Coercion, Undue Influence – Fraud.

UNIT – III:

Legalisation of Consideration- Performance Of Contract, Discharge of Contract - Quasi Contract – Remedies For Breach Of Contract.

UNIT – IV:

Law of Indemnity – Guarantee - Bailment

UNIT – V:

Sale of Goods - Agency and Partnership.

REFERENCE BOOKS:

1. Kucchal, M.C., "Business Law", Vikas Publishing, House (P) Ltd., New Delhi,.
2. Singh, Avtar, "The Principles of Mercantile Law", Eastern Book Company, Lucknow.
3. Maheshwari & Maheshwari, "Business Law", National Publishing House, New Delhi.
4. Kapoor, N. D., "Business Law", Sultan Chand & Sons, New Delhi.

CORE 7 - FINANCIAL ACCOUNTING

No. of Credits : 4
No. of instructional Hours : 5 Hours per week
Course Objective :

- The objective of this subject is to acquaint students with the accounting concepts, tools and techniques influencing business organizations
- To develop the skill required for the preparation of Financial statements and accounts of various business areas.
- To provide basic accounting knowledge as applicable to business and to equip students to maintain various types of ledgers and to prepare final accounting
- To facilitate them to prepare final Accounts of business and non-trading concerns

UNIT – I:

Definition of Account – Nature and Objectives of Accounting – Accounting Concepts and Conventions - Double Entry System Vs. Single Entry System –Books of Accounts.

UNIT – II:

Trial Balance - Rectification Of Errors (Theory only) - Final Accounts.

UNIT – III:

Depreciation - Meaning – Need – Causes - Methods of Depreciation (Straight Line Method, Written Down Value Method and Annuity Method).

UNIT – IV:

Capital and Revenue – Accounts of Non-trading organizations - Income and Expenditure Account – Receipts and Payments Account.

UNIT – V:

Single Entry – Definition And Defects – Net worth method – Conversion method (Simple Problems).

REFERENCE BOOKS:

1. Advanced Accountancy – M.C. Shukla, T.S. Grewal
2. Advanced Accountancy – R.L.Gupta
3. Financial Accounting and Managerial perspective- Narayanasamy.
4. Financial Accounting for business managers – Bhattacharyya.
5. Financial Accounting – S.N.Maheswari, S.K.Maheswari.

CORE 8 - ORGANISATIONAL BEHAVIOUR

No. of Credits : 4
No. of instructional Hours : 5 Hours per week

Course Objective :

- The course aims to provide an understanding of basic concepts, theories and techniques in the field of human behaviour at the individual, group and organizational levels in the changing global scenario
- To enable the students to understand the Organizational culture and defensive behaviour.
- To study the reason for Organizational Change and dynamic of groups .
- To expose them to the concepts of motivation and acquire interpersonal skills

UNIT –I

OrganisationalBehaviour – Nature And Importance – Process of OB –Organisational Behaviour And Management – Hawthorne studies - System Approach To Management.

UNIT –II

Individual Behaviour – Process and Causes of Human Behaviour -Learning - Process – Attitudes And Values - Morale – Importance – Steps to improve Morale in an organization.

UNIT –III

Perception – Implications - Motivation Theories (Maslow's Hierarchy Theory, Herzberg Two Factor Theory, Vrooms Theory) – Groups – Characteristics And Processes – Group Dynamics – Group Cohesiveness- Decision Making In Groups.

UNIT –IV

Leadership styles and Theories (Trait Theory, Behavioural Theory, Managerial Grid) – Change Management – Nature – Causes – Process - Counselling .

UNIT –V

Organisational Culture – Levels of Culture – Strategies for Sustaining Organisational Culture- Organisational Development – Objectives and Characteristics – Defensive Behaviour .

REFERENCE BOOKS:

1. Concepts and Contrivances And Applications – Robbins S.P
2. Organisational Behaviour - Umasekaran
3. Organisational Behaviour – Luthans . F
4. Organisational Behaviour - Schemerhorn
5. Organisational Behaviour – Text and cases – K. Aswathappa.
6. Organisational Behaviour – R.D. Agarwal
7. Organisational Behaviour – V.S.P.Rao.

ALLIED – III ADVERTISING

No. of Credits : 3
No. of instructional Hours : 3 Hour per week
Course objective :

- To acquaint the students with the basic knowledge of advertising and sales promotion
- To enable the students to understand the importance of media planning
- To provide basic knowledge on types of media available
- To equip students to prepare advertising budget and copywriting

UNIT – I Advertising - Meaning -Objectives - Functions.

UNIT – II Types Of Advertising.

UNIT – III Advertisement Plan -Meaning- Planning Process - Advertising Budget – Process.

UNIT- IV Advertising Media - Role of media - Types of media - Advantages and Disadvantages - Media Planning and Selection.

UNIT – V Advertising Creative Approaches :The art of copywriting - Advertising Copy Testing .

BOOKS FOR REFERENCE:

1. Advertising Management - Rajeev Batra, John. G.Myers. T. David.A. Aaker
2. Advertising & Sales promotion - Kazmi/Batra
3. Advertising and Media Management - Ghouse Basha
4. Advertising – Jefkins &Yadin
5. Advertising Management - Concepts & Cases - Manendra Mohan
6. Advertising & Media Management - K. Venkataraman
7. Foundations of Advertising - Theory & Practice - S.A.Chunnawalia &K.C.Sethia
8. Media and Communication Management - Rayudu

SKILL BASED – CORE - I

INTRODUCTION TO BANKING

No. of Credits : 4
No. of instructional Hours : 4 Hour per week
Course objective :

- To provide the students with the basic knowledge of the theory and practice of banking and to provide skill in operating banking transactions
- To enable the students to understand the working of the Indian Banking System.
- To acquaint learners with the theoretical and legal concepts of banking in India
- To help them to attain the competencies required for a career in banking services**.**

UNIT –I

Banker and Customer : Meaning – Definition – General and Special relationship between Banker and Customer – Functions of Bank.

UNIT –II

Types of Deposits –Pass Book – Negotiable Instruments – Cheque - Definition – Difference Between Cheque And Bill Of Exchange, Endorsement, Crossing, Marking , Material Alteration.

UNIT –III

Loans and Advances – Principles of Sound Lending – Secured and Unsecured Advance – Forms of Advances.

UNIT –IV

Modes of Charging Security – Lien – Pledge – Mortgage – Assignment – Hypothecation.

UNIT –V

Electronic Banking – Traditional Vs E-Banking – Types of E-Banking – Advantages – Constraints.

REFERENCE BOOKS:

1. Banking Law and Practice – Gordon and Natarajan
2. Banking Law and Practice – Davar.
3. Banking Law and Practice - Varshney
4. Banking Law and Practice- Tandon.

NON-MAJOR ELECTIVE – I

1.BANKING AND FINANCE

No. of Credits : 2
No. of instructional Hours : 2 Hour per week

Course objective :

- To provide the students with the basic knowledge of the theory and practice of banking and to provide skill in operating banking transactions
- To promote an understanding of the basic concepts in banking
- To acquaint learners with the theoretical and legal concepts of banking in India
- To help them to attain the competencies required for a career in banking services**.**

UNIT –I

Loans and Advances – Principles of Sound Lending – Secured and Unsecured advance – Forms of Advances.

UNIT –II

Modes of Charging Security – Lien – Pledge – Mortgage – Assignment – Hypothecation.

UNIT – III

Electronic Banking – Traditional Vs E-Banking– Facts of E- Banking

UNIT –IV

E-Banking Transactions– Models for E-Banking.

UNIT – V

Advantages of E-Banking – Constraints in E-Banking – Security measures.

REFERENCE BOOKS:

1. Banking Law and Practice – Gordon and Natarajan
2. Banking Law and Practice – Davar.
3. Banking Law and Practice - Varshney
4. Banking Law and Practice- Tandon.

(OR)

NON-MAJOR ELECTIVE – I

2. INTRODUCTION TO CONSUMER BEHAVIOUR

No. of Credits : 2
No. of instructional Hours : 2 Hour per week
Course objective :

- To provide the students with the basic knowledge of the theory and practice of consumer behaviour
- To promote an understanding of the determinants of consumer behaviour
- To acquaint learners with the theoretical and legal concepts of consumer rights
- To help them to solve their problems regarding dissatisfaction.

UNIT - I

Consumer Behaviour: Nature and Scope – Characteristics - Importance of Consumer Behaviour in marketing decisions.

UNIT - II

Types of Consumer - Consumer Vs. Industrial Consumer and their Buying Behaviour .

UNIT- III

Determinants of Consumer Behaviour - Basic models of consumer behavior.

UNIT- IV

Consumer Decision Making Process - Pre- purchase and Post Purchase Behaviour.

UNIT- V

Customer Satisfaction - Sources of consumer dissatisfaction - Methods of Problem Solving - Consumer Protection Act 1986.

REFERENCE BOOKS:

1. Consumer Behaviour by Leon G. Schiffman& Leslie L. Kanuk, Prentice Hall Publication
2. Consumer Behaviour – Buying, Having, and Being by M R Solomon, Pearson Prentice Hall
3. Consumer Behaviour – Building Marketing Strategy by D. I. Hawkins and J. B. Roger, Tata McGraw Hill
4. Consumer Behaviour by R.D.Blackwell, P.W. Miniard,&J.F. Engel, Cengage Learning
5. Marketing Management by Philip Kotler and K L Keller, Pearson (Global Edition)

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IV SEMESTER

CORE 9 - COST ACCOUNTING

No. of Credits : 4
No. of instructional Hours : 6 Hour per week
Course objective :

- The primary objective of the course is to familiarize the students with the basic cost allocation and control of various costs and methods of costing.
- To enable students for understand the basic concepts of cost accounting, gain knowledge on principles and procedures of cost accounting
- To practice them to apply the costing techniques in different practical situations

UNIT - I

Meaning and Scope of Cost Accounting – Concept and Classification of Cost – Elements and Methods of Cost –Relationship of Cost Accounting and Financial Accounting – Preparation of Cost Sheet.

UNIT - II

Materials – EOQ - Levels of Stock – Receipts and Issues of materials – ABC Analysis - Stores Ledger – FIFO, LIFO, Simple Average and Weighted Average.

UNIT - III

Labour – Time-Keeping and Time-Booking – Methods of Remuneration and Incentive Schemes – Overtime and Idle time – Labour Turnover – Causes, Types and Measurement.

UNIT - IV

Overheads – Collection, Classification, Allocation, Apportionment and Absorption – Recovery Rates – Over and Under Absorption -Machine Hour Rate – Job Costing – Contract Costing.

UNIT - V

Operating Costing – Process Costing: Normal Loss, Abnormal Loss and Abnormal Gains (excluding Equivalent Production and Inter process).

(Marks: Theory 50% and Problems 50%)

REFERNECE BOOKS:

1. Cost Accounting – Jain Narang
2. Cost Accounting – S.P Iyangar
3. Cost Accounting – R.S.N. Pillai and Bagavathi
4. Cost Accounting – T.S.Reddy and Hari Prasad Reddy.

CORE 10 - INDUSTRIAL LAW

No. of Credits : 4
No. of instructional Hours : 5 Hours per week

Course Objective :

- To acquaint the students with the legal framework influencing industrial Operations
- To enlighten the students on the basic principles and legal aspects of industrial laws
- To promote the understanding of various legislations relating to industries
- To make them acquire knowledge on the legal aspects in the industrial**.**

UNIT–I

Factories Act, 1948 - Workmen Compensation Act, 1923.

UNIT –II

Payment of Wages Act 1936 - The Maternity Benefit Act, 1961.

UNIT –III

Employee's Provident Fund and Miscellaneous Provisions Act, 1952 - Employee's State Insurance Act, 1948.

UNIT –IV

The Industrial Disputes Act, 1947 - The payment of Gratuity Act, 1972.

UNIT –V

Trade Unions Act ,1926 -The Industrial Employment (Standing Order) Act, 1946.

REFERENCE BOOKS:

1. Kucchal, M.C., "Business Law", Vikas Publishing, House (P) Ltd., New Delhi,.
2. Singh, Avtar, "The Principles of Mercantile Law", Eastern Book Company, Lucknow.
3. Maheshwari & Maheshwari, "Business Law", National Publishing House, New Delhi.
4. Kapoor, N. D., "Business Law", Sultan Chand & Sons, New Delhi.

CORE 11 - FINANCIAL SERVICES

No. of Credits : 4
No. of instructional Hours : 5 Hours per week
Course objective :

- Providing the students with an understanding of the various financial services available in the country
- To give learners the basic understanding of the fundamental concepts of stock marketing
- To enable them to analyse stock movements
- To help them to know the role of intermediaries in the capital market

UNIT –I

Financial services - Concepts – Objectives / Functions – Characteristics - Financial Services Market – Problems of Financial Services Sector - Growth of Financial Services in India.

UNIT –II

Fund Based And Non- Fund Based Financial Services - Leasing, Hire Purchases – Salient Features, Guidelines – Functions.

UNIT –III

Mutual funds – Benefits -Types of Mutual Funds – Mutual Funds Regulations .

UNIT –IV

Factoring, Forfeiting and Venture Capital - Salient Features – Guidelines – Functions, Strategies Involved In Financing.

UNIT –V

Merchant Banking and Credit Rating Services - Salient Features – Guidelines – Functions.

REFERENCE BOOKS:

1. Financial Management – Dr.Prasanna Chandra.
2. Investment Management including Securities Market - Dr. Avadani.
3. Merchant Banking – Dr. Varma.
4. Financial Markets and Services – Gordon and Natrajan.
5. Financial Services – Dr. S. Gurusamy.

CORE 12 - SALESMANSHIP

No. of Credits : 4
No. of instructional Hours : 5 Hours per week
Course objective :

- Providing the students with an understanding of the various duties and responsibilities of salesman
- To learn importance of sales presentation and sales aids
- To enable them to analyse sales forecasting and its methods
- To help them to know the factors affecting sales decision

UNIT – I

Salesmanship - Functions of Salesman - Importance - Duties and Responsibilities of salesman - Qualities of a successful salesman **.**

UNIT – II

Essentials of Sales: Knowledge of Industry and Company-Knowledge of Products-Knowledge of Customer – Study of buying motives.

UNIT – III

Sales presentations - Sales Aids- Use of Technology in sales- market survey- Importance of market survey to salesman and producer.

UNIT – IV

Sales Forecasting- Definition- Methods of sales forecasting- Uses - Advantages and Disadvantages of Sales forecasting – Sales Quota .

UNIT – V

Sales management: Definition - Roles and techniques - Sales decisions - Factors affecting sales decision – Sales force decision- Sales Territory -Tele Marketing.

Reference Books:

1. Sales Management - Richard Rstill, Edward W. Cundiff
2. SALESMANSHIP - Prof. Bholanath Dutta & Dr. Girish C.
3. Advertising and Salesmanship- P.Saravanavel and S. Sumathi
4. Salesmanship and Sales Management - P.K. Sahu , K.C. Raut
5. Salesmanship – William Maxwell
6. Professional Sales Management – Anderson, Hair and Bush
7. Sales management and Personal Selling - Prof. Anil Keskar &Dr. Suresh Abhyankar
8. Sales Management – Thomas

ALLIED –IV SECRETARIAL PRACTICE

No. of Credits : 3
No. of instructional Hours : 3 Hours per week
Course Objectives :

- To provide an understanding of the administration and management of corporate form of business**.**
- To help learners understand the concept of company law and secretarial practice comprehend important elements of company documents
- To get enlightened on the role of company secretary and the procedures of meetings.

UNIT – I Secretary-Definition-Types-company secretary-Legal position-Qualification-

UNIT – II Appointment-Rights, Duties and Liabilities-Termination.

UNIT – III Prospectus – Contents - Shares-Kinds-Allotment and Forfeiture of shares - Secretary's Duties.

UNIT – IV Debentures-Types- Dividend – Secretary's Duties .

UNIT – V Notice – Quorum - Resolution – Types – Secretary's Duties.

TEXT BOOK RECOMMENDED:

1. Company Law and Secretarial Practice –N.D. KAPOOR, S.Chand& Co.
2. Company Law and Secretarial Practice – TANDON.
3. Company Law and Secretarial Practice – P.K. GHOSH, S.Chand& Sons.

SKILL BASED SUBJECT – CORE -II

MANAGERIAL SKILL DEVELOPMENT

No. of Credits : 4
No. of instructional Hours : 4 Hours per week

Course objective :

- The primary objective of the course is to familiarize the students with the basic Conceptual skills and Applicative domains of Managerial skills
- To enable students for understand the basic concepts of Emotional intelligence and Public relations
- To practice them for good Speeches and Presentation.

UNIT – I

Managerial skills – Technical, Human relations, Conceptual skills – Managing environment – Human and Non-Human factors – Applicative domains of Managerial skills.

UNIT – II

Communication Management: Verbal and Non-verbal communication – Meta communication – Non-verbal behaviour – Body language of Kinesics behaviour – Touching Behaviour – Physical characteristics, paralanguage and proximics.

UNIT-III

Expressions and Emotions – Managing emotions – Types – Face and expressions of emotions- Emotional intelligence – Public relations – Objectives of Public relations – Internal and External Public relations – Use of mass media for PR.

UNIT-IV

Stress Management: Stress – Types – Stressors – Coping strategies or techniques – Role conflict – Conflict management styles – Role play – Johari window – Transaction analysis (TA).

UNIT –V

Speeches and Presentation – Finding out about the environment - Preparing the Text – Composition of presentation – Speaker's appearance and Personality – Profile of a good speaker.

REFERENCE BOOKS:

1. Organisational Behaviour – Stephen p. Robbins
2. Business Communication – UrmilaRai, S.M. Rai
3. Non-verbal Communication – K. L. Knapp
4. Commercial correspondence and Office management – R.S.N.Pillai and Baghavathi
5. Organisational Behaviour – Fred Luthans
6. Organisational Behaviour – K. Aswathappa

NON-MAJOR ELECTIVE – II

1.ENTREPRENEURIAL DEVELOPMENT

No. of Credits : 2
No. of instructional Hours : 2 Hours per week

Course Objectives :

- To make the student understand the concept & importance of Entrepreneurship and facilitate generation of young entrepreneur
- To help students to understand the concepts of entrepreneurship development
- To acquire requisite knowledge and skills for becoming successful entrepreneurs
- To formulate and develop business projects.

UNIT –I

Entrepreneurship – Entrepreneurship and Economic Growth – Qualities of an Entrepreneur.

UNIT –II

Identification of opportunities – Steps in setting up of a Business – Setting up a small scale unit.

UNIT –III

Institutional arrangement for Entrepreneurship Development – DIC, ITCOT, SIDCO, NSIC, SISI, TIIC, SIDBI, Commercial Banks.

UNIT –IV

Project report – Project Identification – Contents of Project report.

UNIT –V

Women Entrepreneurship.

REFERENCE BOOKS:

1. Entrepreneurship Development in India – Dr. C.B.Gupta , Dr. N.P. Srinivasan.
2. Entrepreneurship Development Principles, Polices andProgrames – P.Saravanvel.
3. Dynamics of Entrepreneurship Development in India – Vasant Desai.
4. Fundaments of Entrepreneurship – Mohanty (PHI).

(OR)

NON -MAJOR ELECTIVE-II

3. SERVICES MARKETING

No. of Credits : 2
No. of instructional Hours : 2 Hours per week
Course Objectives :

- To familiarise the students with the basic concept of Services marketing.
- To enable students to know the various concepts of services marketing
- To understand the strategies for managing and marketing of services and devise strategies for marketing services in the liberalized business environment.

UNIT - I

Services Marketing: Meaning and Nature of Services - Differentiating goods from services - Importance of services marketing.

UNIT- II

Importance of Services Sector - Classification of Services - Market Segmentation and positioning of services.

UNIT- III

Services Design and Development: Creating new service -Identifying and classifying supplementary services -Service blue printing.

UNIT- IV

Pricing of services - Objectives and foundations for setting prices -Value based pricing.

UNIT- V

Distributing services - Options for Service delivery - Measuring Service Quality - The GAP Model - Customer Feedback and Service Recovery.

REFERENCE BOOKS:

1. Services Marketing -by Dr. L.Natarajan
2. Services Marketing - Zeithaml V. A. ,Bitner M. J. and Pandit, A.
3. Services Marketing - Verma H.V.
4. Marketing of Services - Hoffman, K. D. & Bateson, J. E.G.
5. Services Marketing - Kurtz D. L. and Clow K. E.
6., Services Marketing - Text and Cases - Nargundkar, Rajendran
7. Services Marketing - P.K. Sinha &S.C. Sahoo

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V SEMESTER

CORE 13 - CASE ANALYSIS

No. of Credits : 4
No. of instructional Hours : 4 Hours per week

Course Objective :

- To analyse the different functional areas of management.
- To discuss the 'case' in groups for identifying the problems
- To develop leadership and communication skills of the students
- To know the decision making capacity of the students and solving methods of the problems.

One case per week is to be discussed by the students. The cases could be from different functional areas of management.

The students would be provided with the case lets. They would discuss the 'case' in groups. The teacher would guide and facilitate group discussions so as to impart, develop and hone the GD Skills.

Since, this subject focuses on developing GD Skills, the scheme of examination has two main components' and respective sub – components and marks. The marks are to be distributed as follows:

Components	**External**	**Internal (25 Marks)**			
	(3 Hours Examination)	Skill Components			Test
		Communication Skill	Leadership Skill	Inter – Personal Skill	
Marks	75	5	5	5	10
Total	75	15			10

CORE 14 - MARKETING MANAGEMENT

No. of Credits : 4
No. of instructional Hours : 5 Hours per week
Course Objective :

- The aim of the course is to develop an overview regarding concepts underlying in the marketing management process
- To expose students to marketing concepts and trends in the market.
- To promote the ability to relate consumer behaviour and market trends
- To make students realize the relationship between marketing channels and corresponding strategies.

UNIT –I

Market and Marketing - Distinction between marketing and selling - Types of market – – Functions - Marketing management – Objectives – Importance – Marketing Information System.

UNIT –II

Market Segmentation: Criteria of effective segmentation – Benefits – Bases for market segmentation - Factors influencing consumer behavior – Buyer motives – Buying process.

UNIT –III

Product – Product Classification –New Product Development- Product Modification-Product diversification and Product Elimination – Branding and Packaging-Product Life Cycle-Product positioning.

UNIT –IV

Pricing – Meaning –Influencing factors – Objectives – Pricing methods.

UNIT –V

Marketing channels -Need and importance – Classification – Types of Intermediaries – Wholesalers – Functions – Retailers – Functions - Physical distribution – Elements of physical distribution (logistics).

Reference books:

1. Fundamentals of Marketing – Willam J. Stanton
2. Marketing Management – Philip Kotler
3. Marketing Management (In the Indian context) – V.S. Ramasamy and S. Namakumari.
4. Marketing - Rajan Nair
5. Marketing Management - Saxena, Tata McGraw Hill Pub
6. Modern Marketing - Pillai &Bhagavathi,
7. Marketing Management - Sherlekar,
8. Marketing Management - Varshney R.L. and Gupta S.L.

CORE 15 - MANAGEMENT ACCOUNTING

No. of Credits : 4
No. of instructional Hours : 5 Hours per week
Course Objectives :

- The objective of the course is to acquaint the students with the basic Concepts and tools of cost and Management Accounting
- To help students understand the nature and scope of management accounting gain knowledge in the preparation of financial statement analysis, marginal costing, budget, working capital and standard costing
- To utilize the management tools and techniques to take appropriate financial decisions.

UNIT - I

Management Accounting – Definition – Objectives – Merits and Limitations – Financial Statement Analysis – Comparative Statements – Common Size Statements – Ratio Analysis - Construction of Balance sheet (simple problems).

.UNIT - II

Fund Flow Statement – Cash Flow Analysis – Uses and Construction – Distinction.

UNIT - III

Marginal Costing – Objectives and Limitations – Cost Volume Profit (CVP) Analysis – Break Even Analysis – Merits and Demerits - Margin of Safety.

UNIT - IV

Budget and Budgetary Control – Characteristics and Limitations – Preparation of Sales, Production, Raw material Cost, Cash, Master Budgets and Flexible Budgets.

UNIT - V

Working Capital – Types – Factors Determining Working Capital - Estimate of Working Capital Requirements – Standard Costing – Material and Labour Variance only.
(Marks: Theory 40% and Problems 60%)

Note: Question 50% from Theory and 50% from Problem.

REFERENCE BOOKS:

1. Management Accounting – Manmohan and S.N. GoyalS
2. Management Accounting and Financial Control – S.N. Maheswari
3. Cost Accounting – Banerjee
4. Management Accounting – T.S. Reddy and Y. Hari Prasad Reddy
5. Management Accounting -R.S.N. PILLAI & BHAGAVATHI, Sultan Chand & Sons.
6. Management Accounting – Principles and Practice – R.K. SHARMA & JHOSHI K. GUPTA.
7. Principles of Management Accounting– MANMOHAN & S.N. GOYAL
8. Management Accounting – Tools and Techniques – N.VINAYAKAM, I.B. SINHA,
9. Himalaya Publishing House.

CORE 16 -RESEARCH METHODOLOGY

No. of Credits : 4
No. of instructional Hours : 4 Hours per week
Course Objectives :

- To provide an insight into the fundamentals of social science Research and to acquire practical knowledge and required skills in carrying out research
- To help students understand the basic theoretical ideas and logic of research know about various aspects of research problems
- To gain thorough knowledge on the development of research projects

UNIT –I Research – Concept - Business research – Features – Types: Basic and applied, exploratory, descriptive – Phases of business research - Process and formulation of Research problem – Sources.

UNIT –II Sampling - Nature -Types of sampling - Probability and Non-probability - Merits and Demerits - Sampling Errors – Hypothesis —Characteristics of good Hypothesis.

UNIT – III Data collection: Sources and Collection of data - Primary and Secondary sources - Methods of data Collection – Merits and Demerits - Scaling Techniques.

UNIT – IV Data Analysis : Coding - Data entry -Analysis Interpretation of data -Tabulation – Types - – Tools for analysis (Percentage and Chi-square analysis only).

UNIT – V Report Writing : Research Report – Concept – Types - –Significance of Report Writing– Contents of a report – Drafting of reports.

REFERENCE BOOKS:

1. Research Methodology for Social Sciences - Kothari, C.R.
2. Research Methods - Trochim, W.M.K.
3. Research Methodology - D.K. Bhattacharjee
4. Project Work – Guidelines - Kumar, M.S. & Prakash, M.
5. Research Methodology - Taylor, Bill, Sinha, G and Ghoshal, Taposh Prentice Hall of India.

MAJOR ELECTIVE – I

PRODUCTION MANAGEMENT

No. of Credits : 4
No. of instructional Hours : 4 Hours per week

Course Objectives :

- To enable students understand the nature and importance of production management
- To comprehend the principles and areas of application of shop floor management
- To know the operations and skills needed for major decisions in material management

UNIT - I

Production Management– Scope and Significance –Production System – Functions and Types – Factors influencing Plant Location – Plant Layout and its kinds.

UNIT - II

Work Study - Time Study - Motion Study – Work Measurement– Principles and factors - Maintenance of Plant – Types.

UNIT - III

Production Planning and Control – Definition – Objectives and Importance – Elements of Production Planning – Routing and Scheduling.

UNIT - IV

Quality Control and Inspection – Objectives and Significance – SQC – AGMARK, ISI and ISO – Certification Marks.

UNIT - V

Material Management – Objectives and importance – Purchasing – Procedure – Store Keeping – Objectives – Functions - JIT.

REFERENCE BOOKS:

1. Production Management – EiwoodBuffa
2. Manufacturing Management – Frankling G. Moore
3. Effective Industrial Managment – Lundy
4. Production Management – Goel Gupta
5. Introduction to Work Study – I.LO.
6. Time and Motion Study – Barner
7. Time and Motion Study – Nadiler
8. Production and Material Management – K. SridharanBhat
9. Production and Material Management – KanishkaBadi

(OR)

MAJOR ELECTIVE – I

CONSUMER BEHAVIOUR

No. of Credits : 4
No. of instructional Hours : 4 Hour per week

Course objective :

- To develop an understanding of underlying concepts and issues in Consumer behavior in marketing.
- To enable the students to learn the basics of Customer Relationship Management
- To know the factors influencing Buying Process
- To familiarise with Consumer Protection Act, 1986

UNIT -I

Consumer Behaviour - Definition - Nature - Scope - Need to study Consumer Behaviour - Applications Of Consumer Behaviour Knowledge - Current trends in Consumer Behaviour.

UNIT- II

Buying behavior - Concepts - Importance – Need and Elements Involved in Buying Process - Factors Influencing Buying Process - Behavioral factors.

UNIT-III

Consumer Decisions - Types Of Consumer Decisions - Consumer Decision Making Process - Purchase processes - Post-purchase behavior .

UNIT-IV

Consumer Satisfaction – Objectives - Importance - Working Towards Enhancing Consumer Satisfaction - Reasons Of Consumer Dissatisfaction - Consumer Research Process.

UNIT-V

Consumerism - Dealing With Consumer Complaint - Reasons For Growth Of Consumerism In India - Consumer Protection Act, 1986.

BOOKS FOR REFERENCE:

1. Consumer behavior - Leon. G. Schiffman & Leslve Lazer Kanuk
2. Consumer behaviour in Indian perspective - Suja.R.Nair
3. Consumer Behaviour - Batra/Kazmi
4. Consumer Behaviour - David. L. Loudon & Albert J. Bitta
5., Consumer Behaviour - K. Venkatramana
6. Consumer behaviour and marketing action - Assael Henry
7. Buyer and Consumer Behaviour - Jay D. Lindquist & M. Joseph Sirgy
8.Consumer Behaviour - Blackwell
9. Commentary on Consumer Behaviour - S.A.Chunawalla
10. Consumer Behaviour - Sontakki
11. Consumer Behaviour - Schiffman

SKILL BASED (COMMON) –

PERSONALITY DEVELOPMENT

No. of Credits : 2
No. of instructional Hours : 2 Hours per week
Course objective :

- To develop the skills of the professional undergraduate students for proper self expression, social communication, spoken English, correct pronunciation, voice modulation and business etiquettes.
- The students should improve their personality, communication skills and enhance their self-confidence.
- To develop the presentation skills of the undergraduate students.
- The students should be able to act with confidence, should be clear about their own personality, character and future goals.

UNIT-I:

PERSONALITY- Definition – Determinants - Personality Traits – Theories Of Personality – Importance Of Personality Development - SELF AWARENESS – Meaning – Benefits Of Self – Awareness – Developing Self- Awareness. SWOT – Meaning – Importance – Application – Components. GOAL SETTING: Meaning – Importance – Effective Goal Setting – Principles Of Goal Setting – Goal Setting At The Right Level .

UNIT-II:

SELF MONITORING- Meaning-High Self – Monitor Vs. Low-Self Monitor-Advantages & Disadvantages of Self- Monitor- Self Monitoring And Job Performance. PERCEPTION – Definition – Factors Influencing Perception – Perception Process – Errors In Perception – Avoiding Perceptual Errors. ATTITUDE- Meaning – Formation Of Attitude – Types Of Attitude – Measurement Of Attitude – Barriers To Attitude Change- Methods To Attitude Change. ASSERTIVENESS - Meaning –Assertiveness In Communication - Assertiveness Techniques – Benefits Of Being Assertive – Improving Assertiveness.

UNIT-III

TEAM BUILDING – Meaning – Types Of Teams – Importance of Team Building - Creating Effective Team. LEADERSHIP – Definition – Leadership Style – Theories Of Leadership – Qualities Of An Effect Leader. NEGOTIATION SKILLS – Meaning – Principles Of Negotiation - Types Of Negotiation – The Negotiation Process – Common Mistakes In Negotiation Process.CONFLICT MANAGEMENT – Definition – Types Of Conflict – Levels Of Conflict – Conflict Resolution – Conflict Management.

UNIT-IV

COMMUNICATION – Definition – Importance Of Communication – Process Of Communication – Communication Symbols – Communication Network – Barriers In Communication - Overcoming Communication Barriers. TRANSACTIONAL ANALYSIS – Meaning – EGO states – Types Of Transactions – Johari Window – Life Positions. EMOTIONAL INTELLIGENCE – Meaning – Components Of Emotional Intelligence – Significance Of Managing Emotional Intelligence – How Develop Emotional Quotient. STRESS MANAGEMENT – Meaning – Sources Of Stress – Symptoms Of Stress – Consequences Of Stress – Managing Stress.

UNIT – V:

SOCIAL GRACES – Meaning – Social Grace At Work – Acquiring Social Graces. TABLE MANNERS – Meaning – Table Etiquettes In Multicultural Environment – Do's And Don'ts Of Table Etiquettes. DRESS CODE – Meaning – Dress code for selected Occasions – Dress Code for an Interview – GROUP DISCUSSION: Meaning - Personality Traits Required For Group Discussion – Process Of Group Discussion – Group Discussion Topics. INTERVIEW – Definition – Types Of Skills – Employer Expectations – Planning For The Interview – Interview Questions – Critical Interview Questions.

REFERENCE BOOKS:

1. Personality Development – Dr. S. Narayanarajan, Dr. B. Rajasekaran, G. Venkadasalapathi, V. VijueshNayaham and Herald M.Dass
2.Organisational Behaviour – Stephan P. Robbins
3. Organisational Behaviour – Jit S. Chandran
4. From campus to Corporate – Dr.K.K. Ramachandran and Dr. K.K. Karthick

MINI PROJECT

No. of Credits : 3
No. of instructional Hours : 6 Hours per week
Course Objectives :

- To undergo an external field survey by choosing any industry (or) company (or) organization
- To train in drafting the formal report
- To improve the presentation skill among the students

The students may choose any industry (or) company (or) organization of their choice for doing mini-project. The data may be primary or secondary sources.

1. The students should undergo an external field survey or case study of a selected industry (or) company (or) organization by confining the specialisation chosen from the available clusters.
2. As like a project report, this field survey / case study report shall be prepared by starting the title as Survey/ Case study of ..... company or industry or organisation.
3. Since it is an external study report, the students should pay utmost interest in drafting the report and it should be as like formal report.
4. Field survey/ Case study chosen by the students for field investigation should be related to the course.
5. Before starting of fifth semester examinations, the student should submit the report both hard and soft copy with regard to this viva-voce shall be conducted through the Power-point presentation.
6. The report should be evaluated for 50 marks and viva-voce exam shall be conducted for 50 marks. Total marks for the paper is 100.
7. Students should attain 40 marks in both report and viva-voce to clear the paper. If the student is unable to clear or absent for the above examination, he/she should reappear with updated report after paying the examination fees to the university in the next semester.
8. After the completion of semester end examinations, the report and viva-voce exams have to be conducted by the approved examiners of the university.
9. ***Instruction for submission:***
    a) The volume or size of the report may be about 15 to 20 pages typed with font name of Times New Roman in 1.5 paragraph space.
    (Excluding Content page, Certificate, Acknowledgement, Declaration certificate, Index and Appendix)
    b) Students are required to submit the survey/case report in duplicate after duly signed by Principal/Director of the college and approved Faculty Guide before the semester end examination.
    c) Duration for the survey/case report preparation can be fixed as per the direction of the Guide.

The report should have the following aspects and present the report in the order mentioned below.

CHAPTER-I : Introduction about the industry (or) company (or) organization - Form of Ownership - License or Registration - Organisation structure - Sources of Finance .

CHAPTER-II : Number of employees - Recruitment process – Training – Appraisal of employees .

CHAPTER-III: Product / Service produced or offered – Manufacturing process – Raw materials and Equipments used - Logo – Slogan.

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CHAPTER-IV: Marketing of Products/Services – Channel of Distribution – Advertising – Sales promotion and sales management.

CHAPTER-V : Conclusion based on the overall observation of the study.

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VI SEMESTER

CORE 17 - RETAIL MANAGEMENT

No. of Credits : 4
No. of instructional Hours : 4 Hours per week

Course objective :

- To give an overview of the conceptual aspects of retail marketing management
- To understand the principles of retailing
- To expose learners to various factors influencing selection of location
- To know the opportunity in retail sales

UNIT – I

Retailing – Importance – Functions and Characteristics – Types of Retailers – Retailing principles - Main drives of retailing.

UNIT – II

Retailing formats: Store based and Non-store based – Advantages and Disadvantages.

UNIT –III

Retail Location – Types of Location site – Factors influencing selection of Location – Selection of Location (Urban, Rural, Sub-urban) – Merits and Demerits.

UNIT – IV

Store Layout – Importance – Steps for designing store layout – Visual merchandising – Objectives – Essentials of successful visual merchandising- Signage – Types – Characteristics of a good signage.

UNIT – V

Opportunity in retail sales: Management and Entrepreneurial opportunities - Internet Retailing – Advantages and Disadvantages – Traditional Vs. Cyber retailing.

REFERENCE BOOKS:

1. Retail Management – A Global Perspective, Text and Cases – Dr. Harjit Singh
2. Retail Marketing – S. Banumathy and M. Jayalakshmi
3. Retail Management – Arif Sheikh and Kaneez Fatima
4. Retail Management – Chetan Bajaj, RajnishTuli and Nidhi Srivastava
5. Retail Management – Dr. A. Mustafa
6. Retail Marketing – Dr. L. Natarajan

CORE 18 - FINANCIAL MANAGEMENT

No. of Credits : 4
No. of instructional Hours : 4 Hours per week

Course Objective :

- To familiarize the students with the conceptual frame work of Business finance with respect to raising, financing and managing finance.
- To expose learners to various concepts and principles of financial management
- To develop in them decision- making skills on various financial matters
- To acquaint them with various tools for the management and understanding of finance.

UNIT - I

Financial Management - Meaning and Scope - Finance Functions – Sources of Finance - Profit Maximization and Wealth Maximization.

UNIT - II

Cost of Capital – Concept, Importance – Classification – Calculation of Cost of Debt, Cost of Equity and Cost of Preference Shares - Cost of Retained Earnings – Weighted Average Cost of Capital.

UNIT - III

Leverages – Meaning and Significance – Types: Operating, Financial and Combined Leverages – EBIT and EPS Analysis, Dividend– Forms of Dividend – Factors determining dividend - Dividend Theories and Dividend Policies.

UNIT - IV

Capital Structure Planning – Meaning and Scope – Approaches: Net Income Approach – Net Operating Income Approach – MM Approach – Arbitrage Process – Traditional Approach – Indifference Point.

UNIT – V

Capital Budgeting (Investment Decisions) – Concept and Importance – Appraisal Methods: Pay Back Method – Discounted Cash Flow Method - NPV Method, Excess Present Value Index, IRR, ARR and ROI.

(Marks: Theory 50% and Problems 50%)

REFERENCE BOOKS:

1. Financial Management – M.Y.Khan&P.K.Jain
2. Financial Management – I.M. Pandey
3. Financial Management – James C.Van Horne
4. Financial Management – G. Sudarsana Reddy.
5. Financial Management – A.Murthy.

CORE 19 - HUMAN RESOURCE MANAGEMENT

No. of Credits : 4
No. of instructional Hours : 4 Hours per week
Course Objective :

- The objective of this course is to familiarize students with the Principles of Human Resources Management
- To make the students familiar with the concept of Industrial Relations and the related labour legislations.
- To familiarize and acquaint the students with the knowledge of Organisational culture and to enlighten the students with the HRD Practices followed in various organizations
- To make the students understand the importance and direction of performance in the organizational context
- To acquire knowledge on the recent trends in HRM.

UNIT –I

Human Resource - Definition – Characteristics and Objectives – Principles of HRM– Functions of Personnel Department – Managerial and Operative Functions.

UNIT –II

HR Planning - Basics and needs – Factors - Steps in HR Planning – Job Analysis, Job Description and Job Specification .

UNIT-III

Recruitment-Selection– Interviews and Tests - Placement of Personnel - Training – Objectives –Importance - Methods .

UNIT –IV

Performance Evaluation- Importance – Methods – Promotion- Criteria and Types – Transfer - Types .

UNIT –V

Industrial relations – Significance -Causes - Suggestion to improve industrial relations - Workers participation in Management - Collective Bargaining - Disciplinary procedure – Grievances - Steps in Grievance Handling.

REFERENCE BOOKS:

1. Personnel Management - EDWIN& FLIPPO
2. Personnel Management - C.B.MAMORIA
3. Human Resource Management – C. B. GUPTA
4. Human Resource Management- S.S. Khanka
5. Human Resource Management – P.S. SUBBORAO
6. Human Resource Management – L. NATARAJAN

MAJOR ELECTIVE – II
1. ENTREPRENEURSHIP

No. of Credits : 4
No. of instructional Hours : 4 Hours per week

Course Objectives :

- To make the student understand the concept & importance of Entrepreneurship and facilitate generation of young entrepreneur
- To help students for understand the concepts of entrepreneurship development
- To acquire requisite knowledge and skills for becoming successful entrepreneurs and
- To formulate and develop business projects.

UNIT –I

Entrepreneurship – Meaning - Importance- Types – Role of Entrepreneur in economic development – Qualities of entrepreneur – Entrepreneurship as a career.

UNIT – II

How to start a business – Product Selection – Forms of Ownership – Plant location – Land , Building , Water and Power - Raw Materials – Man Power – Other Infrastructural facilities – Licensing , Registration and Local Byelaws.

UNIT – III

Institutional arrangement for Entrepreneurship Development- DIC, ITCOT, SIDCO, NSIC, SISI, TIIC,SIDBI, Commercial Banks- Incentives to Small Scale Industries - Sickness in Small Scale Industries And Their Remedial Measures.

UNIT – IV

Project report – Meaning and Importance- Project identification - Contents of project report – Formulation of the project report .

UNIT – V

Project appraisal- Market Feasibility- Technical feasibility- Financial feasibility- Economic feasibility - Women Entrepreneurship in India.

REFERENCE BOOKS:

1. Entrepreneurship Development in India – Dr. C.B.Gupta , Dr. N.P. Srinivasan.
2. Entrepreneurship Development Principles, Polices and Programes – P.Saravanvel.
3. Dynamics of Entrepreneurship Development in India – Vasant Desai.
4. Fundamentals of Entrepreneurship – Mohanty

(OR)

MAJOR ELECTIVE – II

INTERNATIONAL BUSINESS

No. of Credits : 4
No. of instructional Hours : 4 Hours per week

Course Objectives :

- To help students for understand the fundamental concepts of international trade
- To know the basic principles of MNCs
- Togain broad knowledge on Global Liberalization and WTO Agreement
- To make students to understand the fundamental concepts of international trade

Unit- I

International Business – Nature - Distinction between Indian Companies and MNC - Advantages and disadvantages of International Trade.

Unit- II

Mode of Entry – Exporting – Licensing – Franchising – Contract Manufacturing – Turn Key Projects – Foreign Direct Investment – Mergers, Acquisitions and Joint Ventures.

Unit-III

Export Trade – Procedure - Steps – Documents related to Export Trade.

Unit-IV

Import Trade – Procedure - Steps - Documentations and Problems.

Unit-V

EXIM Policy - Balance of Payment – Disequilibrium and Measures for Rectification - Institutions connected with EXIM Trade - International Marketing Information System.

BOOKS FOR REFERENCE

1. Dr. Aswathappa International Business, Tata McGraw Hill.
2. P. SubbaRao – International Business – HPH
3. Shyam Shukla; International Business, Excel Books.
4. Francis Cherunilam; International Business, Prentice Hall of India
5. MahuaDutta, International Business, I.K. Intl
6. J. Maskeri- International Business
7. Rosy Joshi; International Business, Kalyani Publishers.
8. Venkataramana. K, International Business, SHBP.
9. Subhasre S – International Business, HPH.

MAJOR PROJECT

No. of Credits : 7
No. of instructional Hours : 14 Hours per week
Course Objectives :

- To work & gain knowledge of real time business environment.
- To explore the various functional areas and analyze how theoretical concepts taught are applied in real life situations.
- To analyze best practices, system, processes, procedures and policies of a different functional areas and bring forward the deviations.
- To develop skills in report writing through data collection, data analysis, data extraction, and presentation and draw lessons vis-à-vis firm or company

SCOPE OF THE PROJECT REPORT AND VIVA -VOCE

The project study is to be based on the functional areas (such as Marketing, Finance, HRM,etc). Before commencement of project study, each student has to consultation with his/her guide for choosing functional area of project on which the data is proposed to be collected and analysis is to be conducted. It may be noted that the chosen functional area is not restrictive. If the student finds any other area is interesting or otherwise, they must explore it and comment on it with his /her report.

Guidelines:

a. Every student must undertake a project work by group or individual. The maximum number of students for group based project is six.

b. To undertake a project work at a reputed organization, the students should apply for permission through the institution formally.

c. Students must select the topic based on specialization.

d. Three copies of report have to be prepared and submitted.

e. The project work must be completed within four months' duration.

f. The students will be allocated a guide from the department.

g. The students have to meet the guides at regular intervals to update about the progress.
h. The format for submitting the project work report will be provided by the department.
i. The project work report should have the following structures:

- Cover pages

- Chapter 1: Introduction

- Chapter 2: Research Design

- Chapter 3: Company Profile/ Theories related to study area

- Chapter 4: Data Analysis and Interpretation

- Chapter 5: Findings , Recommendations and conclusion

j. The student will have to undergo a viva voce on the successful completion of project work. Thesis should be evaluated by external examiner.

j. Internal marks for project is 25 and external marks is 75.

Note:

To foster deep insights into the practical domains of production and management industrial visits should be arranged as a part of the curriculum.

SCOPE OF THE PROJECT REPORTAND VIVA VOCE

The project study is to be based on the functional area (such as Marketing, Finance, HRM) that the student opted as major in third and fourth semester. Before commencement of project study, each student is to develop a synopsis in consultation with his/her guide in the chosen functional area covering the broad aspects on which the data is proposed to be collected and analysis is to be conducted. It may be noted that the chosen functional area is not restrictive.

If the student finds any other area interesting or other wise, they must explore it and comment on it in his /her report. Each student is required to carry out the work and submit the report individually.

To undertake a project work at a reputed organization by applying the concepts of management.

Guidelines:

- Every student must undertake an individual project at a reputed registered organisation.
- Students must select the topic based on specialization.
- Interning at the organization/ Field work has to be done by every student.
- Two copies of report have to be prepared and submitted.
- The project work must be completed within three months' duration.
- The students will be allocated a guide from the department.
- The students are expected to register the organization of undertaking the project with the guide.
- Synopsis has to be prepared by every student to the guide.
- The synopsis has to approved by the guide.
- The students have to meet the guides at regular intervals to update about the progress.
- The format for submitting the project work report will be provided by the department.
- The project work report shouldhave the following structures:

- Cover pages
- Chapter1: Introduction
- Chapter2: Research Design
- Chapter3: Company Profile
- Chapter4: Data Analysis and Interpretation
- Chapter5: Findings and Recommendations
- Chapter6: Conclusion

 The student will have to undergo a viva voce on the successful completion of project work.

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI
UG COURSES – AFFILIATED COLLEGES

B.A. English

(Choice Based Credit System)

(with effect from the academic year 2016-2017 onwards)

Sem.	Pt. I/II/ III/ IV/V	Sub. No.	Subject status	Subject Title	Hrs. per week	Cre-dits	Marks				
							Maximum			Passing minimum	
							Int.	Ext.	Tot.	Ext.	Tot.
V	III	25	Core - 7	NON-FICTION	7	5	25	75	100	30	40
	III	26	Core - 8	LITERARY CRITICS AND APPROACHES	7	5	25	75	100	30	40
	III	27	Major Electives (select 2 courses out of 3)	A) CANADIAN LITERATURE	6	5	25	75	100	30	40
	III	28		B) JOURNALISM AND MASS COMMUNICATION	6	5	25	75	100	30	40
				C) WOMEN'S WRITING							
	IV	29	Skilled Based subject (Common)	Personality Development/ Effective Communication/ Youth Leadership	4	4	25	75	100	30	40
SUBTOTAL					30	24					

Sem	Pt. I/ II/ III/ IV /V	Sub. / Ppr. No.	Subject status	Subject Title	Hrs. per week	Credits	Marks				
							Maximum			Passing minimum	
							Int.	Ext.	Tot.	Ext.	Tot.
VI	III	30	Core - 9	SHAKESPEARE	6	5	25	75	100	30	40
	III	31	Core - 10	SOUTH-ASIA LITERATURE IN ENGLISH	6	5	25	75	100	30	40
	III	32	Core - 11	SHORT-STORIES AND ONE-ACT PLAYS	6	5	25	75	100	30	40
	III	33	Core - 12	REGIONAL LITERATURE IN TRANSLATION	6	5	25	75	100	30	40
	III	34	Major Electives-III (Select 1 out of 2)	(A) AFRICAN LITERATURE (B) WRITING FOR THE MEDIA	6	5	25	75	100	30	40
SUBTOTAL					30	25					

MSU/2016-17/UG-Colleges/Part-III (B.A. English) Semester-V/Ppr.no.25/Core-7

Non-Fiction

Objectives:

1. To familiarize the students to the prose writings of the representative writers.
2. To develop a sense of literary appreciation in the minds of students

Unit-I :

Francis Bacon	-	Of Studies, and Of Friendship
Joseph Addison	-	Sir Roger at Theatre

Unit-II :

Richard Steele	-	Sir Roger and the Widow
Oliver Goldsmith	-	The Man in Black

Unit-III:

Charles Lamb	-	Dream Children
William Hazlitt	-	On Disagreeable People

Unit-IV:

A. G. Gardiner	-	The Fellow Traveller
Robert Lynd	-	The Money Box

Unit-V:

A. J. Cronin	-	The Best Investment I ever made.
G. K. Chesterton	-	The Worship of the Wealthy

Text Prescribed: *Elegant English Essays*. Board of Editors. Emerald Publishers. Chennai.

Literary Critics and Approaches

Objectives:

1. To introduce the major schools of literary criticism to the students.
2. To develop the critical sensibilities of the students

Unit-I

Plato
Aristotle

Unit-II

Philip Sidney
Dryden

Unit-III

Dr. Johnson
William Wordsworth

Unit – IV

Matthew Arnold
T. S. Eliot

Unit-V

The Moral Approach (Introduction)
The Psychological Approach (Introduction)
The Sociological Approach (Introduction)
The Formalistic Approach (Introduction)
The Archetypal Approach (Introduction)

Texts:

1. *An Introduction to English Criticism*. B. Prasad
2. *Five Approaches of Literary Criticism*. Wilbur Scott

MSU/2016-17/UG-Colleges/Part-III (B.A. English) Semester-V/Ppr.no.27 & 28(A) /Major Electives – I & II (A)

Major Electives (Select 2 out of 3 Papers)

Canadian Literature

Objectives:

1. To introduce the students to Canadian literature through the close reading of the selected texts.
2. To make them approach selected texts for their literary value and cross cultural importance.

Unit I: Poetry

Al Pardy	-	Listening to Myself
Wilfred Campbell	-	The Winter Lake
A. J. M. Smith	-	Live as Old Proud King in Parable
A. M. Klein	-	Indian Reservations: Caughnawaga
P. K. Page	-	First Neighbours

Unit II: Short- Stories

Yann Martel	–	The Facts behind the Helsinki Roccamatios
Alice Munro	–	Red Dress
Margaret Atwood	–	The Resplendent Quetzal
Alistair MacLeod	-	As Birds Bring Forth the Sun

Unit III: Drama

George Ryga	-	*Ecstasy of Rita Joe*

Unit IV: Fiction

Michael Ondaatje	-	*In the Skin of a Lion*

Unit V: Fiction

Joy Kogawa - *Obasan*

Prescribed Text: *Mosaics: An Anthology of Canadian Literature*. Mainspring Publishers. Chennai-600042.

Reference: The Arnold Anthology of Post-colonial Literatures. Ed. John Thieme. Arnold Pub. New York

MSU/2016-17/UG-Colleges/Part-III (B.A. English) Semester-V/Ppr.no.27 & 28 (B) / Major Electives –I & II (B)

Journalism and Mass Communication

Objectives:

1. To introduce the students to the challenges of the constantly evolving world of journalism and Mass Communication.
2. To develop multi-tasking skills required in the dynamic multi-media and convergent environment.

Unit-I

1. Journalism and Mass Communication
2. Journalism of Print Media

Unit-II

3. News Agencies
4. News Gathering and Reporting

Unit-III

5. History of Indian Journalism
6. Communication and Mass Communication

Unit-IV

7. Radio Broadcasting in India
8. Television Broadcasting in India

Unit-V

9. Information Technology
10. Web Journalism

Text Prescribed:

Hena Naqvi. *Journalism and Mass Communication*. Upkar Prakashan, Agra–2.

Reference:

Keval J. Kumar. Mass Communication in India 4th Ed. Jaico Publishing House. Mumbai-1

MSU/2016-17/UG-Colleges/Part-III (B.A. English) Semester-V/Ppr.no.27 & 28 (C) / Major Electives –I & II (C)

Women's Writing

Objectives:

1. To sensitise the students about the problems women face in the patriarchal cultural milieu.
2. Employ literature to analyse issues and questions relating to women's experience and empowerment.

Unit-I: Poetry

Maya Angelou	-	Phenomenal Woman
Judith Wright	-	Woman to Man
Kishwar Naheed	-	I am not that Woman
Carol Ann Duffy	-	Originally

Unit-II: Prose

Jean Rhys	-	The Day they burned the Books
Virginia Woolf	-	Shakespeare's Sister

Unit-III: Short-Story

Nadine Gardiner	-	A Correspondence Course
Katherine Mansfield	-	An Ideal Family
Alice Munroe	-	The Photographer

Unit-IV: Fiction

Meena Alexander	-	*Nampally Road*

Unit-V:Drama

Suzan-Lori Parks	**-**	*Topdog/Underdog*

Texts Prescribed:

Women's Writing: Anthology. Mainspring Publishers. Chennai-600042.

Nampally Road. Meena Alexander. Orient Blackswan.

References:

The Arnold Anthology of Post-colonial Literatures. Ed. John Thieme. Arnold Pub. New York

Shakespeare

Objectives:

1. To acquaint the students to the dramatic and theatrical conventions of Shakespeare.
2. To enable the learners to analyse plot, characters, themes and stage craft of his plays.

Unit – I

As You Like It

Unit – II

Othello

Unit – III

Julius Caesar

Unit – IV

The Tempest

Unit – V

Elizabethan Stage & Audience

Fools and Clowns

Women in Shakespeare

Supernatural Elements in Shakespeare

South-Asian Literature in English

Objectives:

1. Learning the complexities of the region through its literature.
2. An understanding of South Asia's social, historical, local and global contexts.
3. Learning to read texts critically in order to analyse the distinctive literary strategies and devices deployed in these texts.

Unit-I
Poetry

Yasmine Gooneratne	:	This Language, This Woman
Imtiaz Dharkar	:	Minority
Eunice De Souza	:	Marriages are Made
Alamgir Hashmi	:	So What if I Live in a House made by Idiots.

Unit-II

Prose

Natantara Sahgal	:	Martland
Jamil Ahmed	:	The Sins of the Mother (from *The Wandering Falcon.)*

Unit-III
Short-Stories

Hanif Kureshi	:	The Assault
Jackie Kabir	:	Silent Noise
Gita Hariharan	:	The Remains of the Feast

Unit – IV
Fiction

Khaled Hossain	:	*A Thousand Splendid Sun*.

Unit-V
Drama

Mahaswetha Devi	:	*Mother of 1084*.

Text Prescribed: *South Asian Literature in English*. Mainspring Publishers. Chennai-600042.

Short-Stories and One-Act Plays

Objectives:

1. Help the students analyzing and evaluating the plot and characters in short stories and one-act plays.
2. Enable the students to make comparisons in terms of theme, rhetorical structure, and genre.

Unit-I

Short-Stories

Leo Tolstoy	:	God Sees the Truth, but Waits
Jerome K Jerome	:	Uncle Podger Hangs a Picture
A.J. Cronin	:	Two Gentle Men of Verona

Unit-II

Short-Stories

Oscar Wilde	:	The Selfish Giant
Guy de Maupassant	:	At the Church Door
Sinclair Ross	:	The Lamp at Noon

Unit-III

Short-Stories

Stephen Leacock	:	The Errors of Santa Claus
Anton Chekhov	:	Misery
Catherine Mansfield	:	The Doll's House

Unit – IV

One-Act Plays

J. B. Priestley	:	Mother's Day
Anton Chekov	:	The Swan Song

Unit-V

One-Act Plays

Erisa Kironde	:	The Trick
Lady Gregory	:	The Rising of the Moon

Prescribed Text: *Echoes: An Anthology of Short Stories and One-Act Plays.* Mainspring Publishers. Chennai-600042.

Regional Literature in English

Objectives:

1. To acquaint the students to the rich cultural and literary heritage of the native literature.
2. To inculcate in the students a flair to enjoy and appreciate native literature.

Unit-I: Poetry

Tiruvalluvar	-	*Tirukkural* (Translated by G. U. Pope) Chapter-8: The Possession of Love Chapter-11: Gratitude Chapter-30: Veracity Chapter-40: Learning

Unit-II: Poetry

Subramanya Bharathi	-	Indian Republic There is no fear
Mu. Mehta	-	Charge Sheet
Adavan Theetchanya	-	Self-Realization

Unit-III: Short-Story

U. R. Anantha Murthy	-	A Horse for the Sun
Vaikom Muhammad Basheer	-	Walls
Yandamoori Veerendranath	-	Advaitam
Ambai (C.S.Lakshmi)	-	Gifts

Unit-IV: Fiction

Sundara Ramaswamy	-	*Tamarind History*

Unit-V: Drama

Girish Karnad	-	*Nagamandala*

Text Prescribed: *Regional Literature in English*. Ed. Board of Studies.Angel Publishers. Chennai-8

Short Stories: The Picador Book of Modern Indian Literature. Ed: Amit Chaudhuri. Picador India. 2016.

Tamarind History. Sundara Ramaswamy. Penguin India.

Major Elective (Select 1 out of 2)

African Literature

Objectives:

1. To enable the students to understand the cross-cultural and historical approaches to the works by major writers of Africa.
2. To understand the role of African literature in developing a national identity in the former colonies of Africa.

Unit-I
Poetry

Mazisi Kunene	-	A Note to all Surviving Africans
Jean-Joseph Rabearivelo	-	Cactus
Chinua Achebe	-	Refugee Mother and Child
Tsegaye Gabre-Medhin	-	Home Coming Son

Unit-II
Poetry

Walter Odame	-	Dear Child
Wole Soyinka	-	Telephone Conversation
John Pepper Clarke	-	The Casualties (to Chinua Achebe)
Bernard Dadie	-	I Thank You God

Unit-III
Short-Story

Oral tradition	-	Nwashisisana, The Hare
Assia Djebar	-	My Father writes to my Mother
Henry Lopes	-	The Advance

Unit-IV
Fiction

Chinua Achebe	-	*The Arrow of God*

Unit-V
Drama

Wole Soyinka	-	*The Lion and the Jewel*

Text Prescribed: *African Literature: Expanding Horizons*. Mahaam Publishers.
Chennai-78. email: mahaampubishers@gmail.com

MSU/2016-17/UG-Colleges/Part-III (B.A. English) / Semester – VI / ppr.no.34 (B) / Major Elective – 3 (B)

Writing for Media

Objectives:

1. To teach the fundamentals of good writing
2. To help the students aware of the basic conventions of fiction writing
3. To provide the students the tools for self expression in this medium

Unit I

The Making of a Writer
Writing for Print Media
News and News Writing

Unit II

Freelance Writer
The Art of Interviewing
Editorial Writing

Unit III

Script Writer
Play writing
Script Writing

Unit IV

Copy Writer
Writing for Advertisement
Copy Writing

Unit V

Writing Novels
Writing a Bestseller
Writing effectively

Text Book: *Writing for the Media*. Sunny Thomas, Vision Books Pvt. Ltd., New Delhi.

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UG COURSES – AFFILIATED COLLEGES

B.A History (Vocational) Tourism

(Choice Based Credit System)

(with effect from the academic year 2016-2017 onwards)

Sem	Pt. I/ II/ III/ IV /V	Sub. / Ppr. No.	Subject status	Subject Title	Hrs. per week	Credits	Marks				
							Maximum			Passing minimum	
							Int.	Ext.	Tot.	Ext.	Tot.
V	III	25	Core - 7	HISTORY OF INDIA V (C.1750s-1970s)	7	5	25	75	100	30	40
	III	26	Core - 8	CULTURAL HISTORY OF SOUTH INDIA -I	7	5	25	75	100	30	40
	III	27	Major Elective-I	(ANY ONE) (A) ECONOMICS OF TOURISM (B) ECO TOURISM	6	5	25	75	100	30	40
	III	28	Major Elective-II	(ANY ONE) (A) HOTEL ACCOUNTING (B) TRAVEL AGENCY MANAGEMENT	6	5	25	75	100	30	40
	IV	29	Skilled Based subject (Common)	Personality Development/ Effective Communication/ Youth Leadership	4	4	25	75	100	30	40
SUBTOTAL					30	24					

Sem	Pt. I/ II/ III/ IV /V	Sub. / Ppr. No.	Subject status	Subject Title	Hrs. per week	Credits	Marks				
							Maximum			Passing minimum	
							Int.	Ext.	Tot.	Ext.	Tot.
VI	III	30	Core - 9	SOCIAL HISTORY OF INDIA	6	5	25	75	100	30	40
	III	31	Core - 10	CULTURAL HISTORY OF SOUTH INDIA -II	6	5	25	75	100	30	40
	III	32	Core - 11	TOURISM UNDERTAKING	6	5	25	75	100	30	40
	III	33	Core - 12	TOURISM POLICY AND PLANNING	6	5	25	75	100	30	40
	III	34	Major Elective-III	(ANY ONE) (A)HOUSE KEEPING MANAGEMENT (B)HUMAN RESOURCE MANAGEMENT IN TOURISM	6	5	25	75	100	30	40
SUBTOTAL					30	25					

MSU/2016-17/UG-Colleges/Part-IV/B.A.History(vocational)Tourism/Semester-V/ Core-7

HISTORY OF INDIA (c. 1750s – 1970s)

Unit - I

The First Century of Colonial Rule: Expansion and Consolidation of British Power Institutions and Policies Making of a Colonial Economy Cultural Responses – Tradition and Reform

Unit - II

The Revolt of 1857: Social and regional spread, consequences.

Unit – III

Modern Colonial State After the Revolt: 1858 – 1947. Idioms of Rule: (i) Knowing India – Race Caste, Religion, Custom (ii) Representative Politics – Constitutional Developments.

Unit - IV

Colonial Economy and Society: Features of Colonial economy Patterns of Trade Decline of traditional industry Commercialization and Agrarian stagnation Growth of Modern industry 1914 – 1947

Unit – V

Features of Colonial Society English Education and Middle Class Indian capitalist class and growth of working class

Suggested Books

Sugata Bose and Ayesha Jalal: Modern South Asia:History, Culture, Political Economy, New Delhi, 1998

Sekhar Bandyopadhyay From Plassey to Partition Barbara D Metcalf andT.R. Metcalf A Concise History of India, Cambridge, 2002

C.A. Bayly: An Illustrated History of Modern India 1600 – 1947, London 1990 Sumit Sarkar Modern India 1885 – 1947,

Mamillan, 1983 Mushirul Hasan John Company to the Republic: A story of Modern India.

R.P. Dutt India Today. Thomas Metcalf Ideologies of the Raj.

R. Jeffery, J Masseloss, P Reeves (ed) From Rebellion to the Republic.

Bipan Chandra: Nationalism and Colonialism.

Cultural History of South India - I

Unit I

Definitions of Culture and its various aspects :(i) Perspective on Cultures: Indian Cultural tradition: An overview (ii) Plurality of Cultures: Social Content of Culture

Unit II

Language and Literature, Sanskrit: Kavya - Kalidasa'sRitusambhara, Prakrit:GathaSaptasati, Development of vernacular language and literature, Indo-Persian Literature: Amir Khusro's works, Urdupoetry and prose: Ghalib

Unit III

Performing Arts, Hindustani, Carnatic classical Music ,Devotional music: bhakti and sufi Classical and Folk Dance, Theatre: Classical, Folk, Colonial and Modern

Unit IV

Architecture: Meanings, form and Function, Rock-cut-Mamallapuram, Structural – temple architecture- Khajuraho complex and Tanjavur temple; Fort – Dalulatabad or Chittor forts; Palace-dargahat FatehpurSikri; Colonial – Lutyen's Delhi

Suggested Readings

- Asher Catherine, (ed.): Perceptions of India's Visual Past, AIIS, Delhi, 1994.
- Asher Catherine, Architecture of Mughal India.
- Basham A.L., The Wonder that was India. Volume I, New Delhi.
- Brown Percy, Indian Architecture, Buddhist Hindu and Islamic, Vol. I, II, Mumbai, 1956.
- Chandra Prainod, ed, Studies in Indian Temple Architecture; Chapter 1. AIIS, 1975.
- Deva, B.C., An introduction to Indian Music, Delhi, 1973.

MSU/2016-17/UG-Colleges/Part-IV/ B.A. History(vocational)Tourism / Semester - V/

Major Elective -I (A)

ECONOMICS OF TOURISM

Unit I:

Nature, scope and application of economics in tourism and hospitality; Tourism scenario in India – tourist arrival data and Indian economy

Unit II:

Law of Demand, Determinants of Demand; Elasticity of Demand; Nature of tourism demand analysis and its forecasting; Law of supply; Determinants of tourism and hospitality supply; Elasticity of supply analysis and forecasting

Unit III:

Liberalization, privatization, globalization and tourism Input-Output decisions, Production function, short-run analysis; Long-run function; short run and long-run cost functions. Empirical estimation of production and costs

Unit IV:

Price-Output Decisions; Tourism and hospitality market structures; Price determination under different market conditions; Pricing practices and strategies; Profit measurement and profit policy; Determinants of investment decision in tourism and hospitality

Unit V:

ourism development and economic planning, review of the economic planning of tourism through the annual and five year plans, foreign exchange earnings and contribution to GDP through tourism.

Books for reference:

1. Hailstones, Thomas J. and Rathwell, John C., Managerial Economics, Prentice Hall International, New Delhi.
2. Chopra, O.P., Managerial Economics, Tata-McGraw Hill, New Delhi.
3. Agarwal, Manju, Economics for decision Making, Indian Institute of Finance, 1997, Delhi.
4. Davis, J.R. and Chang, Simon, Principles of Managerial Economics, Prentice Hall International, New Delhi.
   1. Mehta, P.L., Managerial Economics, Sultan Chand, New Delhi.
   2. Petterson: Managerial Economics, 3rd Ed., Prentice Hall of India, Delhi.
   3. Adhikary M., Managerial Economics, Khosla Pub.
4. Salvatore, Domnick, Managerial Economics in a global economy, Irwin McGraw Hill.
5. Tribe, J. 2001, The Economics of Leisure and Tourism, New Delhi, Butterworth – Heineman.
6. Cullen, P. 1997, Economics for Hospitality Management, London, International Thomson Business Press.
7. Sinclair, M.T. and Stabler, M., 1997, The Economics of Tourism, London, Routledge

MSU/2016-17/UG-Colleges/Part-IV/ B.A. History(vocational)Tourism/Semester-V/

Major Elective -I (B)

ECO TOURISM

Unit I:

Environmental Studies : Definitions, components of environment, types of environment (an overview of food chains, food web and energy flow). Bio – Geo Chemical cycles,

Unit II:

Environmental Pollution – Air, Water and Noise Pollution with special reference to tourism activities. Green house effect. Depletion of ozone layer treats due to global warming.

Unit III:

Concept and Origin : Emergence of Eco-tourism, growth and development. Definitions. Principles of Eco-tourism. An overview of Eco-tourists.

Unit IV:

Eco-tourism Resources in India – Caves, National Parks, Wild life sanctuaries, Tiger Reserves, Biosphere Reserves, Wet lands, Mangroves, Coral reefs and desert Ecosystem.

Unit V:

Eco-tourism Planning and development strategies – Eco-tourism strategies with special reference to Environmental Protection (Environmental Impact Analysis) Role of Eco tourism in WTO, UNDP, UNEP, Ministry of Tourism GOI - Eco tourism in Tamil nadu.

Books for Reference

1. Baldvin J.H. (1985) Environmental Planning and Management. I.B.D. Dehradun
2. Singh Ratandeep : Handbook of Environmental Guidelines for Indian Tourism – Kanishka Publishers, New Delhi.
3. Romila Chawla : Wildlife Tourism and Development; Sonali Publications, New Delhi. 4. Dash M.C. (1993) fundamentals of Ecology (New Delhi), Tata McGraw Hill Co.Ltd., Publishing Co.Ltd.)
4. Kormandy E.J. (1989) Environmental issues Concerns and Strategies (New Delhi) Ashish
5. Kandari O. P., Chandra Ashish : Tourism Biodiversity & Sustainable Development, Isha Books, Delhi.

MSU/2016-17/UG-Colleges / Part-IV / B.A. History(vocational)Tourism / Semester-V/

Major Elective -II(A)

HOTEL ACCOUNTING

Unit – I:

INTRODUCTION TO ACCOUNTING: Meaning and Definition - Types and Classification - Principles of accounting - Systems of accounting - Generally Accepted Accounting Principles (GAAP) – departmental income & expense statement (all schedules including long – form)

Unit – II:

Departmental accounting : Meaning and purpose, methods allocation and apportionment of expenses.

Unit – III:

Understanding Balance sheet statement: Meaning and purpose, assets and liabilities, identification of assets and liabilities.

Unit – IV:

Visitors Tabular Ledger : Meaning & purpose, very basic of audit, night audit in hotels.

Unit – V:

Costing: Fundamentals, marginal costing technique, basic standard costing techniques, standard for material & labour variance only.

Books for Reference :

1. Hotel Accounting, Earnest B. Horwath & Luis Toth
2. Hospitality Accountig, Richard Kotas & Michael Conlan
3. Hotel & Catering Costing & Budgets, R.D Boardman, Heinemann

MSU/2016-17/UG-Colleges/Part-IV/ B.A. History(vocational)Tourism/Semester-V/ Ppr.no.28 (B)/

Major Elective -II(B)

TRAVEL AGENCY MANAGEMENT

Unit I:

Definition of Travel Agency and Tour Operations, differentiation, interrelationship. Origin and growth of travel agencies. An overview of the travel agents in India, local travel agents.

Unit II :

How to set up travel agency:

(a) Market research, sources of funding

(b) Comparative study of various types of organisation proprietorship, partnership, private limited and limited

(c) Govt. rules for getting approval

(d) IATA rules, regulation for accreditation

(e) Documentation

(f) Office automation

(g) Practical exercise in setting up a Travel Agency

Unit III:

Departmentalization, managerial responsibilities and use of technology. Sources of earning : commissions, service charges etc. Itinerary preparation, important considerations for preparing itinerary, costing, types and components of package tour.

Unit IV:

Dealing with Principal Suppliers: Dealing with air travel, tourist transport and accommodation. Supplier challenges. Present business trends and future prospects problems and issues.

Unit V:

Publicity and promotion: Issues related to sales, promotional issues, marketing communication, public relations. Associations and Organizations promoting travel agencies and tour operators: IATO, TAAI, ASTA,WATA, PATA, FHRAI, UFTA

Books for Refernce:

1. Travel Agency and Tour Operation, Concepts and Principls - J.M.S. Negi
2. Professional Travel Agency Management - Chunk, James, Dexter & Boberg
3. The Business of Travel Agency Operations and Management - D.L. Foster
4. Travel Agency Management-An Introductory Text, Anmol Publication New Delhi-Mohinder Chand.
5. Tourist Guide and Tour Operations, Kanishka Publication, New Delhi.

SOCIAL HISTORY OF INDIA

Unit - I

Social Movements: Issues of Social Reform: The 'Womens' Question Phule, Ambedkar and the Caste question Dalit. Peasant. Tribal Movements

Unit - II

Nationalist Politics, 1858 – 1947 Phases of National Movement Economic Nationalism and Cultural Nationalism Mahatma Gandhi and Mass Nationalism: Gandhian thought, techniques and movements Growth of Communal Politics Partition of India

Unit – III

Independent India: Economy and Polity Constituent Assembly and Establishment of the Republic Economic and Social Change 1950 – 1970s Planned Economy Industrialization.

Unit – IV

Models of Growth Land Reform and the Structures of Dominations in Rural India Foreign Policy: Non-Alignment Panchsheel Federalism and the Linguistic States Politics Parties and Indian Politics 1950 – 1977.

Unit – V

Independent India: Culture and Society Modern Indian Literature, Art and Films Scientific and Technological Developments Dalit and Backward Caste Self Assertion Origins of environmentalism Peasant and Labour Movements.

Suggested Books:

Sugata Bose and Ayesha Jalal: Modern South Asia:History, Culture, Political Economy, New Delhi, 1998.

Sekhar Bandyopadhyay From Plassey to Partition Barbara D Metcalf andT.R. Metcalf A Concise History of India, Cambridge, 2002.

C.A. Bayly An Illustrated History of Modern India 1600 – 1947, London 1990 Sumit Sarkar Modern India 1885 – 1947, Macmillan, 1983.

Mushirul Hasan John Company to the Republic: A story of Modern India.

R.P. Dutt India Today Thomas Metcalf Ideologies of the Raj.

R. Jeffery, J Masseloss, P Reeves (ed) From Rebellion to the Republic Bipan Chandra: Nationalism and Colonialism Urvashi Butalia The Other side of Silence Francine Frankel India's Political Economy 1947- 1977.

Cultural History of South India – II

Unit I

Perceptions of visual Past and Present, Sculpture and Painting: Silpashastric normative tradition, Classicism – Narrative and Sculptural, Mural, fresco paintings, Post Classicism – Pallava – Cola ,

Unit II

Medieval idiom –Mughal paintings, painters and illustrated texts, Modern – company school, Ravi Varma, Bengal School, Amrita Shregil and Progressive Artists.

Unit III

Popular Culture

a) Folk Lore and Oral tradition of Kathas, narratives, legends and proverbs, Linkages ofbardic and literary traditions.

b) Festivals, fairs and fasts; Links with tirtha, pilgrimage and localities.

c) Textile and Crafts; the Culture of Food.

Unit IV

Communication, Patronage and Audiences

a) Court Merchant groups and communities.

b) Culture as Communication.

Unit V

Nationalism and the issue of Culture; Institutions of Cultural Practices Colonial and Post Colonial.

Suggested Reading:

- K. T. Acharya**,** A Historical Dictionary of Indian Food , OUP.
- Banerjea J.N.: The Development of Hindu Iconography, Calcutta, 1956
- Bussagli M and Srivaramamurthy C.: 5000 Years of Indian Art, New York, n.d.

Tourism Undertaking

Unit I

Modes of transport- Rail, Road, Air and Sea.Elements of transportation. Political influences on transport for tourism. Regulation of competition.Role of Railways in promotion of domestic tourism. Important tourist trains in India. Case study of Air India and a few important International Airlines.

Unit - II

Accommodation and Catering- Types of hotel, procedure of categorization and classification of hotels . Accommodation and the tourism product.Qualityissues.New concepts and developments in accommodation.

Unit III

Definitions of Travel Agency and Tour Operators, Itinerary making and costing ,

Approval of Travel Agency by Department of Tourism , Govt. of India. Rules and Regulations for approval.Classifications of travel agents and Forms of organizations.Functions of travel

agency and the tour operators.Tour planning.

Unit IV

Tourism Organization and their role in Tourism Development, Local – DTTDC, RTDC, MPTDC

Unit - V

National- IATO, TAAI, ITDC, International – IATA, ICAO,UNWTO, Freedoms of air,Open skies

policy.

Suggested readings

- Achariya " Civil Aviation and Tourism Management"
- Mill and Morrison- " The Tourism System"
- Murphy- " Transport and Distribution"
- JagmohanNegi -Travel Agency Operations and Concepts and Principles
- S. P. Singh-Travel Tourism Management
- Hollander S. - Passenger Transportation (Michigan

TOURISM POLICY AND PLANNING

Unit – I:

Tourism Planning – phases – needs – goals – planning process – role of government in tourism

Unit – II:

Tourism Planning in India - five year plans – tourism policy Considerations and structure planning – safety and security of tourists.

Unit – III:

Tourism policy formulation – public sector involvement – role of public sector and planning – legislation and regulation establishing tourism policy – Manila Declaration – Goa declaration.

Unit – IV:

Origin and development of tourism policy in India – Tamilnadu. Types of planning – local, regional, national and master plan – National Action plan of 1992 – National Tourism Policy of 2002.

Unit – V:

Incentives and subsidies of state and central government to promote tourism – nationall committee for tourism.

Books for Reference :

Balu U. : Tourism in India – Policy and Perspective

Gunn C.M. : Tourism Planning

Hall P. : Urban and Regional Planning

Mishra S.K. : Tourism in India – Policy and Perspective

MSU/2016-17/UG-Colleges / Part-IV / B.A. History (vocational) Tourism / Semester-VI /

Major Elective –III (A)

HOUSE KEEPING MANAGEMENT

Unit – 1:

Introduction to House Keeping**:** Importance & Functions of Housekeeping House Keeping Areas – Front-of-the-house and Back-of-the-house areas, Guest Rooms, Public Areas, Maids Room, Indoor and Outdoor Areas. Co-ordination with other Departments like Front Office, Engineering, F & B, Kitchen, Security, Purchase, HRD, Accounts.

Unit - II :

Layout of House Keeping Department **:** Sections of the housekeeping department, their functions and layout. Organization of Housekeeping Department : Hierarchy in large, medium & small hotels - Attributes of staff. Job Descriptions and Job Specifications

Unit – III:

Guest Rooms: Types - Amenities & facilities for Standard & VIP guest rooms.

Unit – IV:

Cleaning Equipments : Classification, use, care & maintenance Selection & purchase criteria. Cleaning Agents: Classification, use, care and storage - Distribution & Control - Selection Criteria

Unit – V:

Key Control **:** Computerized keys - Manual keys - Key Control Procedures Glossary of Terms: Students should be familiar with the glossary of terms pertaining to above mentioned topics

REFERENCE BOOKS: -

1. Housekeeping Training Manual - Sudhir Andrews

Hotel, Hostel & Hospital Housekeeping – Brenscon & Lanox

MSU/2016-17/UG-Colleges/Part-IV/ B.A. History(vocational)Tourism/Semester-VI /

Major Elective –III (B)

HUMAN RESOURCE MANAGEMENT IN TOURISM

Unit I:
Basic Philosophy and Approaches in HRD Planning. HRD Functions

Unit II:
Human Resource Management (HRM) in Perspective: HRM: The Field and It's Environment. The Evolving Role of HRM in the tourism industry: the Changing Emphasis

Unit III:
Meeting Human Resource Requirements: Human Resource Planning (HRP). Job/Role Analysis. Recruitment & Selection. Orientation & Placement.

Unit IV:
Developing Effectiveness in Human Resources: Training & Development (T&D). Performance Management. Potential Appraisal. Career/Succession Planning.

Unit V :
Managing Employee Growth: Conflict and Stress management. Importance of Discipline and Counseling in Tourism. Human Resource Management in Tourism: HRM in the service Industry. Emerging trends and Perspectives

Books for Reference:

1. Ian Beardwell & Len Holden– Human Resource Management: A contemporary
   1. perspective, Macmillan
2. Wayne F. Cascio – Managing Human Resources: Productivity, Quality of Work Life,
3. Profits, Tata Mcgraw Hill
4. M. Madhukar - Human Resource Management in Tourism , R. Publications

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES

B.A. History

(Choice Based Credit System)

(with effect from the academic year 2016-2017 onwards)

Sem	Pt. I/ II/ III/ IV /V	Sub. / Ppr. No.	Subject status	Subject Title	Hrs. per week	Credits	Marks				
							Maximum			Passing minimum	
							Int.	Ext.	Tot.	Ext.	Tot.
V	III	25	Core - 7	HISTORY OF TAMIL NADU UP TO 1565 A.D.	7	5	25	75	100	30	40
	III	26	Core - 8	CONTEMPORARY HISTORY OF INDIA SINCE 1947	7	5	25	75	100	30	40
	III	27	Major Elective-I	(A) HISTORY OF WORLD CIVILIZATION (B) HISTORY OF EUROPE (1453 A.D. TO 1789 A.D)	6	5	25	75	100	30	40
	III	28	Major Elective-II	(A) HISTORY OF THE FAR EAST (1839-1970 A.D) (B) HUMAN RIGHTS	6	5	25	75	100	30	40
	IV	29	Skilled Based subject (Common)	Personality Development/ Effective Communication/ Youth Leadership	4	4	25	75	100	30	40
SUBTOTAL					30	24					

Sem	Pt. I/ II/ III/ IV /V	Sub. / Ppr. No.	Subject status	Subject Title	Hrs. per week	Credits	Marks				
							Maximum			Passing minimum	
							Int.	Ext.	Tot.	Ext.	Tot.
VI	III	30	Core - 9	HISTORY OF TAMIL NADU (1565 A.D. TO 2000 A.D)	6	5	25	75	100	30	40
	III	31	Core - 10	INTERNATIONAL RELATIONS (1945-2000 AD)	6	5	25	75	100	30	40
	III	32	Core - 11	HISTORY OF SCIENCE AND TECHNOLOGY SINCE 1500 A.D.	6	5	25	75	100	30	40
	III	33	Core - 12	WOMEN'S STUDIES	6	5	25	75	100	30	40
	III	34	Major Elective-III	(A) CONSTITUTIONAL HISTORY OF ENGLAND (1603–1970 A.D) (B) HISTORY OF THE EUROPE (1789A.D to 1945A.D) (C) HISTORY OF INDIA'S STRUGGLE FOR FREEDOM. (D) WORKING OF THE INDIAN CONSTITUTION.	6	5	25	75	100	30	40
SUBTOTAL					30	25					

MSU/2016-17/UG-Colleges/Part-III (B.A. History) /Semester-V/Ppr.no.25/Core-7

HISTORY OF TAMILNADU – (UPTO 1565 AD)

Unit – I

- Geographical features of Tamil Nadu – Society – Sangam Age – Political, Social, Economic and Religious conditions – Kalabhras.

Unit – II

- Origin of the Pallavas – Mahendravarman I – Narasimhavarman I – contributions of Pallavas to Art and Architecture – Pallava Administration.

Unit – III

- Imperial Cholas – Paranthaka I – Rajaraja I – Rajendra I – Chola Chalukyas - Kulottungan III – Chola administration – Contribution to Literature – Art and Architecture.

Unit – IV

- First Pandyan Empire – Battle of Thirupurambiam – Second Pandyan Empire – Contribution of Pandyas to Art and Architecture.

Unit – V

- Invasion of Malik Kafur – Rise of Madurai Sultanate – Impact of Muslim Rule – Tamil Nadu under Vijayanagar Empire – Administration, Art and Literature – Battle of Talaikota – Decline of Vijayanagar Empire.

BOOKS OF REFERENCE

1. Social History of Tamils - Pillai K.K
2. History of the Pallavas of Kanchi - Gopalan R.
3. The Tamils 1800 years ago - KanakasabhaiPillai
4. History of Tamil Nadu upto 1336 - Subramanian N.
5. History of the Tamils - SrinivasaIyengar P.T.
6. History of South India - NilakantaSastri K.A.

CONTEMPORARY HISTORY OF INDIA SINCE 1947

Unit- I

The Land and the People – National symbols – Partition and its effects – Patel and integration of Indian States – Re-organisation of States and Union territories.

Unit -II

Prime Ministers of India – Jawaharlal Nehru – Lal Bhagathur Sastri – Indira Gandhi – Rajiv Gandhi – National Front Government – Narasimha Rao – Vaj Payee – Manmohan Singh. Foreign Policy of India – Policy of Non-Alignment – India and UNO – India and SAARC – India and ASEAN – Indo – Pakistan relations.

Unit- III

Education - Educational Policy – Elementary, Secondary, University and Higher Education – Women's Education – Vocational - New Educational Policy – Welfare " Welfare of SC/ST – Education – Technical Education - - Constitutional safeguards – Legislation against Untouchability – Welfare of Minorities.

Unit- IV

Economic Development of India – Five Year Plans – Green Revolution – White Revolution – Blue Revolution – Industrial and Commercial Progress – Land Reforms: New Economic Policy – Liberalization, Privatization and Globalization – Agrarian Struggle since Independence.

Unit -V

Cultural development – Festivals – Promotion of Cultural activities – Tourism Development Corporation of India – Sports – Threats to National integration – Religious fundamentalism – Separatism – Assam Struggle – Punjab terrorism – Telengana Struggle – Factors promoting Indian Integrity.

BOOKS FOR REFERENCE:

1. Bipan Chandra, India after Independence 1947 – 2000, Penguin Books, New Delhi -2000.
2. P.K. Braw, Politics of India since Independence, New Delhi, 1999.
3. S.R. Chakravarthy, Contemporary India, New Delhi,2005
4. M. Edwards, Last years of British Rule, London, 1963.
5. Sumit Sarkar, Modern India, New Delhi, 2004.
6. John Gilbert. G. Contemporary History of India, New Delhi, 2006.

HISTORY OF WORLD CIVILIZATION

Unit – I

- Civilization – Definition – Causes for the growth of Civilization – Palaeolithic Age – Neolithic Age – Age of Metals – Egyptian Civilization – Sources – Salient Features – Mesopotamian Civilization.

Unit – II

- Hebrew Civilization – Ancient Persian Civilization – Phoenician Civilization – Greek Civilization – Age of Pericles – Legacy of Greece – Roman Civilization – Legacy in the field of Law, Philosophy – Art and architecture – Chinese Civilization – Salient Features – Indian Civilization – Salient features.

Unit – III

- Rise and Growth of Major religions – Hinduism – Confucianism – Zoarstrianism – Christianity – Islam.

Unit – IV

- Byzantine Civilization – Code Justinian - Social and Economic Condition – Art – religion and philosophy – Arabian Civilization – Salient factures – American Civilization – Incas – Mayas – Aztects – Legacy,

Unit – V

- The Church and the State – Monastic Orders – The Crusades – Feudalism – Guild System – Rise of Cities and Universities.

BOOKS OF REFERENCE

1. S.E. Swaine - The World Civilization
2. Wall Bank Tayler - History of World Civilizations
3. W. Watson - Early Civilization in China
4. Arnold Toynbee - A Study of History
5. Will Durant - A Study of Civilization
6. H.A.L. Fisher - A History of Europe, Vol: I.

HISTORY OF EUROPE – 1453 A.D. TO 1789 A.D

Unit – I

- The Survey of the condition of Europe at the close of the middle ages – Fall of Constantinople, 1453 A.D. – The Geographical Discoveries – Causes – Effects – Renaissance – causes – Effects on Literature, Art and Science.

Unit – II

- Reformation movement – Martin Luther and Calvin – Zwingli – Anglicanism – Counter Reformation – Revival of Catholicism – Results of the Reformation.

Unit – III

- Emergence of Nation States – Rise of Spain – Ferdinand – Isabella – Charles V – Philip II – Foreign Policy – Armada – Dutch War of Independence.

Unit – IV

- Rise of Bourbon Dynasty – Henry IV – Sully – Richelieu – Cardinal Mazarin – Thirty years war – causes – course – Results – significance.

Unit – V

- The Enlightened Despots – Louis XIV – Peter the Great – Catherine II – Frederick the Great – Maria Theresa – Joseph II.

BOOKS OF REFERENCE

1. History of Europe 1450 to 1815 - Rao B.V
2. Modern Europe up to 1945 - Verma S.P
3. History of Europe 1453 – 1789 - ArunBhattacharjee

MSU/2016-17/UG-Colleges/Part-III (B.A. History)/Semester-V/ppr.no.-28(A)/ Major Elective-2(A)

HISTORY OF THE FAR EAST (1839 – 1970 A.D.)

Unit I

Early European Contacts – First opium War – Taiping rebellion – Second Opium war – First Sino – Japanese War – Open Door Policy – Hundred Days Reforms – Boxer Rebellion – Empress Dowager – Manchus Reforms

Unit II

Rebellion of 1911 – Sun - Yat -Sen , Yuan – Shi – Kai – China and the First World War – 21 Demands – May 4th movement – Manchurian Crisis

Unit III

Chiang Kai Sheik – the Kuomintang and the Communists – China and the Second World War – The Civil War and the Long March – The Communist Revolution of 1949 – Mao Tse – Tung – Foreign Policy of China since 1949

Unit IV

The Opening of Japan – Meiji restoration – Mutzhi Hito - Meiji constitution – Anglo – Japanese Alliance – Russo – Japanese War – Second Sino – Japanese War.

Unit V

Japan and the First World War – Japan and the Second World War – Foreign Policy of Japan Since 1950

BOOKS FOR REFERENCE

1. Harold M. Vinacke : A History of the Far East in Modern Times

2. Clyde and Beers : The Far East

3. Gupta R. S. : A History of Modern China

MSU/2016-17/UG-Colleges/Part-III (B.A. History)/Semester-V/ppr.no.-28(A)/ Major Elective- 2(B)

HUMAN RIGHTS

Unit- I

Definition of Human Rights – Nature – Content – Legitimacy and priority – Theories of Human Rights: Historical and Sociological- Kinds of Human Rights: Natural, Historical, Moral and Legal. Historical perspective of Human Rights – Universal Declaration of Human Rights – International Covenant on Civil and Political rights – International Covenant on Economic, Social and Cultural rights.

Unit -II

Declaration on Human Rights – Declaration on the Rights of Children (1959) – Rights of the Disabled Persons (1975) – Declaration on the Protections against torture and other cruel inhuman treatment on punishment (1975) – Declaration on the elimination of all form of religious intolerance.

Unit- III

Conventions of Human Rights: Conventions on the Prevention and Punishment of the Crime of Genocide – Various conventions on the protection of the rights of women and freedom of association – convention on the abolition of forced labour – conventions relating to the state of Refugees – conventions on the eliminations of all forms of social discrimination.

Unit- IV

Violation of Human Rights and the U.N.O-Amnesty International Human Rights – Helsinki Declaration – International Human Rights in Domestic courts.

Unit -V

Contemporary Challenges: Child Labour – Women Right – Bonded Labour – Rural and Urban Labours – Problems of Refugees – Capital Punishment.

REFERENCE BOOKS:

1. Lekshmi Devi, Women as Human resources, New Delhi, 1998.
2. Fatima Ehtesham Siddiqi and Sarala Ranganathan, Hand Book on Women and Human Rights, New Delhi, 2001.
3. Paras Diwan, Dowry and Protection to married Women, New Delhi, 1995.
4. Prakash Mishra, Human Rights in India, Cyber Technology Publications, New Delhi-2012.
5. Vagoan Naick, Human Rights and Social Justice, Cresent Publication Corporation, New Delhi, 2011.
6. S.K. Khanna, War and Human Rights, Wisdom Press, New Delhi, 2012.

HISTORY OF THE TAMILNADU – 1565 A.D. TO 2000 A.D.

Unit I

Nayaks of Madurai – Viswanatha Nayak – Thirumalai Nayak – Chockanatha Nayak – Rani Mangammal – Nayaks of Tanjore – Ragunatha Nayak – Vijaya Ragava Nayak – Nayaks of Gingi – Krishnappa II – Contribution of the Nayaks to administration, art and architecture

Unit II

Sethupathys of Ramnad – Kizhavan Sethupathy – Maratha Rule in Tanjore – Venkoji – Shaji – Serfoji II – contribution to Art and Architecture.

Unit III

Advent of the British and the French – Carnatic Wars – Mysore wars.

Unit IV

Polygars – Kattabomman – Maruthu Pandyan – South Indian Rebellion – Vellore Mutiny – Impact of British Rule – Ryotwari System

Unit V

Service of Christian Missionaries - Growth of Education and Press – Justice Party – E.V. Ramasamy and Self Respect Movement – V.O.Chidambaram – C. Subramania Bharathy – Vanchi Nathan - Subramania Siva - Rajaji – Administration of Kamaraj, C. N. Annathurai, M.G.Ramachandran, M. Karunanithi and J. Jeyalalitha.

BOOKS FOR REFERENCE

1. History of Tamil Nadu	:	Rajayyan K.
2. History of Tamil Nadu	:	Krishnamurthi V. M.
3. Social History of Tamils	:	Pillai K. K.
4. History of Tamil Nadu	:	Chellam V. T.
5. History of Nayaks of Madurai	:	Sathianathaier R.
6. History of Tamil Nadu - Vol II	:	Subramanian N.

INTERNATIONAL RELATIONS (1945 – 2000 A.D.)

Unit I

UNO – Origin and establishment – structure – functions – specialized agencies achievements – Common Wealth of Nations – Non-alignment.

Unit II

The concept of cold war – various phases of cold war – NATO, SEATO, CENTO, WARSAW PACT – Truman Doctrine – Marshall Plan – Korean War – Vietnam war – Cuban crisis – German Question – effects of Cold War

Unit III

International Law – Disarmament – Initiatives of UNO – NPT – CTBT – Nuclear Power for Peace – SAARC.

Unit IV

Middle East Problem – Palestine Question – Arab – Israel War – Oil Diplomacy – Gulf War – International Atomic Energy Commission (IAEC).

Unit V

European Common Market – European Union (EU) – Foreign Policy of U.S.A., Russia and India – Disintegration of USSR – Afghan war.

BOOKS FOR REFERENCE

1. Gibbons : An Introduction to World Policies
2. Palmer and Perkins : International Relations
3. W. Schuman : International Politics
4. Arnold Joseph Toynbee : Survey of International Affairs
5. M. G. Gupta : International Relations Volume I

HISTORY OF SCIENCE AND TECHNOLOGY SINCE 1500 A.D.

Unit I

Modern era – Impact of Renaissance – Science and Technology, Nicholas Copernicus – Kepler – Galileo – Toricelli.Rence Descartus – Immanuel Kant – Issac Newton – Francis Bacon.

Unit II

Industrial Revolution – Cotton Mining – Metallurgy – Agrarian Revolution – Plough Horticulture – Transportation and Communication – Discoveries of Henry Cavendish – Joseph Priestly - Lavoisier

Unit III

Communicative Skills – Telegraph – Telephone – Television – Progress of Biology – Charles Darwin – Progress in Physics and Mathematics – Michael Faraday – James Clark Maxwell – Progress in Chemistry – John Dalton – Mandeleef – Alfred Nobel –Rontgen – X-Ray Marie Curie – and Radium – Marconi and Radio

Unit IV

Nuclear Space Research – Newtonian Impact – Meteorological Studies – Space shuttles – Rockets – Albert Einstein – Theory of Darwin – Rutherford.

Unit V

Modern Science in India – Pioneers of Indian Science and Technology – Jagadish Chandra Bose – P. Chandra Roy – Srinivasa Ramanujan – C. V. Raman – Harhobind Kharona – Abdul Kalam – Kasthuri Rangan.

BOOKS FOR REFERENCE

1. Vargheese Jeyaraj : History of Science and Technology
2. Venkat Raman : History of Science and Technology
3. Sinjar : A Short History of Science
4. Charles Van Daren : History of Knowledge – The Pivot Event
5. Charles Van Daren : People and Achievements of World History

MSU/2016-17/UG-Colleges/Part-III (B.A. History)/Semester-VI/
Ppr.no.33 /Core-12

WOMEN'S STUDIES

Unit- I

Women's Studies: Definition – Terminologies – Subject matter of Women's Studies – Importance – Purpose of Women's Studies – Feminism – Definition, Feminist – Definition – Concept of Feminism – Theories of Feminism

Unit- II

Causes for the rise of Feminism – Rise and Growth of Feminism in USA – In England – Kinds of Feminism – Liberal, socialist, Marxist, Radical, Existentialist, Psycho analytical and post-Modern – Feminist thinkers

Unit-III

Women's rights – UNO and Women's Rights – Women's Right Conferences – Convention on all forms of Discrimination against women – Social Status of Indian Women, A historical View – Social evils in India

Unit -IV

Rise of Indian Feminism – Social Reforms Movements and Feminism – Women's Organisations – Struggle for Women's suffrage – Protection of Women's right Acts – Government schemes for Women – Central and State level

Unit -V

Pioneering Indian Women – Women in Indian Politics – Women and Environment – Women Self-Help Groups – Women and Media – Contemporary Social Problems faced by Women

BOOKS FOR REFERENCE:

1. Lalitha.N. Rural Women Empowerment and development banking, New Delhi, 1997.
2. Lakshmi Devi, K. Women as her new resources, New Delhi, 1998.
3. Ram Sharma, S. Women and Education, New Delhi, 1995.
4. Usha Devi, R. Divorced Women, New Delhi.
5. Roy,M.K. Violence against Women, New Delhi.

CONSTITUTIONAL HISTORY OF ENGLAND (1603 – 1970 A.D)

Unit – I

- Stuart Period – James I and Parliaments – Struggle between Charles I and the Parliament – The petition of Rights – The eleven years tyranny – The Long Parliament – The Civil War – Causes – Course – Consequences.

Unit – II

- The Common Wealth – The Constitutional experiments of Oliver Cromwell – The significance of his experiments – the end of the Common Wealth – Restoration – Charles II – James II Glorious revolution of 1688 – Causes – Course – Results – The Bill of Rights – The Act of Settlement.

Unit – III

- George I and George II – Whig Oligarchy – Emergence of the office of the Prime Minister – Walpole – Origin and development of Cabinet System – George III – his Personal Government – Causes of failure.

Unit – IV

- The Age of Reforms – The Parliamentary Reforms Act of 1832 – Relation between the two houses of Parliament – The Parliament Act of 1911 – The Representation of Peoples Act of 1918 and 1928 – Reduction of Voting age in 1970 – The Chartist Movement – Characteristics – Significance.

Unit – V

- Constitutional Change due to the two World Wars – War Cabinet – The Statute of West Minister – The abdication of Edward VIII – The Constitutional Significance – Recent Development in the Political and Constitutional Institution - Judiciary - The Local Government - The Common Wealth of Nations.

BOOKS OF REFERENCE

1. L.N. Srinivastava - Constitutional History of England
2. Prof. Gultti - History of England since 1760
3. Warner and Martin - Political Constitutional History of England

HISTORY OF THE EURPOE – 1789 A.D. TO 1945 A.D.

Unit I

Europe on the eve of the French Revolution - French Revolution – Causes' course – results – Napolean Bonaparte – Campaigns – Domestic Reforms – The Congress of Vienna – Concert of Europe – The Revolution of 1830 and 1848 – Mertternich – Napolean III – Domestic Policy and Foreign Policy.

Unit II

Unification of Italy - Unification of Germany – Bismarck's Domestic and foreign Policy – Franco Prussian War 1871 – Policy of Kaiser William II – Eastern Question – The Greek war of Independence – Crimean war – Congress of Berlin and Balkan wars.

Unit III

Europe on the eve of First World War – First World War – Causes – course and results – Paris Peace Conference - Peace of Versailles – League of Nations – Russian Revolution of 1917.

Unit IV

Fascism in Italy – Mussolini – Foreign Policy – Nazism in Germany – Hitler – Foreign Policy – Turkey Under Mustafa Kamal Pasha.

Unit V

Rome – Berlin – Tokyo Axis – Second World War – causes , course and results – Potsdam conference –U.N.O. – Origin - Achievements

BOOKS FOR REFERENCE

1. History of Europe : V. D. Mahajan

2. History of Europe : South Gate

3. History of Europe : Keltleby

4. History of Europe 1789 A.D. – 1945 A.D. : ArunBhattacharje

HISTORY OF INDIA'S STRUGGLE FOR FREEDOM.

Unit – I

- Early Movement – Poligar Rebellion 1799 - South Indian Rebellion 1800 – 1801 - Vellore mutiny of 1806 – The Revolt of 1857 – Causes, Course and results – Tribal and Peasant movements.

Unit – II

- Causes for the rise of Indian Nationalism – Birth of Indian National Congress – Moderates and Extremists – Partition of Bengal and Swadesi movement – Terrorists – Muslim League – Home Rule Movement.

Unit – III

- Gandhian Era – Rowlatt Satyagraha of 1919 – Khilafat movement – Non Co-operation Movement – 1920-1922 – The Swarajya party – Simon Commission – Nehru report and Jinnah's Fourteen points.

Unit – IV

- Civil Disobedience Movement, 1930 – Salt Satyagraha – Gandhi Irwin Pact – Round Table Conferences – Communal Award – Poona Pact – Cripp's mission – Quit India Movement – Muslim League and Demand for Pakistan – Indian National Army.

Unit – V

- Towards transfer of power – Wavell plan – Cabinet Mission Plan, 1946 – Mountbatten Plan – Indian Independence Act of 1947 – Role of Tamilnadu in the Freedom Movement – Role of Press and Cinema in the Freedom Movement – Leaders – V.O. Chidambaram Pillai – Bharathy, Subramania Siva, Vanchinathan – Rajaji – Kamaraj.

BOOKS OF REFERENCE

1. R.C. Agarwall : National movement and Constitutional Development in India
2. D.C. Gupta : Indian National movement
3. M.M. Ahulwalia : Freedom struggle in India 1857 – 1909
4. R.C. Majumdor : History of Freedom movement in India, Vol. 1 to 3
5. K. Rajayyan : Freedom struggle in India
6. G. Venkatesan : History of Freedom struggle in India.

MSU/2016-17/UG-Colleges/Part-III (B.A. History)/ppr.no.34 (D)/
Major Elective-3 (D)

WORKING OF THE INDIAN CONSTITUTION

Unit I

History back ground – Growth of Legislature from 1861 to 1892 – Minto – Marley Reforms of 1909 – Montague Chelms Ford Reforms of 1919

Unit II

The Government of India Act 1935 – The Indian Independence Act, 1947 – Framing of the Indian Constitution – Outstanding features of the constitution – Fundamental Rights – Duties – Directive Principles of State Policy.

Unit III

Federal System – Government of the Union – the President – Prime Minister and the Council of Ministers – Composition of Parliament – Functions of Parliament Legislative Procedure – Ordinary Bills – Money Bills.

Unit IV

Government of the States – Governor - Chief Minister and the Council of Ministers – Special Status of Jammu and Kashmir

Unit V

Organisation of Judiciary – The Supreme court - Appointment of Judges – High Courts – Judicial Review –Constitutional amendments.

BOOKS FOR REFERENCE

1. Durga Das Basu	:	Introduction to the Constitution of India
2. Gran Ville Austin	:	The Indian Constitution corner Stone of a Nation
3. Santhanam	:	Union – State Relation in India
4. A. C. Kapur	:	Constitutional History of India
5. A. V. Pylee	:	Constitutional History of India
6. A. B. Keith	:	Constitutional History of India

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES

B.Com. Corporate Secretaryship

(Choice Based Credit System)

(with effect from the academic year 2016-2017 onwards)

Sem.	Pt. I / II/ III/ IV/V	Sub. No.	Subject Status	Subject Title	Hrs. per week	Cre-dits	Marks				
							Maximum			Passing minimum	
							Int.	Ext.	Tot.	Ext.	Tot.
V	III	25	Core – 10	CORPORATE ACCOUNTING- I	7	5	25	75	100	30	40
		26	Core – 11	COST ACCOUNTING	7	5	25	75	100	30	40
		27	Core - 12	BUSINESS LAW	6	6	25	75	100	30	40
		28	Major Elective -2 (Any One)	1. INCOME TAX LAW& PRACTICE -I 2.*APPLICATION OF TALLY IN ACCOUNTING (Theory- 4Hrs, Practical – 2 Hrs)	6	5	25	75	100	30	40
	IV	29	Common Skill Based (Any One)	1.EFFECTIVE COMMUNICATION 2.PERSONALITY DEVELOPMENT	4	4	25	75	100	30	40
		SUBTOTAL			30	25					

*** Internal 25 marks for Theory and External 75 marks for Practical**

Sem.	Pt. I / II/ III/ IV/V	Sub. No.	Subject Status	Subject Title	Hrs./ week	Cre-dits	Marks				
							Maximum			Passing minimum	
							Int.	Ext.	Tot.	Ext.	Tot.
VI	III	30	Core – 13	CORPORATE ACCOUNTING II	6	5	25	75	100	30	40
		31	Core – 14	MANAGEMENT ACCOUNTING	6	5	25	75	100	30	40
		32	Core – 15	INDUSTRIAL LAW	6	5	25	75	100	30	40
		33	Core - 16	AUDITING	6	5	25	75	100	30	40
	IV	34	Major Elective-3 (Any One)	1. INCOME TAX LAW & PRATICE II	6	5	25	75	100	30	40
				2.INTERNATIONAL MARKETING MANAGEMENT			25	75	100	30	40
				3.VALUES AND ETHICS FOR BUSINESS			25	75	100	30	40
		SUBTOTAL			30	25					

For problem papers **40%** marks for theory and **60%** for problem.

MSU/2016-17/UG-Colleges/Part-III (B.Com Corporate Secretaryship)
Semester-V / Core -10
CORPORATE ACCOUNTING I

Unit I: Issue of shares- Issue at par, Premium and discount- Forfeiture and Re-issue of shares – Pro rata allotment- Redemption of preference shares. Issue of debentures.

Unit II: Final Accounts of Companies as per Schedule II of Companies Act 2013 – excluding managerial remuneration.

Unit III: Amalgamation, Absorption and External Reconstruction - Methods of Purchase consideration. (Simple Problems only)

Unit IV: Profit Prior to Incorporation- Alteration of share capital and Internal Reconstruction.

Unit V: Valuation of Goodwill and Shares- various methods of valuation of goodwill and shares.

Text & Reference books:

1. S.P.Jain & K.L.Narang Advanced Accountancy, Kalyani Publishers, New Delhi.
2. R.L.Gupta and M.Radhaswamy, Advanced Accountancy, Sultan Chand &Sons, New Delhi.
3. M.C.Shukla and T.S.Grewal, Advanced Accountancy, Sultan Chand &Co., New Delhi.
4. Dr.M.A.Arulanandam&K.S.Raman, Advanced Accountancy, Himalaya Publishing House, Mumbai.
5. Pearson, Financial Accounting, Margham Publications.

MSU/2016-17/UG-Colleges/Part-III (B.Com Corporate Secretaryship)
Semester-V / Core - 11
COST ACCOUNTING

Unit I: Introduction – Cost – Costing – Cost Accounting – Objectives and Functions of Cost Accounting – Advantages and Limitations – Methods of Costing – Types of Costing – Classification of Cost – Elements of Cost – Cost Sheet, Practical problems.

Unit II: Process Costing – Costing procedures – Losses and Gains in process – Normal and Abnormal Losses – Abnormal Gain – Operating and Service Costing - Practical problems.

Unit III: Marginal Costing – Meaning – Definition – Uses and Limitations – CVP Analysis – Marginal Costing Equations – Contribution – Break Even Analysis – P/V Ratio – Margin of Safety – Key Factors – Break Even Chart – Application of Marginal Costing –Fixation of selling price – Closure of Department or Discontinuing a Product – Selection of Profitable Product Mix – Profit planning – Decision to Make or Buy – Foreign market order – Introduction of New product – Practical problems.

Unit IV: Budgetary Control – Budget - Definition – objectives – Budgeting – Advantages and Limitations – Classification of Budgets – Fixed and Flexible Budgets – Production and Sales Budgets – Cash Budget – Zero Base Budget .

Unit V: Standard Costing – Definition – Advantages and Limitations – Variances – Material Variances – Labour Variances – (Overhead and other Variances excluded) – Simple Practical problems.

Text & Reference Books:

1. R.S.N.Pillai&V.Bagavathi, Cost Accounting, S.Chand & company LTD, Ramnagar, Newdelhi -110055.
2. S.P.Iyenger , Cost and Management Accounting, Sultan chand &Sons, New Delhi - 110002.
3. S.P.Jain & Narang, Cost Accounting, Kalyani Publishers, Ludhiana- 141008.
4. A. Murthy, S. Guruswamy- Cost Accounting- Vijay Nilcole Cost Accounting, Imprints Private Limited , Chennai.
5. T.S. Reddy and Hariprasad Reddy- Cost Accounting- Margham Publications
6. K. Alex, Cost Accounting, Dorling Kindersley (India) Pvt. Ltd, Noida.

MSU/2016-17/UG-Colleges/Part-III (B.Com Corporate Secretaryship)
Semester-V / Core - 12
BUSINESS LAW

Unit I: Indian Contract Act 1872 – Fundamental essentials of a valid contract – classification of contracts – offer – acceptance – consideration – capacity – free consent – legality of object – contingent contracts

Unit II: Performance of contract – discharge of contract - breach of contract – remedies – quasi contracts

Unit III: Special contracts – indemnity – guarantee

Unit IV: Bailment – Pledge – contract of agency

Unit V: Sale of goods Act – differences between sale and agreement to sell – sale and hire purchase agreement – classification of goods – documents of title to goods – rights and duties of buyers and sellers – rights of unpaid seller

Text & References Books:

1. N.D.Kapoor, Business Law, Sultan Chand Publishers
2. N.D.Kapoor, Elements of Mercantile Law, Sultan Chand Publishers
3. P.C. Tulsian, Business Law, Tata McGraw Hill
4. R.S.N. Pillai, Business Law, Himalaya Publishing House
5. Srinivasan & C.D. Balaji, Industrial Law and Public Relationship, Margham Publications.
6. Tejpal Sheth, Business Law, Pearson's India Education Services Pvt. Ltd.

MSU/2016-17/UG-Colleges/Part-III (B.Com Corporate Secretaryship)
Semester-V / Major Elective – 2 (A)
INCOME TAX LAW &PRACTICE I

Unit I: Basic Concept – Person, Assessee, previous and assessment year, total income, gross total income– concept of income – Agricultural Income- Income exempted from tax – Residential status – problems.

Unit II: Income from Salary – different forms of salary and allowance – perquisites – problems in computation of salary income.

Unit III: Income from House property – Annual value – Standard deduction – Unrealized rent – problems in computation of house property income.

Unit IV: Income from under the Head Business or profession – deduction allowable – Expressly disallowed expenses – computations – problems in computation of business or professional income.

Unit V: Income from capital gain – Types – Exemption – Computation – problems in computation of capital gain.

Text & Reference Books:

1. Dr. H.C. Mehrotra and Dr. P. Mehrotra, Income tax law and accounts
2. V.P. Gaur, D.B. Narang, Pooja Ghai and Rajeev Puri, Income tax law and practice
3. A.Murthy, Income Tax Law and Practice Assessment Tear - 3rd Edition, Vijay Nicole Imprints Private Limited, 2015-16.
4. B.B. Lal, Income Tax, Darling Kindersley Pvt. Ltd, Noida.

MSU/2016-17/UG-Colleges/Part-III (B.Com Corporate Secretaryship)
Semester-V / Major Elective-2(B)
APPLICATION OF TALLY IN ACCOUNTING

Unit I: Fundamentals Of Tally.ERP 9 - Introduction - Salient Features of Tally.ERP 9, Getting functional with Tally ERP 9, Start up, Quitting Tally .ERP 9 - Create a Company, Select a Company, Alter a Company, Shut a Company - Company Features -Configurations

Unit II: Create Accounting Masters in Tally.ERP 9 - Groups - Pre-defined Groups of Accounts, Creating Single Group, Creating Multiple Groups, Displaying Group, Altering Group. Ledgers -Creating Single Ledger, Creating Multiple Ledgers, Displaying Ledger, Altering Ledger.

Unit III: Creating Inventory Masters in Tally.ERP - Stock Groups - Creating Single, Multiple Stock Group, Displaying and Altering Stock Groups. Stock Categories - Creating Single, Multiple Stock Categories, Displaying and Altering Stock Category - Units of Measure , Godowns - Creating Single Multiple Godowns, Displaying and Altering Godowns - Stock Items - Creating Single, Multiple Stock Item Stock Items, Displaying and Altering Stock items

Unit IV : Voucher Entry In Tally.ERP 9 - Voucher Types - Predefined Vouchers in Tally.ERP 9, Creating Voucher Type, Displaying Voucher Type, Altering Voucher Types - Financial Statements - Balance sheet, Profit &Loss A/c, Trial Balance - Accounting Books & Reports - Cash Book, Bank Book, Purchase Register, Sales Register, Journal Register, Debit Note Register, Credit Note Register, Day Book, Statistics

Unit V: VAT – Value Added Tax and TDS- Introduction to VAT -VAT Classification – Creating Tax Ledger Input VAT @ 12.5 % - Creating Tax Ledger Output VAT @ 4%, Cost Centers, Cost Categories, Tax Collected at Source (TCS) TDS (Tax Deducted at Source), Payroll, Attendance Creation, Salary Detail Creation

Text & Reference Books:

1. Using Tally ERP 9, Ramesh.Bangia, Khanna Book Publishing Ltd.2010
2. Mastering Tally ERP 9, Asok K. Nadhani, BPB Publication.
3. Tally ERP 9 Training Guide, Kitabmahal.

*** Internal 25 marks for Theory and External 75 marks for Practical**

Tally Practical

1. Preparation of Trial balance
2. Balance sheet
3. Subsidiary Books
4. Petty cash book
5. Inventory Info
6. Pay Roll Module
7. TDS and TCS Calculations
8. VAT Calculations

Record note	**: 15 marks,**
Programme Writing	**: 15×2=30 marks,**
Debugging	**: 10×2=20 marks,**
Result	**: 5×2=10 marks.**

MSU/2016-17/UG-Colleges/Part-III (B.Com Corporate Secretaryship)
Semester-V / Major Elective- 2 (C)
LOGISTICS MANAGEMENT

Unit I: Logistics - Meaning - Importance - Logistical Competency - Logistical Mission - Service - Total Cost - Logistical Renaissance - Technological Advancement - Regulatory Change - IT Revolution - TQM initiatives.

Unit II: Work of Logistics - Network design - information - Transportation and Inventory - Warehousing - material handling - packaging - integrated Logistics - Inventory flow - Information flow.

Unit III: Operating objectives - Rapid response - minimum variance - minimum inventory - movement consideration - quality - Life cycle support - barriers to internal integration in organizational structure - measurement system - inventory ownership - information technology - knowledge transfer capacity.

Unit IV: Information functionality and inventory functionality - principles of logistics information - Information Architecture - planning - operations - Logistics Information flow - application of new information technologies - electronic data interchange standards - inventory determining order point - lot size - accommodating uncertainty - replenishing ordering and warehousing management.

Unit V: Transportation infrastructure - transport functionality - principles - modal classification transportation formats - suppliers of transportation service - storage functionality principles - concept of strategic storage - developing warehouse resource - warehouse strategy.

Text & Reference Books:

1. Logistical Management (Integrated supply chain Process) - By Donald J Bowersox, David J. Closs - Tata McGraw-Hill edition
2. Supply chain Logistics Management - By Donald J. Bowersox, David J. Closs, and M. Bixby Cooper – Tata Mc Grow Hill Publishers.

MSU/2016-17/UG-Colleges/Part-III (B.Com Corporate Secretaryship)
Semester-VI / Core - 13
CORPORATE ACCOUNTING II

Unit I : Liquidator's final statement of Accounts.

Unit II: Accounts of Banking Companies – Rebate on Bills discounted- Final Accounts.

Unit III: Double Account System- Accounts of Electricity companies - Replacement of Asset - Calculation of Reasonable Return- Disposable of surplus.

Unit IV: Holding companies- Preparation of Consolidated balance sheet

Unit V: Human Resource accounting – Objectives- Methods of Human Resource Value Accounting- Social Responsibility Accounting.

Text & Reference Books:

1. S.P.Jain & K.L.Narang, Advanced Accountancy, Kalyani Publishers, New Delhi.
2. R.L.Gupta and M.Radhaswamy, Advanced Accountancy, Sultan Chand &Sons, New Delhi.
3. M.C.Shukla and T.S.Grewal, Advanced Accountancy, Sultan Chand &Co., New Delhi.
4. Dr.M.A.Arulanandam&K.S.Raman, Advanced Accountancy, Himalaya Publishing House, Mumbai.
5. P.C.Tulsian, Corporate Accounting, Tata McGraw Hill Companies.

MSU/2016-17/UG-Colleges/Part-III (B.Com Corporate Secretaryship)
Semester-VI / Core - 14
MANAGEMENT ACCOUNTING

Unit I: Management accounting – Meaning – Definition – Nature and Scope – Utility and Limitations – Management accounting Principles – Functions of Management accounting – Tools of Management accounting - Management accounting and Financial accounting – Cost accounting and Management accounting.

Unit II: Financial Statements – Meaning and types of Financial Statements - Analysis and Interpretation of Financial Statements – Types of Financial Statement Analysis – Steps involved in Financial Statement Analysis – Techniques of Financial Statement Analysis – Uses and Limitations of Financial Statement Analysis.

Unit III: Ratio Analysis – Meaning of Ratios – Classification of Ratios – Analysis and Interpretation of different Ratios – Profitability Ratios – Coverage Ratios – Turnover Ratios – Financial Ratios – Uses and Limitations of Ratio Analysis.

Unit IV: Fund Flow Analysis – Meaning of Fund Flow Statement – Uses of Fund Flow Statement – Parties interested in Fund Flow Statement – Preparation of Fund Flow Statement – Treatment of provision for Taxation, Proposed Dividend and Depreciation – Statement of Changes in Financial position – Cash Flow Analysis – Meaning of Cash Flow Statement – Preparation of Cash Flow Statement (Simple problems only) – Utility and Limitations of Cash Flow Analysis.

Unit V: Basics of Capital Budgeting – Concepts of Capital Budgeting – Importance of Capital Budgeting – Capital Budgeting Process – Evaluation of Investment proposals – Traditional methods – Pay- back period method – Net Present Value method – Internal Rate of Return method (Simple problems only).

Text & Reference Books:

1. R.S.N.Pillai & Bagavathi, Management Accounting, S.Chand &Company,New Delhi.
2. Dr.S.N.Maheswari, Principles Of Management Accounting, Sultanchand&Sons, New Delhi.
3. S.P.Jain&K.L.Narang, Cost And Management Accounting, Kalyani Publishers, Ludhiana.
4. S.P.Iyenger, Cost And Management Accounting, Sultanchand&Sons, Newdelhi -110002.
5. T.S.Reddy & Y.Hariprasad Reddy, Management Accounting, Margham Publications, Chennai.
6. A. Murthy, S. Guruswamy, Management Accounting-Theory & Practice, Vijay Nicole Imprints Private Limited , Chennai.

MSU/2016-17/UG-Colleges/Part-III (B.Com Corporate Secretaryship)
Semester-VI / Core - 15
INDUSTRIAL LAW

Unit I : The Factories Act, 1948- definitions - approval, licensing and registration of factories - duties of occupier - inspecting staff - certifying surgeons - provisions for health –safety – welfare - working hours and holidays- employment of young persons and women – annual leave with wages- penalties and procedure.

Unit II : Workmen's compensation Act 1923 - Scope and coverage - definitions – rules - personal injury by accident - occupational diseases arising out of and in the course of employment - theory of national extension - amount of compensation- distribution of the compensation- notice and claim.

Unit III: Industrial Disputes Act 1947- object - definitions- conciliation - machinery- adjudication machinery- powers and duties of authorities - procedures - voluntary reference to arbitration – award - strike – and lock outs – lay off – retrenchment – transfer and closing down of their undertaking – penalties.

Unit IV: The Trade Unions Act, 1926 – Consumer Act 1986

Unit V: The Employees' State Insurance Act 1948 – The payment of Gratuity Act 1972.

Text & Reference Books:

1. N.D.Kapoor, Elements of Mercantile Law, Sulatan Chand.
2. P.C.Tyisian, Business and Corporate Law, Tata McGraw hill Publications

MSU/2016-17/UG-Colleges/Part-III (B.Com Corporate Secretaryship)
Semester-VI / Core -16
AUDITING

Unit I: Introduction – meaning – objectives – difference between Accountancy and Auditing – advantages – limitations – Audit programme – Audit working papers – preliminaries before Audit – test checking and routine checking.

Unit II: Internal check – meaning – objectives – difference between internal control and internal Audit – Advantages and Disadvantages of internal check – internal check regarding cash, purchases, purchase returns, sales and sales returns.

Unit III: Vouching – meaning – objects – importance of vouchers – precautions to be taken by the Auditors while examining vouchers – vouching of various transactions.

Unit IV: Verification and valuation of assets and liabilities – classification of assets – verification of different types of assets – verification of liabilities – Valuation of investment, Stock -in -Trade and Book debts.

Unit V: Company Auditor - Appointment – qualification and disqualification – removal of an Auditor – status – rights – duties and liabilities – Auditor's Report – content – kinds of Auditors Report – general considerations for drafting the report.

Text & Reference Books:

1. B. N. Tandon, Auditing, S. Chand & Co., New Delhi
2. Dr. T.R. Sharma, Auditing, Sahitya Publication, Agra.
3. Dinkar Pagare, Principles and practice of Auditing, Sultan Chand & Sons, New Delhi.
4. Saxana, Reddy and Appannaiah, Text Book of Auditing, Himalaya Publishing House.
5. S.K. Basu, Auditing Principles and Techniques, Pearson India Education Services Pvt. Ltd, Noida.

MSU/2016-17/UG-Colleges/Part-III (B.Com Corporate Secretaryship)
Semester-VI / Major Elective- 3(A)
INCOME TAX LAW AND PRACTICE II

Unit I: Income under the head- other sources – Computation – Problems.

Unit II: Set off and carry forward of losses. Deduction from Gross total Income- Problems

Unit III: Procedures for Assessment – Returns – Types of returns – Types of Assessment – Tax Deducted at source.

Unit IV: Assessment of Individual – Problems including computation of tax.

Unit V: Assessment of firm – Problems including Section 40(b) application.

Text & Reference Books:

1. Dr. H.C. Mehrotra and Dr. P. Mehrotra, Income tax law and accounts
2. V.P. Gaur, D.B. Narang, Pooja Ghai and Rajeev Puri, Income tax law and practice
3. A.Murthy, Income Tax Law and Practice Assessment Year 2015-16, - 3rd Edition, Vijay Nicole Imprints Private Limited.

MSU/2016-17/UG-Colleges/Part-III (B.Com Corporate Secretaryship)
Semester-VI / Major Elective - 3 (B)
INTERNATIONAL MARKETING MANAGEMENT

Unit I: International marketing – meaning - international marketing vs. domestic marketing; objectives - international marketing decision - an overview of business environment - environment of international business

Unit II: International marketing channels; channels between nations; marketing; environment and internal distribution – business from world Bank aide projects – area of business - project cycle - awarding of contracts - tips of company

Unit III: Production strategies - business environment and production strategies - product life cycle - PLC and international marketing - product communication strategies

Unit IV: Promotion strategy - marketing environment and promotion strategies - factors influencing promotion strategies - promotion mix - export promotion organization - trade fairs and exhibitions – promotion organization – trade fairs and exhibitions - personal selling – problem in international promotion

Unit V: Pricing – pricing objective – factors affecting pricing - pricing methods - steps in pricing - transfer pricing-dumping

Text & Reference Books:

1. International marketing Management – U C Mathur
2. International marketing Management – Subhash C Jain
3. International marketing Management – Francis Cherunilam

MSU/2016-17/UG-Colleges/Part-III (B.Com Corporate Secretaryship)
Semester-VI / Major Elective – 3 (C)
VALUES AND ETHICS FOR BUSINESS

Unit I: Introduction to Values – as ideals that guide one's behaviour reflecting what one perceives as good in a decision or action – Values guide behaviour and could be terminal goals- Values in the society, politics, inter-personal relations, economics and business- Morals -Value and Vision statements in organizations - Focusing on Innovation, Reliability, Customer satisfaction, Quality assurance, Profitability, Utility, Productivity etc. and the continuous improvement in their standards.

Unit II: Ethics as the art of choosing between right and wrong – Interpreting the consequences and choosing the right- Ideas of freedom of choice, equality, justice, fairness in dealing with customers, society, environment .

Unit III: Application of Values and ethics in business – Examples from Business- Government interactions: Use and Misuse of government incentives, subsidies and licenses- Tax evasions- How to be ethical and still do good business. Human Resources employment in Business: in hiring, compensating, work assignments- discrimination; Marketing: Issues in Pricing policies and strategies, cartels between sellers, misleading advertisements; Policies relating to exchange and return of goods sold. How to give value for money and still do good business?

Unit IV: Examples in Production: Poor quality, risky products, defective/un tested products, unauthorized copies/imitations, Quality Policy: Zero defect and quality of ingredients, components, ISI, AG Marks, Hall Mark, Patents, Copy rights, post-sales services. Guarantee for performance- Legal and self imposed norms for doing good business and earning goodwill.

Unit V: Handling customer complaints, Problems- examples from consumer goods and services oriented industries(Tourism, Travel, Telephones, Edible goods, Health etc.) -Consumer Protection Act 1986 and Some of the best Industry Practices- Code of Conduct for professions (Professional Ethics).

Text & Reference Books:

1. Colin M. Fisher and Alan Lovell, Business Ethics and Values, F.T. Prentice Hall, 2006.
2. G.P. Martin, Glenn Martin, Human Values and Ethics in the work place, 2010.

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES

B.Com with Computer Applications

(Choice Based Credit System)

(with effect from the academic year 2016-2017 onwards)

(45th SCAA meeting held on 09.02.2017)

Sem.	Pt. I / II/ III/ IV/V	Subject Status	Subject Title	Hrs. per week	Credits	Marks				
						Maximum			Passing minimum	
						Int.	Ext.	Tot.	Ext.	Tot.
V	III	Core - 10	CORPORATE ACCOUNTING I	7	5	25	75	100	30	40
	III	Core - 11	COST ACCOUNTING	7	5	25	75	100	30	40
	III	Core - 12	BUSINESS LAW	6	6	25	75	100	30	40
	III	Major Elective – II (Any One)	1.*APPLICATION OF TALLY IN ACCOUNTING 2.INCOME TAX LAW &PRACTICE I 3.LOGISTICS MANAGEMENT	6	5	50@	50@	100	20	40
	IV	Common Skill Based (Any One)	1.EFFECTIVE COMMUNICATION / 2.PERSONALITY DEVELOPMENT	4	4	25	75	100	30	40
	SUBTOTAL			30	25					

*** Internal 25 marks for Theory and External 75 marks for Practical**

@: Award of marks for practical component is as per the 45th SCAA resolution [no.: 45.7.2.1(45.T4) –refer www.msuniv.ac.in]

Sem	Pt. I / II/ III/ IV/V	Subject Status	Subject Title	Hrs per week	Credits	Marks				
						Maximum			Passing minimum	
						Int.	Ext.	Tot.	Ext.	Tot.
VI	III	Core - 13	CORPORATE ACCOUNTING II	6	5	25	75	100	30	40
	III	Core - 14	MANAGEMENT ACCOUNTING	6	5	25	75	100	30	40
	III	Core - 15	INDUSTRIAL LAW	6	5	25	75	100	30	40
	III	Core - 16	AUDITING	6	5	25	75	100	30	40
	III	Major Elective – III (Any One)	1.MULTIMEDIA WITH APPLICATION 2.RETAIL MANAGEMENT 3.INCOME TAX LAW & PRATICE II	6	5	25	75	100	30	40
	SUBTOTAL			30	25					

MSU/2016-17/UG-Colleges/Part-III (B.Com with Computer Applications)

Semester-V / Ppr.no.25/Core-10

CORPORATE ACCOUNTING - I

Unit I: Issue of shares- Issue at par, Premium and discount- Forfeiture and Re-issue of shares – Pro rata allotment- Redemption of preference shares. Issue of debentures.

Unit II: Final Accounts of Companies as per Schedule II of Companies Act 2013 – excluding managerial remuneration.

Unit III: Amalgamation, Absorption and External Reconstruction - Methods of Purchase consideration. (Simple Problems only)

Unit IV: Profit Prior to Incorporation- Alteration of share capital and Internal Reconstruction.

Unit V: Valuation of Goodwill and Shares- various methods of valuation of goodwill and shares.

Text & Reference books:

1. S.P.Jain & K.L.Narang Advanced Accountancy, Kalyani Publishers, New Delhi.
2. R.L.Gupta and M.Radhaswamy, Advanced Accountancy, Sultan Chand &Sons, New Delhi.
3. M.C.Shukla and T.S.Grewal, Advanced Accountancy, Sultan Chand &Co., New Delhi.
4. Dr.M.A.Arulanandam&K.S.Raman, Advanced Accountancy, Himalaya Publishing House, Mumbai.
5. Pearson, Financial Accounting, Margham Publications.

MSU/2016-17/UG-Colleges/Part-III (B.Com with Computer Applications)
Semester-V /Ppr.no.26 /Core-11

COST ACCOUNTING

Unit I: Introduction – Cost – Costing – Cost Accounting – Objectives and Functions of Cost Accounting – Advantages and Limitations – Methods of Costing – Types of Costing – Classification of Cost – Elements of Cost – Cost Sheet, Practical problems.

Unit II: Process Costing – Costing procedures – Losses and Gains in process – Normal and Abnormal Losses – Abnormal Gain – Operating and Service Costing - Practical problems.

Unit III: Marginal Costing – Meaning – Definition – Uses and Limitations – CVP Analysis – Marginal Costing Equations – Contribution – Break Even Analysis – P/V Ratio – Margin of Safety – Key Factors – Break Even Chart – Application of Marginal Costing –Fixation of selling price – Closure of Department or Discontinuing a Product – Selection of Profitable Product Mix – Profit planning – Decision to Make or Buy – Foreign market order – Introduction of New product – Practical problems.

Unit IV: Budgetary Control – Budget - Definition – objectives – Budgeting – Advantages and Limitations – Classification of Budgets – Fixed and Flexible Budgets – Production and Sales Budgets – Cash Budget – Zero Base Budget .

Unit V: Standard Costing – Definition – Advantages and Limitations – Variances – Material Variances – Labour Variances – (Overhead and other Variances excluded) – Simple Practical problems.

Text & Reference Books:

1. R.S.N.Pillai&V.Bagavathi, Cost Accounting, S.Chand & company LTD, Ramnagar, NewDelhi -110055.
2. S.P.Iyenger , Cost and Management Accounting, Sultan chand &Sons, New Delhi - 110002.
3. S.P.Jain & Narang, Cost Accounting, Kalyani Publishers, Ludhiana- 141008.
4. A. Murthy, S. Guruswamy- Cost Accounting- Vijay Nilcole Cost Accounting, Imprints Private Limited , Chennai.
5. T.S. Reddy and Hariprasad Reddy- Cost Accounting- Margham Publications
6. K. Alex, Cost Accounting, Dorling Kindersley (India) Pvt. Ltd, Noida.

MSU/2016-17/UG-Colleges/Part-III (B.Com with Computer Applications)
Semester-V/ Ppr.no.27/Core-12

BUSINESS LAW

Unit I: Indian Contract Act 1872 – Fundamental essentials of a valid contract – classification of contracts – offer – acceptance – consideration – capacity – free consent – legality of object – contingent contracts

Unit II: Performance of contract – discharge of contract - breach of contract – remedies – quasi contracts

Unit III: Special contracts – indemnity – guarantee

Unit IV: Bailment – Pledge – contract of agency

Unit V: Sale of goods Act – differences between sale and agreement to sell – sale and hire purchase agreement – classification of goods – documents of title to goods – rights and duties of buyers and sellers – rights of unpaid seller

Text & References Books:

1. N.D.Kapoor, Business Law, Sultan Chand Publishers
2. N.D.Kapoor, Elements of Mercantile Law, Sultan Chand Publishers
3. P.C. Tulsian, Business Law, Tata McGraw Hill
4. R.S.N. Pillai, Business Law, Himalaya Publishing House
5. Srinivasan & C.D. Balaji, Industrial Law and Public Relationship, Margham Publications.
6. Tejpal Sheth, Business Law, Pearson's India Education Services Pvt. Ltd.

MSU/2016-17/UG-Colleges/Part-III (B.Com with Computer Applications)
Semester-V / Ppr.no.28(A)/Major Elective – 2 (A)

APPLICATION OF TALLY IN ACCOUNTING

Unit I : Fundamentals of TALLY.ERP 9 -Introduction - Salient Features of Tally.ERP 9, Getting functional with Tally ERP 9, Start up, Quitting Tally .ERP 9 Create a Company, Select a Company, Alter a Company, Shut a Company - Company Features - -Configurations

Unit II: Create Accounting Masters In TALLY.ERP 9 - Groups - Pre-defined Groups of Accounts, Creating Single Group, Creating Multiple Groups, Displaying Group, Altering Group. Ledgers - Creating Single Ledger, Creating Multiple Ledgers, Displaying Ledger, Altering Ledger.

Unit III: Creating Inventory Masters In TALLY.ERP- Stock Groups - Creating Single, Multiple Stock Group, Displaying and Altering Stock Groups. Stock Categories - Creating Single, Multiple Stock Categories, Displaying and Altering Stock Category -Units of Measure , Godowns - Creating Single Multiple Godowns, Displaying and Altering Godowns Stock Items - Creating Single, Multiple Stock Item Stock Items, Displaying and Altering Stock items

Unit IV: Voucher Entry In TALLY.ERP 9 Voucher Types - Predefined Vouchers in Tally.ERP 9, Creating Voucher Type, Displaying Voucher Type, Altering Voucher Types Financial Statements - Balance sheet, Profit &Loss A/c, Trial Balance -Accounting Books & Reports - Cash Book, Bank Book, Purchase Register, Sales Register, Journal Register, Debit Note Register, Credit Note Register, Day Book, Statistics

Unit V: VAT – Value Added Tax and TDS- Introduction to VAT -VAT Classification – Creating Tax Ledger Input VAT @ 12.5 % - Creating Tax Ledger Output VAT @ 4%, Cost Centers, Cost Categories, Tax Collected at Source (TCS) TDS (Tax Deducted at Source), Payroll, Attendance Creation, Salary Detail Creation

Text & Reference Books:

1. Ramesh.Bangia, Using Tally ERP 9, Khanna Book Publishing Ltd.2010
2. Asok K. Nadhani, Mastering Tally ERP 9, BPB Publication.
3. Tally ERP 9 Training Guide, Kitabmahal.

TALLY PRACTICAL

1. Preparation of Trial balance
2. Balance sheet
3. Subsidiary Books
4. Petty cash book
5. Inventory Info
6. Pay Roll Module
7. TDS and TCS Calculations
8. VAT Calculations

Record note	**: 15 marks,**
Programme Writing	**: 15×2=30 marks,**
Debugging	**: 10×2=20 marks,**
Result	**: 5×2=10**

MSU/2016-17/UG-Colleges/Part-III (B.Com with Computer Applications)
Semester-V/ Ppr.no.28(B) / Major Elective – 2 (B)

INCOME TAX LAW &PRACTICE I

Unit I: Basic Concept – Person, Assessee, previous and assessment year, total income, gross total income– concept of income – Agricultural Income- Income exempted from tax – Residential status – problems.

Unit II: Income from Salary – different forms of salary and allowance – perquisites – problems in computation of salary income.

Unit III: Income from House property – Annual value – Standard deduction – Unrealized rent – problems in computation of house property income.

Unit IV: Income from under the Head Business or profession – deduction allowable – Expressly disallowed expenses – computations – problems in computation of business or professional income.

Unit V: Income from capital gain – Types – Exemption – Computation – problems in computation of capital gain.

Text & Reference Books:

1. Dr. H.C. Mehrotra and Dr. P. Mehrotra, Income tax law and accounts
2. V.P. Gaur, D.B. Narang, Pooja Ghai and Rajeev Puri, Income tax law and practice
3. A.Murthy, Income Tax Law and Practice Assessment Tear - 3rd Edition, Vijay Nicole Imprints Private Limited, 2015-16.
4. B.B. Lal, Income Tax, Darling Kindersley Pvt. Ltd, Noida.

MSU/2016-17/UG-Colleges/Part-III (B.Com with Computer Applications)
Semester-V / Ppr.no.28(C)/ Major Elective – 2 (C)

LOGISTICS MANAGEMENT

Unit I: Logistics - Meaning - Importance - Logistical Competency - Logistical Mission - Service - Total Cost - Logistical Renaissance - Technological Advancement - Regulatory Change - IT Revolution - TQM initiatives.

Unit II: Work of Logistics - Network design - information - Transportation and Inventory - Warehousing - material handling - packaging - integrated Logistics - Inventory flow - Information flow.

Unit III: Operating objectives - Rapid response - minimum variance - minimum inventory - movement consideration - quality - Life cycle support - barriers to internal integration in organizational structure - measurement system - inventory ownership - information technology - knowledge transfer capacity.

Unit IV: Information functionality and inventory functionality - principles of logistics information - Information Architecture - planning - operations - Logistics Information flow - application of new information technologies - electronic data interchange standards - inventory determining order point - lot size - accommodating uncertainty - replenishing ordering and warehousing management.

Unit V: Transportation infrastructure - transport functionality - principles - modal classification transportation formats - suppliers of transportation service - storage functionality principles - concept of strategic storage - developing warehouse resource - warehouse strategy.

Text & Reference Book:

1. Logistical Management (Integrated supply chain Process) - By Donald J Bowersox, David J. Closs - Tata McGraw-Hill edition
2. Supply chain Logistics Management - By Donald J. Bowersox, David J. Closs, and M. Bixby Cooper – Tata Mc Grow Hill Publishers.

MSU/2016-17/UG-Colleges/Part-III (B.Com with Computer Applications)
Semester-VI/Ppr.no.30/ Core-13

CORPORATE ACCOUNTING II

Unit I : Liquidator's final statement of Accounts.

Unit II: Accounts of Banking Companies – Rebate on Bills discounted- Final Accounts.

Unit III: Double Account System- Accounts of Electricity companies - Replacement of Asset - Calculation of Reasonable Return- Disposable of surplus.

Unit IV: Holding companies- Preparation of Consolidated balance sheet

Unit V: Human Resource accounting – Objectives- Methods of Human Resource Value Accounting- Social Responsibility Accounting.

Text & Reference Books:

1. S.P.Jain & K.L.Narang, Advanced Accountancy, Kalyani Publishers, New Delhi.
2. R.L.Gupta and M.Radhaswamy, Advanced Accountancy, Sultan Chand &Sons, New Delhi.
3. M.C.Shukla and T.S.Grewal, Advanced Accountancy, Sultan Chand &Co., New Delhi.
4. Dr.M.A.Arulanandam&K.S.Raman, Advanced Accountancy, Himalaya Publishing House, Mumbai.
5. P.C.Tulsian, Corporate Accounting, Tata McGraw Hill Companies.

MSU/2016-17/UG-Colleges/Part-III (B.Com with Computer Applications)
Semester-VI /Ppr.no.31/ Core-14

MANAGEMENT ACCOUNTING

Unit I: Management accounting – Meaning – Definition – Nature and Scope – Utility and Limitations – Management accounting Principles – Functions of Management accounting – Tools of Management accounting - Management accounting and financial accounting – Cost accounting and Management accounting.

Unit II: Financial Statements – Meaning and types of Financial Statements - Analysis and Interpretation of Financial Statements – Types of Financial Statement Analysis – Steps involved in Financial Statement Analysis – Techniques of Financial Statement Analysis – Uses and Limitations of Financial Statement Analysis.

Unit III: Ratio Analysis – Meaning of Ratios – Classification of Ratios – Analysis and Interpretation of different Ratios – Profitability Ratios – Coverage Ratios – Turnover Ratios – Financial Ratios – Uses and Limitations of Ratio Analysis.

Unit IV: Fund Flow Analysis – Meaning of Fund Flow Statement – Uses of Fund Flow Statement – Parties interested in Fund Flow Statement – Preparation of Fund Flow Statement – Treatment of provision for Taxation, Proposed Dividend and Depreciation – Statement of Changes in Financial position – Cash Flow Analysis – Meaning of Cash Flow Statement – Preparation of Cash Flow Statement (Simple problems only) – Utility and Limitations of Cash Flow Analysis.

Unit V: Basics of Capital Budgeting – Concepts of Capital Budgeting – Importance of Capital Budgeting – Capital Budgeting Process – Evaluation of Investment proposals – Traditional methods – Pay- back period method – Net Present Value method – Internal Rate of Return method (Simple problems only).

Text & Reference Books:

1. R.S.N.Pillai & Bagavathi, Management Accounting, S.Chand &Company New Delhi-110055.
2. Dr.S.N.Maheswari, Principles Of Management Accounting, Sultanchand&Sons, New Delhi 110002.
3. S.P.Jain&K.L.Narang, Cost And Management Accounting, Kalyani Publishers, Ludhiana 141008.
4. S.P.Iyenger, Cost And Management Accounting, Sultanchand&Sons, Newdelhi -110002.
5. T.S.Reddy & Y.Hariprasad Reddy, Management Accounting, Margham Publications, Chennai -600017.
6. A.Murthy, S. Guruswamy, Management Accounting-Theory & Practice, Vijay Nicole Imprints Private Limited, Chennai.

MSU/2016-17/UG-Colleges/Part-III (B.Com with Computer Applications)
Semester-VI / Ppr.no.32/Core-15

INDUSTRIAL LAW

Unit I : The Factories Act, 1948- definitions - approval, licensing and registration of factories - duties of occupier - inspecting staff - certifying surgeons - provisions for health –safety – welfare - working hours and holidays- employment of young persons and women – annual leave with wages- penalties and procedure.

Unit II: Workmen's compensation Act 1923 - Scope and coverage - definitions – rules - personal injury by accident - occupational diseases arising out of and in the course of employment - theory of national extension - amount of compensation- distribution of the compensation- notice and claim.

Unit III: Industrial Disputes Act 1947- object - definitions- conciliation - machinery- adjudication machinery- powers and duties of authorities - procedures - voluntary reference to arbitration – award - strike – and lock outs – lay off – retrenchment – transfer and closing down of their undertaking – penalties.

Unit IV: The Trade Unions Act, 1926 – Consumer Act 1986

Unit V: The Employees' State Insurance Act 1948 – The payment of Gratuity Act 1972.

Text & Reference Books:

1. N.D.Kapoor, Elements of Mercantile Law, Sulatan Chand.
2. P.C.Tyisian, Business and Corporate Law, Tata McGraw hill Publications

MSU/2016-17/UG-Colleges/Part-III (B.Com with Computer Applications)
Semester-VI / Ppr.no.33 /Core-16
AUDITING

Unit I: Introduction – meaning – objectives – difference between Accountancy and Auditing – advantages – limitations – Audit programme – Audit working papers – preliminaries before Audit – test checking and routine checking.

Unit II: Internal check – meaning – objectives – difference between internal control and internal Audit – Advantages and Disadvantages of internal check – internal check regarding cash, purchases, purchase returns, sales and sales returns.

Unit III: Vouching – meaning – objects – importance of vouchers – precautions to be taken by the Auditors while examining vouchers – vouching of various transactions.

Unit IV: Verification and valuation of assets and liabilities – classification of assets – verification of different types of assets – verification of liabilities – Valuation of investment, Stock -in -Trade and Book debts.

Unit V: Company Auditor - Appointment – qualification and disqualification – removal of an Auditor – status – rights – duties and liabilities – Auditor's Report – content – kinds of Auditors Report – general considerations for drafting the report.

Text & Reference Books:

1. B. N. Tandon, Auditing, S. Chand & Co., New Delhi
2. Dr. T.R. Sharma, Auditing, Sahitya Publication, Agra.
3. Dinkar Pagare, Principles and practice of Auditing, Sultan Chand & Sons, New Delhi.
4. Saxana, Reddy and Appannaiah, Text Book of Auditing, Himalaya Publishing House.
5. S.K. Basu, Auditing Principles and Techniques, Pearson India Education Services Pvt. Ltd, Noida.

MSU/2016-17/UG-Colleges/Part-III (B.Com with Computer Applications)
Semester-VI / Ppr.no.34 (A) / Major Elective – 3(A)

MULTIMEDIA WITH APPLICATION

Unit I: Introduction: Multimedia : Introduction to Multimedia : Classification of Multimedia, Multimedia Software, Components of Multimedia – Audio : Analog to Digital conversion, sound card fundamentals, Audio play backing and recording Video, Text : Hyper text, Hyper media and Hyper Graphics, Graphics and Animation : Classification of Animation. Authoring Process and Tools.

Unit II: Multimedia Usages: Uses of Multimedia- Introduction to making multimedia – The stage of Project- hardware & software requirements to make good multimedia- skills and Training opportunities in Multimedia -Motivation for Multimedia usage

Unit III: Muitimedia I/O Technologies: Multimedia input and output technologies -Key Technology Issues- Pen Input- Video and Image Display Systems- Print Output Technologies- Image Scanners- Digital Voice and Audio- Video Images and Animation- Full Motion Video.

Unit IV: Multimedia System Design: Multimedia system design - design- Types of Multimedia systems - Virtual Reality Design - Components of Multimedia system - Distributed Application Design Issues - Distributed Multimedia Systems

Unit V: Multimedia Application: Multimedia Applications- Inter- personnel Communication- Interactive Applications over the Internet- Entertainment Applications and Multimedia Conferencing.

Text & Reference Books:

1. Tay Vaughan, "Multimedia making It work", TMH 8th Edition
2. S. Gokul : Multimedia Magic, BPB Publication.
3. Bufford : Multimedia Systems, Addison Wesley
4. Jeffcoate : Multimedia in Practice, Prentice-Hall.

MSU/2016-17/UG-Colleges/Part-III (B.Com with Computer Applications)
Semester-VI / Ppr.no.34 (B) / Major Elective – 3(B)

RETAIL MANAGEMENT

Unit I: Introduction to retailing - nature and importance of retailing - contemporary retailing in India and marketing challenges facing retailers - Strategic planning in retailing - owning or managing Business - Wheels of retailing - retailing life cycle.

Unit II: Types of retailing institutions - retailing institutions by ownership - retailing institutions by store based and non - store based - vertical marketing system - Traditional retailing.

Unit III: Strategic planning in retailing - understanding retailing environment - identifying and understanding customers, information gathering, designing retail information system processing of information system and research.

Unit IV: Location and organizational decisions - Trading area analysis site selection - organizational pattern in retailing - operational management - financial decisions - use of technology.

Unit V: Merchandise Management - Buying and handling - product assortment decision - Inventory Management - Merchandise pricing - Merchandise Labeling and packing - Retail promotion - Retail promotion strategy - Building retail store image - Role of atmosphere - retail promotion mix strategy - retail store sales promotion schemes.

Text & Reference Book:

1. Michael Levy and Barton A Weot, Retail management, McGraw-Hill Irwin.
2. Berman, Barry and Jeol R Evans, Retail management A Strategic Approach, Prentice Hall, New Jersey.
3. Cox, Roger and Paul Brittain, Retail management, Prentice Hall, Harlow.
4. Michael Levy, Barton A Weitz, Ajay Pandit, Retailing Management, McGraw Hill Company.

MSU/2016-17/UG-Colleges/Part-III (B.Com with Computer Applications)
Semester-VI / Ppr.no.34 (C) / Major Elective – 3(C)

INCOME TAX LAW & PRACTICE II

Unit I: Income under the head- other sources – Computation – Problems.

Unit II: Set off and carry forward of losses. Deduction from Gross total Income- Problems

Unit III: Procedures for Assessment – Returns – Types of returns – Types of Assessment – Tax Deducted at source.

Unit IV: Assessment of Individual – Problems including computation of tax.

Unit V: Assessment of firm – Problems including Section 40(b) application.

Text & Reference Books:

1. Dr. H.C. Mehrotra and Dr. P. Mehrotra, Income tax law and accounts
2. V.P. Gaur, D.B. Narang, Pooja Ghai and Rajeev Puri, Income tax law and practice.
3. A.Murthy, Income Tax Law and Practice Assessment Year 2015-16, - 3rd Edition, Vijay Nicole Imprints Private Limited.

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES

B.Com.

(Choice Based Credit System)

(with effect from the academic year 2016-2017 onwards)

(44th SCAA meeting held on 30.05.2016)

Sem.	Pt. I/II/ III/ IV/V	Sub. No.	Subject status	Subject Title	Hrs./ week	Cre-dits	Marks				
							Maximum			Passing minimum	
							Int.	Ext.	Tot.	Ext.	Tot.
V	I	25	Core - 10	CORPORATE ACCOUNTING -I	7	5	25	75	100	30	40
	II	26	Core - 11	COST ACCOUNTING	7	5	25	75	100	30	40
	III	27	Core - 12	BUSINESS LAW	6	6	25	75	100	30	40
		28	Major Elective -2 (Select any One)	(A) INCOME TAX , LAW& PRACTICE –I	6	5	25	75	100	30	40
				(B) *APPLICATIONS OF TALLY IN ACCOUNTING (Theo.4 hrs,Pra.2hrs)							
				(C) LOGISTICS MANAGEMENT							
	IV	29	Skilled Based (Common)	Personality Development/ Effective Communication/ Youth Leadership	4	4	25	75	100	30	40
Subtotal					30	25					

*** Internal 25 marks for Theory and External 75 marks for Practical**

Sem.	Pt. I/II/ III/ IV/V	Sub. No.	Subject status	Subject Title	Hrs./ week	Cre-dits	Marks				
							Maximum			Passing minimum	
							Int.	Ext.	Tot.	Ext.	Tot.
VI	III	30	Core - 13	CORPORATE ACCOUNTING -II	6	5	25	75	100	30	40
	III	31	Core - 14	MANAGEMENT ACCOUNTING	6	5	25	75	100	30	40
	III	32	Core - 15	INDUSTRIAL LAW	6	5	25	75	100	30	40
	III	33	Core - 16	AUDITING	6	5	25	75	100	30	40
	IV	34	Major Elective-3 (Select any one)	(A) INCOME TAX, LAW AND PRACTICE –II (B) RETAIL MANAGEMENT (C)VALUES AND ETHICS FOR BUSINESS	6	5	25	75	100	30	40
Subtotal					30	25					

MSU/2016-17/UG-Colleges/Part-III (B.Com) Semester-V/ppr.no.25/Core -10

CORPORATE ACCOUNTING I

Unit I: Issue of shares- Issue at par, Premium and discount- Forfeiture and Re-issue of shares – Pro rata allotment- Redemption of preference shares. Issue of debentures.

Unit II: Final Accounts of Companies as per Schedule II of Companies Act 2013 – excluding managerial remuneration.

Unit III: Amalgamation, Absorption and External Reconstruction - Methods of Purchase consideration. (Simple Problems only)

Unit IV: Profit Prior to Incorporation- Alteration of share capital and Internal Reconstruction.

Unit V: Valuation of Goodwill and Shares- various methods of valuation of goodwill and shares.

Text & Reference books:

1. S.P.Jain & K.L.Narang Advanced Accountancy, Kalyani Publishers, New Delhi.
2. R.L.Gupta and M.Radhaswamy, Advanced Accountancy, Sultan Chand &Sons, New Delhi.
3. M.C.Shukla and T.S.Grewal, Advanced Accountancy, Sultan Chand &Co., New Delhi.
4. Dr.M.A.Arulanandam&K.S.Raman, Advanced Accountancy, Himalaya Publishing House, Mumbai.
5. Pearson, Financial Accounting, Margham Publications.

MSU/2016-17/UG-Colleges/Part-III (B.Com) Semester-V/ppr.no.26/Core -11

COST ACCOUNTING

Unit I: Introduction – Cost – Costing – Cost Accounting – Objectives and Functions of Cost Accounting – Advantages and Limitations – Methods of Costing – Types of Costing – Classification of Cost – Elements of Cost – Cost Sheet, Practical problems.

Unit II: Process Costing – Costing procedures – Losses and Gains in process – Normal and Abnormal Losses – Abnormal Gain – Operating and Service Costing - Practical problems.

Unit III: Marginal Costing – Meaning – Definition – Uses and Limitations – CVP Analysis – Marginal Costing Equations – Contribution – Break Even Analysis – P/V Ratio – Margin of Safety – Key Factors – Break Even Chart – Application of Marginal Costing –Fixation of selling price – Closure of Department or Discontinuing a Product – Selection of Profitable Product Mix – Profit planning – Decision to Make or Buy – Foreign market order – Introduction of New product – Practical problems.

Unit IV: Budgetary Control – Budget - Definition – objectives – Budgeting – Advantages and Limitations – Classification of Budgets – Fixed and Flexible Budgets – Production and Sales Budgets – Cash Budget – Zero Base Budget .

Unit V: Standard Costing – Definition – Advantages and Limitations – Variances – Material Variances – Labour Variances – (Overhead and other Variances excluded) – Simple Practical problems.

Text & Reference Books:

1. R.S.N.Pillai&V.Bagavathi, Cost Accounting, S.Chand & company LTD, Ramnagar, Newdelhi -110055.
2. S.P.Iyenger , Cost and Management Accounting, Sultan chand &Sons, New Delhi - 110002.
3. S.P.Jain & Narang, Cost Accounting, Kalyani Publishers, Ludhiana- 141008.
4. A. Murthy, S. Guruswamy- Cost Accounting- Vijay Nilcole Cost Accounting, Imprints Private Limited , Chennai.
5. T.S. Reddy and Hariprasad Reddy- Cost Accounting- Margham Publications
6. K. Alex, Cost Accounting, Dorling Kindersley (India) Pvt. Ltd, Noida.

MSU/2016-17/UG-Colleges/Part-III (B.Com) Semester-V/ppr.no.27/Core -12

BUSINESS LAW

Unit I: Indian Contract Act 1872 – Fundamental essentials of a valid contract – classification of contracts – offer – acceptance – consideration – capacity – free consent – legality of object – contingent contracts

Unit II: Performance of contract – discharge of contract - breach of contract – remedies – quasi contracts

Unit III: Special contracts – indemnity – guarantee

Unit IV: Bailment – Pledge – contract of agency

Unit V: Sale of goods Act – differences between sale and agreement to sell – sale and hire purchase agreement – classification of goods – documents of title to goods – rights and duties of buyers and sellers – rights of unpaid seller

Text & References Books:

1. N.D.Kapoor, Business Law, Sultan Chand Publishers
2. N.D.Kapoor, Elements of Mercantile Law, Sultan Chand Publishers
3. P.C. Tulsian, Business Law, Tata McGraw Hill
4. R.S.N. Pillai, Business Law, Himalaya Publishing House
5. Srinivasan & C.D. Balaji, Industrial Law and Public Relationship, Margham Publications.
6. Tejpal Sheth, Business Law, Pearson's India Education Services Pvt. Ltd.

MSU/2016-17/UG-Colleges/Part-III (B.Com) Semester-V/ppr.no.28/ Major Elective -2(A)

INCOME TAX, LAW &PRACTICE I

Unit I: Basic Concept – Person, Assessee, previous and assessment year, total income, gross total income– concept of income – Agricultural Income- Income exempted from tax – Residential status – problems.

Unit II: Income from Salary – different forms of salary and allowance – perquisites – problems in computation of salary income.

Unit III: Income from House property – Annual value – Standard deduction – Unrealized rent – problems in computation of house property income.

Unit IV: Income from under the Head Business or profession – deduction allowable – Expressly disallowed expenses – computations – problems in computation of business or professional income.

Unit V: Income from capital gain – Types – Exemption – Computation – problems in computation of capital gain.

Text & Reference Books:

1. Dr. H.C. Mehrotra and Dr. P. Mehrotra, Income tax law and accounts
2. V.P. Gaur, D.B. Narang, Pooja Ghai and Rajeev Puri, Income tax law and practice
3. A.Murthy, Income Tax Law and Practice Assessment Tear - 3rd Edition, Vijay Nicole Imprints Private Limited, 2015-16.
4. B.B. Lal, Income Tax, Darling Kindersley Pvt. Ltd, Noida.

MSU/2016-17/UG-Colleges/Part-III (B.Com) Semester-V/ppr.no.28/ Major Elective-2(B)

APPLICATION OF TALLY IN ACCOUNTING

Unit I: Fundamentals Of Tally.ERP 9 - Introduction - Salient Features of Tally.ERP 9, Getting functional with Tally ERP 9, Start up, Quitting Tally .ERP 9 - Create a Company, Select a Company, Alter a Company, Shut a Company - Company Features -Configurations

Unit II: Create Accounting Masters in Tally.ERP 9 - Groups - Pre-defined Groups of Accounts, Creating Single Group, Creating Multiple Groups, Displaying Group, Altering Group. Ledgers -Creating Single Ledger, Creating Multiple Ledgers, Displaying Ledger, Altering Ledger.

Unit III: Creating Inventory Masters in Tally.ERP - Stock Groups - Creating Single, Multiple Stock Group, Displaying and Altering Stock Groups. Stock Categories - Creating Single, Multiple Stock Categories, Displaying and Altering Stock Category - Units of Measure , Godowns - Creating Single Multiple Godowns, Displaying and Altering Godowns - Stock Items - Creating Single, Multiple Stock Item Stock Items, Displaying and Altering Stock items

Unit IV : Voucher Entry In Tally.ERP 9 - Voucher Types - Predefined Vouchers in Tally.ERP 9, Creating Voucher Type, Displaying Voucher Type, Altering Voucher Types - Financial Statements - Balance sheet, Profit &Loss A/c, Trial Balance - Accounting Books & Reports - Cash Book, Bank Book, Purchase Register, Sales Register, Journal Register, Debit Note Register, Credit Note Register, Day Book, Statistics

Unit V: VAT – Value Added Tax and TDS- Introduction to VAT -VAT Classification – Creating Tax Ledger Input VAT @ 12.5 % - Creating Tax Ledger Output VAT @ 4%, Cost Centers, Cost Categories, Tax Collected at Source (TCS) TDS (Tax Deducted at Source), Payroll, Attendance Creation, Salary Detail Creation

Text & Reference Books:

1. Using Tally ERP 9, Ramesh.Bangia, Khanna Book Publishing Ltd.2010
2. Mastering Tally ERP 9, Asok K. Nadhani, BPB Publication.
3. Tally ERP 9 Training Guide, Kitabmahal.

Tally Practical

1. Preparation of Trial balance
2. Balance sheet
3. Subsidiary Books
4. Petty cash book
5. Inventory Info
6. Pay Roll Module
7. TDS and TCS Calculations
8. VAT Calculations

MSU/2016-17/UG-Colleges/Part-III (B.Com) Semester-V/ppr.no.28/
Major Elective-2(C)

LOGISTICS MANAGEMENT

Unit I: Logistics - Meaning - Importance - Logistical Competency - Logistical Mission - Service - Total Cost - Logistical Renaissance - Technological Advancement - Regulatory Change - IT Revolution - TQM initiatives.

Unit II: Work of Logistics - Network design - information - Transportation and Inventory - Warehousing - material handling - packaging - integrated Logistics - Inventory flow - Information flow.

Unit III: Operating objectives - Rapid response - minimum variance - minimum inventory - movement consideration - quality - Life cycle support - barriers to internal integration in organizational structure - measurement system - inventory ownership - information technology - knowledge transfer capacity.

Unit IV: Information functionality and inventory functionality - principles of logistics information - Information Architecture - planning - operations - Logistics Information flow - application of new information technologies - electronic data interchange standards - inventory determining order point - lot size - accommodating uncertainty - replenishing ordering and warehousing management.

Unit V: Transportation infrastructure - transport functionality - principles - modal classification transportation formats - suppliers of transportation service - storage functionality principles - concept of strategic storage - developing warehouse resource - warehouse strategy.

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1. Logistical Management (Integrated supply chain Process) - By Donald J Bowersox, David J. Closs - Tata McGraw-Hill edition
2. Supply chain Logistics Management - By Donald J. Bowersox, David J. Closs, and M. Bixby Cooper – Tata Mc Grow Hill Publishers.

CORPORATE ACCOUNTING II

Unit I : Liquidator's final statement of Accounts.

Unit II: Accounts of Banking Companies – Rebate on Bills discounted- Final Accounts.

Unit III: Double Account System- Accounts of Electricity companies - Replacement of Asset - Calculation of Reasonable Return- Disposable of surplus.

Unit IV: Holding companies- Preparation of Consolidated balance sheet

Unit V: Human Resource accounting – Objectives- Methods of Human Resource Value Accounting- Social Responsibility Accounting.

Text & Reference Books:

1. S.P.Jain & K.L.Narang, Advanced Accountancy, Kalyani Publishers, New Delhi.
2. R.L.Gupta and M.Radhaswamy, Advanced Accountancy, Sultan Chand &Sons, New Delhi.
3. M.C.Shukla and T.S.Grewal, Advanced Accountancy, Sultan Chand &Co., New Delhi.
4. Dr.M.A.Arulanandam&K.S.Raman, Advanced Accountancy, Himalaya Publishing House, Mumbai.
5. P.C.Tulsian, Corporate Accounting, Tata McGraw Hill Companies.

MANAGEMENT ACCOUNTING

Unit I: Management accounting – Meaning – Definition – Nature and Scope – Utility and Limitations – Management accounting Principles – Functions of Management accounting – Tools of Management accounting - Management accounting and Financial accounting – Cost accounting and Management accounting.

Unit II: Financial Statements – Meaning and types of Financial Statements - Analysis and Interpretation of Financial Statements – Types of Financial Statement Analysis – Steps involved in Financial Statement Analysis – Techniques of Financial Statement Analysis – Uses and Limitations of Financial Statement Analysis.

Unit III: Ratio Analysis – Meaning of Ratios – Classification of Ratios – Analysis and Interpretation of different Ratios – Profitability Ratios – Coverage Ratios – Turnover Ratios – Financial Ratios – Uses and Limitations of Ratio Analysis.

Unit IV: Fund Flow Analysis – Meaning of Fund Flow Statement – Uses of Fund Flow Statement – Parties interested in Fund Flow Statement – Preparation of Fund Flow Statement – Treatment of provision for Taxation, Proposed Dividend and Depreciation – Statement of Changes in Financial position – Cash Flow Analysis – Meaning of Cash Flow Statement – Preparation of Cash Flow Statement (Simple problems only) – Utility and Limitations of Cash Flow Analysis.

Unit V: Basics of Capital Budgeting – Concepts of Capital Budgeting – Importance of Capital Budgeting – Capital Budgeting Process – Evaluation of Investment proposals – Traditional methods – Pay- back period method – Net Present Value method – Internal Rate of Return method (Simple problems only).

Text & Reference Books:

1. R.S.N.Pillai & Bagavathi, Management Accounting, S.Chand &Company, New Delhi-110055.
2.Dr.S.N.Maheswari, Principles Of Management Accounting, Sultanchand&Sons, NewDelhi 110002.
3. S.P.Jain&K.L.Narang, Cost And Management Accounting, Kalyani Publishers, Ludhiana 141008.
4. S.P.Iyenger, Cost And Management Accounting, Sultanchand&Sons, NewDelhi -110002.
5. T.S.Reddy & Y.Hariprasad Reddy, Management Accounting, Margham Publications, Chennai -600017.

6. A. Murthy, S. Guruswamy, Management Accounting-Theory & Practice, Vijay Nicole Imprints Private Limited , Chennai.

INDUSTRIAL LAW

Unit I : The Factories Act, 1948- definitions - approval, licensing and registration of factories - duties of occupier - inspecting staff - certifying surgeons - provisions for health –safety – welfare - working hours and holidays- employment of young persons and women – annual leave with wages- penalties and procedure.

Unit II: Workmen's compensation Act 1923 - Scope and coverage - definitions – rules - personal injury by accident - occupational diseases arising out of and in the course of employment - theory of national extension - amount of compensation- distribution of the compensation- notice and claim.

Unit III: Industrial Disputes Act 1947- object - definitions- conciliation - machinery- adjudication machinery- powers and duties of authorities - procedures - voluntary reference to arbitration – award - strike – and lock outs – lay off – retrenchment – transfer and closing down of their undertaking – penalties.

Unit IV: The Trade Unions Act, 1926 – Consumer Act 1986

Unit V: The Employees' State Insurance Act 1948 – The payment of Gratuity Act 1972.

Text & Reference Books:

1. N.D.Kapoor, Elements of Mercantile Law, Sulatan Chand.
2. P.C.Tyisian, Business and Corporate Law, Tata McGraw hill Publications

AUDITING

Unit I: Introduction – meaning – objectives – difference between Accountancy and Auditing – advantages – limitations – Audit programme – Audit working papers – preliminaries before Audit – test checking and routine checking.

Unit II: Internal check – meaning – objectives – difference between internal control and internal Audit – Advantages and Disadvantages of internal check – internal check regarding cash, purchases, purchase returns, sales and sales returns.

Unit III: Vouching – meaning – objects – importance of vouchers – precautions to be taken by the Auditors while examining vouchers – vouching of various transactions.

Unit IV: Verification and valuation of assets and liabilities – classification of assets – verification of different types of assets – verification of liabilities – Valuation of investment, Stock -in -Trade and Book debts.

Unit V: Company Auditor - Appointment – qualification and disqualification – removal of an Auditor – status – rights – duties and liabilities – Auditor's Report – content – kinds of Auditors Report – general considerations for drafting the report.

Text & Reference Books:

1. B. N. Tandon, Auditing, S. Chand & Co., New Delhi
2. Dr. T.R. Sharma, Auditing, Sahitya Publication, Agra.
3. Dinkar Pagare, Principles and practice of Auditing, Sultan Chand & Sons, New Delhi.
4. Saxana, Reddy and Appannaiah, Text Book of Auditing, Himalaya Publishing House.
5. S.K. Basu, Auditing Principles and Techniques, Pearson India Education Services Pvt. Ltd, Noida.

MSU/2016-17/UG-Colleges/Part-III (B.Com) Semester-VI/ppr.no.34/
Major Elective-3(A)

INCOME TAX, LAW AND PRACTICE II

Unit I: Income under the head- other sources – Computation – Problems.

Unit II: Set off and carry forward of losses. Deduction from Gross total Income- Problems

Unit III: Procedures for Assessment – Returns – Types of returns – Types of Assessment – Tax Deducted at source.

Unit IV: Assessment of Individual – Problems including computation of tax.

Unit V: Assessment of firm – Problems including Section 40(b) application.

Text & Reference Books:

1. Dr. H.C. Mehrotra and Dr. P. Mehrotra, Income tax law and accounts
2. V.P. Gaur, D.B. Narang, Pooja Ghai and Rajeev Puri, Income tax law and practice .
3. A.Murthy, Income Tax Law and Practice Assessment Year 2015-16, - 3rd Edition, Vijay Nicole Imprints Private Limited.

MSU/2016-17/UG-Colleges/Part-III (B.Com) Semester-VI/ppr.no.34/
Major Elective-3(B)

RETAIL MANAGEMENT

Unit I: Introduction to retailing - nature and importance of retailing - contemporary retailing in India and marketing challenges facing retailers - Strategic planning in retailing - owning or managing Business - Wheels of retailing - retailing life cycle.

Unit II: Types of retailing institutions - retailing institutions by ownership - retailing institutions by store based and non - store based - vertical marketing system - Traditional retailing.

Unit III: Strategic planning in retailing - understanding retailing environment - identifying and understanding customers, information gathering, designing retail information system processing of information system and research.

Unit IV: Location and organizational decisions - Trading area analysis site selection - organizational pattern in retailing - operational management - financial decisions - use of technology.

Unit V: Merchandise Management - Buying and handling - product assortment decision - Inventory Management - Merchandise pricing - Merchandise Labeling and packing - Retail promotion - Retail promotion strategy - Building retail store image - Role of atmosphere - retail promotion mix strategy - retail store sales promotion schemes.

Text & Reference Book:

1. Michael Levy and Barton A Weot, Retail management, McGraw-Hill Irwin.
2. Berman, Barry and Jeol R Evans, Retail management A Strategic Approach, Prentice Hall, New Jersey.
3. Cox, Roger and Paul Brittain, Retail management, Prentice Hall, Harlow.
4. Michael Levy, Barton A Weitz, Ajay Pandit, Retailing Management, McGraw Hill Company.

MSU/2016-17/UG-Colleges/Part-III (B.Com) Semester-V/ppr.no.34/
Major Elective-3(C)

VALUES AND ETHICS FOR BUSINESS

Unit I: Introduction to Values – as ideals that guide one's behaviour reflecting what one perceives as good in a decision or action – Values guide behaviour and could be terminal goals- Values in the society, politics, inter-personal relations, economics and business- Morals -Value and Vision statements in organizations - Focusing on Innovation, Reliability, Customer satisfaction, Quality assurance, Profitability, Utility, Productivity etc. and the continuous improvement in their standards.

Unit II: Ethics as the art of choosing between right and wrong – Interpreting the consequences and choosing the right- Ideas of freedom of choice, equality, justice, fairness in dealing with customers, society, environment .

Unit III: Application of Values and ethics in business – Examples from Business- Government interactions: Use and Misuse of government incentives, subsidies and licenses- Tax evasions- How to be ethical and still do good business. Human Resources employment in Business: in hiring, compensating, work assignments- discrimination; Marketing: Issues in Pricing policies and strategies, cartels between sellers, misleading advertisements; Policies relating to exchange and return of goods sold. How to give value for money and still do good business?

Unit IV: Examples in Production: Poor quality, risky products, defective/un tested products, unauthorized copies/imitations, Quality Policy: Zero defect and quality of ingredients, components, ISI, AG Marks, Hall Mark, Patents, Copy rights, post-sales services. Guarantee for performance- Legal and self imposed norms for doing good business and earning goodwill.

Unit V: Handling customer complaints, Problems- examples from consumer goods and services oriented industries(Tourism, Travel, Telephones, Edible goods, Health etc.) -Consumer Protection Act 1986 and Some of the best Industry Practices- Code of Conduct for professions (Professional Ethics).

Text & Reference books:

1. Colin M. Fisher and Alan Lovell, Business Ethics and Values, F.T. Prentice Hall, 2006.
2. G.P. Martin, Glenn Martin, Human Values and Ethics in the work place, 2010.

MANONMANIAM SUNDARANAR UNIVERSITY

TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES

B.Sc. Chemistry

. (Choice Based Credit System)

(with effect from the academic year 2016-2017 onwards)

(44th SCAA meeting held on 30.05.2016)

Sem	Pt I/II/ III/IV V/VI	Sub No.	Subject status	Subject Title	Hrs / week	Credits	Marks				
							Maximum			Passing minimum	
							Int.	Ext	Tot.	Ext	Tot.
V	I	33	Core - 7	Organic Chemistry - III	4	4	25	75	100	30	40
	II	34	Core - 8	Physical Chemistry - III	4	4	25	75	100	30	40
	III	35	Elective - 1	Polymer Chemistry / Bioinorganic Chemistry	5	5	25	75	100	30	40
		36	Elective - 2	Analytical Chemistry/ Pharmaceutical Chemistry	5	5	25	75	100	30	40
		37	Practical -5	Gravimetric Estimation & Inorganic preparation	3	-	50	50	100	20	40
		38	Practical - 6	OrganicAnalysis & Organic preparation	3	-	50	50	100	20	40
		39	Practical - 7	Physical Chemistry experiments	2	-	50	50	100	20	40
	IV	40	Skill Based subject (Common)	Personality Development / Effective Communication	4	4	25	75	100	30	40
				Subtotal	30	22					

VI	I	41	Core - 9	Inorganic Chemistry - III	6	4	25	75	100	30	40
	II	42	Core - 10	Organic Chemistry - IV	6	4	25	75	100	30	40
	III	43	Core - 11	Physical Chemistry – IV	5	4	25	75	100	30	40
		44	Elective - 3	Green Chemistry/ Nano Chemistry	5	5	25	75	100	30	40
		45	Practical - 5	Gravimetric Estimation & Inorganic preparation	3	4	50	50	100	20	40
		46	Practical - 6	Organic Analysis & Organic preparation	3	4	50	50	100	20	40
		47	Practical - 7	Physical Chemistry experiments	2	4	50	50	100	20	40
				Subtotal	30	29					

ORGANIC CHEMISTRY-III

UNIT - I OPTICAL ISOMERISM

Representation of molecules in saw horse, Fischer, flying-wedge and Newman formulae and their inter translations.

Symmetry elements - chirality – asymmetric molecules and molecular dissymmetry-pseudo asymmetry.

Optical rotation – specific rotation –optical purity – racemisation (through cationic and anionic and radicalintermediates), resolution of acids, bases and alcohols via diastereomeric salt formation.

Optical isomers - enantiomers – diastereomers – epimers - notation of optical isomers - Cahn-Ingold-Prelog rules, R and S notations for optical isomers with one and two asymmetric carbon atoms - erythro and threo representations - D and L representations

Optical activity in compounds without asymmetric carbon atoms namely biphenyls, allenes and spiranes. Stereo selectivity – stereo specificity – partial asymmetric synthesis.

point,dipolemoment – chemical method – dehydration and cyclisation.

UNIT -II GEOMETRICAL & CONFORMATIONAL ISOMERISM

Geometrical isomerism – nomenclature of geometrical isomers – cis – trans ,E-Z notation and syn-anti for C=C,C=N compounds. Methods to assign configurations.

Stability of geometrical isomers and heats of hydrogenation.

Conformation: Conformational nomenclature - eclipsed, staggered, gauche and anti; dihedral angle, torsion angle, energy barrier of rotation – potential energy diagram. Relative stability of conformers on the basis of steric effect, dipole-dipole interaction, H-bonding;

Conformational analysis of ethane, propane, n-butane, haloethane, 1,2-dihaloethane, 1,2-glycol and 1,2-halohydrin, cyclopentane, cyclohexane and mono substituted cyclohexanes.

UNIT - III AROMATICITY & AROMATIC SUBSTITUTION

Aromaticity – definition – Huckel's rule – consequence of aromaticity – stability, carbon-carbon bond lengths of benzene, resonance energy and participation of substitution vs addition – examples.Non-benzenoid aromatic compounds

Aromatic electrophilic substitution – general pattern of the mechanism, role of σ and π complexes, Mechanism of nitration, halogenation, sulphonation and Friedel-Crafts reaction. Activating and deactivating substituents, orientation in mono substituted benzenes, ortho/para ratio- Orientation- Korner's absolute method, dipole moment method – direct influence of substituents – rules of orientation - Aromatic Nucleophilic substitutions-unimolecular, bimolecular and benzyne mechanisms

UNIT – IV HETEROCYCLIC COMPOUNDS

Molecular orbital picture and aromatic characteristics of pyrrole,furan, thiophene and pyridine. Comparison of basicity of pyridine, piperidine and pyrrole.

Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution and mechanism of nucleophilic substitution reaction in pyridine derivatives.

Preparation and reactions of indole, quinoline and isoquinoline with special reference to Fisher indole synthesis, Skraup synthesis and Bischler-Nepieralski synthesis, mechanism of electrophilc substitution reactions of indole, quinoline and isoquinoline.

UNIT – V DYES & POLYNUCLEAR HYDROCARBONS

Dyes - theory of color and constitution - chromophore, auxochrome, classification according to application and structure - preparation and uses of azo dyes - methyl orange, triphenyl methane dyes -malachite green, indigo dyes - Indigotin, anthraquinone dyes - alizarin, phthalein dyes –Phenolphthalein-Synthesis reactions & Structure of Naphthalene & Anthracene

Reference Books

1. Textbook of Organic Chemistry - P.L.Soni - Sultan Chand
2. Advanced organic Chemistry - B.S.Bahl - S. Chand
3. Principles of Organic Chemistry - A.K.Bansal - New Age
4. A Textbook of Organic Chemistry - A.K.Bansal - New Age
5. Organic Chemistry - I.L.Finar - Volume I & II - Addision **Welsey**
6. Organic Chemistry - R.T.Morrison and Boyd - Prentice Hall
7. Stereochemistry of Organic Compounds - D.Nasipuri - New Age
8. Stereochemistry, Conformation and Mechanisms - Kalsi New Age
9. Advanced General Organic Chemistry - Sachin K.Ghosh - Books and Allied (P) Ltd
10. Textbook of Organic Chemistry - P.S.Kalsi – Macmillan
11. Organic Chemistry – Bhupinder Mehta and Manju Mehta - PHI Learning (P) Ltd.

Physical chemistry-III

UNIT I: THERMODYNAMICS-III

Van't Hoff isotherm and isochore - Clapeyron equation-Clapeyron-Clausius equation-Applications of Clapeyron-Clausius equation.

Third law of thermodynamics: Nernst heat theorem- statement of III law and itsapplications. Exception to third law- experimental verification of the law-residual entropy-Evaluation of absolute entropy from heat capacity measurements.

Partial molar properties: Partial molar free energy. The concept of chemical potential – variation of chemical potential with T and P- Gibbs Duhem equation- concept of fugacity and activity-activity coefficient- standard states.

UNIT – II ELECTROCHEMISTRY –II

Galvanic cells – Reversible and Irreversible cells – EMF and its measurement – Weston Standard cell – types of reversible single electrodes – standard Hydrogen electrode – calomel electrode – Derivation of Nernst equation both for emf of cells and single electrode potentials – Nernst theory for single electrode potential –standard reduction potentials – electro chemical series – significance.Application of emf measurements – Application of Gibbs –Helmholtz equation to galvanic cells – calculation of thermodyamic quantities – pH using hydrogen, quinhydrone and glass electrodes – potentiometric titrations. Concentration cells – electrode concentration cells- electrolyte concentration cells- concentratoion cells with and without transference – LJP expression –polarization – over voltage- decomposition voltage.

UNIT - III SURFACE CHEMISTRY

Adsorption - physisorption and chemisorptions - adsorption of gases by solids - adsorption isotherms - Freundlich adsorption isotherm - derivation of Langmuir adsorption isotherm, statement and explanation of BET isotherm - applications of adsorption - determination of surface area – adsorption indicators.

General characteristics of catalytic reactions – phase transfer catalysis - acid base catalysis - enzyme catalysis - mechanism and kinetics of enzyme catalyzed reactions - Michaelis-Menten equation.

UNIT - IV GROUP THEORY

Concept of symmetry in chemistry - symmetry operations and symmetry elements - rotational axis of symmetry and types of rotational axes - planes of symmetry and types of planes - improper rotational axis of symmetry - identity element - groups and their basic properties – Abelian and cyclic groups - classification of molecules into point groups - the symmetry operations of a molecule form a group – $H_2O$and NH_3point groups - group multiplication tables.

UNIT – V SPECTROSCOPY- I

Introduction - various types of molecular spectra - electronic, vibrational and rotational energy levels - Born-Oppenheimer approximation.

Rotation spectra of diatomic molecules - determination of bond length and moment of inertia from rotational spectra - numerical problems - selection rule, effect of isotopic substitution.

UV-visible spectroscopy: theory - types of transitions in molecules - selection rules for electronic spectra - factors affecting absorption maximum and intensity – applications.

IR spectroscopy : theory - stretching and bending vibrations - factors affecting vibrational frequencies - important spectral regions for the characterization of functional groups - finger print region - determination of force constant - qualitative relation of force constant to bond energies - selection rules - modes of vibrations in polyatomic molecules - vibrational modes of H_2O and CO_2 – applications - numerical problems.

Reference books :

1. B.R. Puri, L.R. Sharma & M.S. Pathania, Principles of Physical Chemistry, Vishal Publishing Co., Jalandhar.
2. P.L. Soni, O.P. Dharmarha & U.N. Dash, Text book of Physical Chemistry, 22ndEdn., Sultan Chand & Sons, New Delhi
3. Essentials of Physical Chemistry– B.S.Bahl, Arun Bahl, G.D.Tuli, Reprint 2006,S.Chand & Company Ltd., New Delhi-110055.
4. Physical Chemistry volumes I & II- S.Pahari, 2004, New Central Book Agency,Kolkotha.
5. Physical Chemistry-G.M.Barrow, 2005, Tata McGraw Hill Publishing Company,NewDelhi.
6. Physical Chemistry-G.K.Vemulapalli, 2004, Prentice Hall of India.
7. Kemp, W. Organic Spectroscopy
8. Jag Mohan Organic Spectroscopy
9. Group theory and its Chemical Applications - P.K.Bhattacharya - Himalaya publishing House.

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc.Chemistry)/Semester-V/ Ppr.no.35(A)/Elective –I (A)

POLYMER CHEMISTRY

Objectives:

To know the concept of polymerization and types of polymers

To understand the characteristics of polymers

To acquire knowledge about the polymerization techniques and polymer processing

To know the chemistry of individual polymers

To have an idea about the recent advances in polymer sciences

UNIT I - INTRODUCTION TO POLYMERS

Definition - Monomer, polymer and polymerisation - classification of polymers on the basis of (i) origin - Natural, semi synthetic, synthetic,

(ii) Physical properties and applications - Rubbers, plastic, fibres

(iii) Thermal response - thermoplastics, thermosetting

(iv) Structure - Homopolymers (linear, branched, cross link or network), Copolymers (Random, Alternate, Block, Graft)

(v) Crystallinity - non-crystalline (amorphous), semi-crystalline

(vi) Mode of formation - Addition, Condensation Polymerisation (definition and examples only)

(vii) Methods of polymerization - Bulk, Solution, Suspension Polymerisation (definition and examples only)

Chemistry of polymerization: Chain polymerization, free radical, ionic, co-ordination, step polymerization, polyaddition and polycondensaion, miscellaneous ring opening and group transfer polymerizations.

UNIT II - CHARACTERISTICS OF POLYMERS

Glass transition temperature (Tg) - definition – Factors affecting Tg – relationships between Tg and molecular weight and melting point. Importance of Tg. Molecular weight of polymers. Number average, weight average (problems), sedimentation and viscosity average molecular weights. Molecular weights and degree of polymerization - chemical reaction - hydrolysis - hydrogenation - addition - substitution – cross-linking, vulcanisation and cyclisation reactions. Polymer degradation - basic idea of thermal, photo and oxidative degradation of polymers.

UNIT III - POLYMERIZATION TECHNIQUES AND PROCESSING

Bulk, solution, suspension, emulsion, melt condensation and interfacial poly condensation polymerizations. polymer processing - calendaring - die-casting, rotational casting - compression moulding - injection moulding - blow moulding - extrusion moulding and reinforcing.

UNIT IV - CHEMISTRY OF SOME COMMERCIAL POLYMERS

Preparation, properties and uses of the following polymers. Thermoplastics, polyethylene, polypropylene, polystyrene, polyacrylonitrile, polyvinyl chloride, nylon, polyester.

Thermosetting plastics: Phenol formaldehyde resin, urea formaldehyde resin, melamine formaldehyde, epoxy resin, polycarbonate.

Elastomers: Natural rubber and synthetic rubber, Styrene and neoprene rubber.

UNIT V - ADVANCES IN POLYMER

Biopolymers - Biomedical polymers - contact lens, dental polymers, artificial heart, kidney, skin and blood cells - High temperature and fire resistant polymers - silicones - conducting polymers - (elementary idea) - polysulphur nitrile, polyphenylene, polypyrrole and polyacetylene. Polymer industry in India.

References books:

1. V.R. Gowarikar, N.V. Viswanathan and J. Sreedhar. Polymer Science, Wiley Eastern, 1995.
2. F.N. Billmeyer, Textbook of Polymer Science, Wiley Interscience, 1971.
3. Material Science II edition, P.K. Palanisamy SCITECH Publications India Pvt., Ltd., Chennai-600001.
4. Engineering Chemistry, V Srinivasan, S.D. Uma Maheshwari, M. Meena. SCITECH Publications India Pvt., Ltd., Chennai-600001.
5. Introduction to Organic Chemistry. John McMurry Brooks/cole Cenage Learning India Private Limited. First Reprint 2008.
6. Modern Chemistry, David. W. Oxtoby, H.P. Gills, Alan Campion Brooks/cole Cenage Learning India Private Limited. First Reprint 2008.

Bioinoganic chemistry

Objectives

To study the significance of metal ions' transport and storage,

To study a few metallo enzymes,

To study electron transfer proteins,

To study oxygen transport and activation proteins,

To study the fundamentals of supramolecular chemistry

Unit I Metal ions in biology

Metal ions in biology- Essential and trace elements in biological system – biological importance and toxicity of elements such as Fe , Cu , Zn , Co , Mo , W , V , Mn , and Cr in biological system and their vital role in the active site- Ion transport mechanism in cell membrane – Na and K pumps- Ionophores.

Unit II Metallo porphyrins

Chlorophyll – photosynthetic electron transport sequence – biological electron carriers : iron-sulphur proteins-ferredoxin, rubridoxin and cytochromes , cytochromes and blue copper proteins – oxygen carriers: haemoglobin and myoglobin dioxygen binding - co-operativity in haemoglobin - the Bohr effect -, Vitamin B12 and cytochrome P450-mechanism of action

Unit III Metallo enzymes

Role of Zinc in enzyme chemistry-Zinc finger, Zinc twist and zinc cluster Structure and functions of Metallo proteins and enzymes - superoxide dismutase, carbonic anhydrase carboxypeptidase A, Catalase, LADH, and Peroxidase.

Unit IV Metals and Health

Application of therapeutic chelating agents- Metal-based drugs cis-platin, carboplatin, platinum anti-cancer drugs, gadolinium MRI contrast agents, Gold and arithritic agents – auranofin,solganol,myochristin, Toxicity of metals–Cd,Hg and Cr-bio metyhylation of mercury

Unit V Supramolecular chemistry

Concepts of supramolecular chemistry. – Host-Guest concept- Various types of non-covalent interactions. Hydrogen bonds, C-H…X interactions, Halogen bonds. π – π interactions,non – bonded interactions. Various types of molecular recognition- Cations, Anions and Neutral guests – Supramolecular Devices and Sensors: Various types of supramolecular devices – an overview

Reference Books:

1. Lippard, S.J. & Berg, J.M., Principles of Bioinorganic Chemistry Panima Publishing Company 1994. Cotton, F.A., Wilkinson, G., & Gaus, P.L. Basic Inorganic Chemistry 3 rd Ed.; Wiley India,
2. Huheey, J. E.; Keiter, E.A. & Keiter, R.L. Inorganic Chemistry, Principles of Structure and Reactivity 4 th Ed., Harper Collins 1993, Pearson,2006.
3. Sharpe, A.G. Inorganic Chemistry, 4 th Indian Reprint (Pearson Education) 2005
4. Douglas, B. E.; McDaniel, D.H. & Alexander, J.J. Concepts and Models in Inorganic Chemistry3rd Ed., John Wiley and Sons, NY, 1994.
5. Greenwood, N.N. & Earnshaw, A. Chemistry of the Elements 2 nd Ed, Elsevier, 1997 (Ziegler Natta Catalyst and Equilibria in Grignard Solution).
6. JW Steed and JL Atwood Supramolecular Chemistry 2nd Ed. Wiley 2011
   P D Beer, P A Gale and D K Smith Supramolecular Chemistry OUP, 1999
   J-M Lehn Supramolecular Chemistry VCH, 1995
7. Lee, J.D. Concise Inorganic Chemistry 5 th Ed., John Wiley and sons 2008.
8. Powell, P. Principles of Organometallic Chemistry, Chapman and Hall, 1988.
9. Shriver, D.D., Atkins, P. and Langford, C.H., Inorganic Chemistry 2 nd Ed., Oxford University Press, 1994.
10. David E Fenton, Bio coordination chemistry, oxford science publications. 1995
11. Asim K. Das, Bioinorganic Chemistry, Books and allied (P) Ltd. 2007.

ANALYTICAL CHEMISTRY

Objective :

To know the importance of analytical chemistry and to study about the different types of analytical techniques

UNIT I - ERRORS AND DATA ANALYSIS

Definition and explanation with examples of the terms – mean, median, mode, range, deviation, mean deviation, relative mean deviation, standard deviation, coefficient of variation and variance – accuracy and precision – types of errors – random and systematic errors – methods of detection and elimination of systematic errors – student's t-test – confidence levels – Q-test for rejection of result – curve fitting – method of least squares – significant figures and computational rules.

UNIT II - WATER ANALYSIS

Sampling and preservation of water samples – physical examination of water : color, odour, turbidity, taste and electrical conductivity – chemical characterisation : pH, acidity, alkalinity, TDS, total, temporary, permanent, calcium and magnesium hardness, chloride, fluoride, BOD, COD, detergents and pesticides – residual chlorine and chlorine demand – Bacteriological examination : total and faecal coliforms.

UNIT III - FUEL ANALYSIS

Solid fuels : coal – classification – proximate analysis : moisture content, ash content, volatile matter and fixed carbon – ultimate analysis : carbon, hydrogen, nitrogen, sulphur and oxygen – heating values – grading of coal – comparison of coal and coke – liquid fuels : flash point, aniline point, octane number and carbon residues – gaseous fuels : producer gas and water gas – calorific values.

UNIT IV - ELECTROANALYTICAL TECHNIQUES

Electrogravimetry : principle, instrumentation and applications. Coulometry : constant current coulometry – coulometric titrations – applications – potentiostatic coulometry – Polarography : principle – experimental assembly – working – advantages and disadvantages of DME – applications to qualitative and quantitative analysis. Amperometric titrations : theory – apparatus – general procedures – applications – advantages.

UNIT V - SPECTROANALYTICAL AND THERMOANALYTICAL METHODS

Spectroanalytical methods : principle, instrumentation and applications of colorimetry, spectrophotometry and fluorimetry – light scattering techniques: nephelometry and turbidimetry.

Thermo analytical methods : principle, instrumentation and applications of TGA and DTA – characteristic features of TGA and DTA curves – factors affecting TGA and DTA curves – simultaneous DTA - TGA curves – thermometric titrations.

Reference books:

1) D.A.Skoog, D.M.West and Holler, *Analytical Chemistry : An introduction*, 6th Ed., Saunders College Publising.
2) Gary D. Christian, *Analytical Chemistr*y, 6th Ed., John Wiley & Sons.
3) S.M.Khopkar, Environmental Pollution Analysis, 1st Ed., Wiley Eastern Ltd.,
4) APHA, *Standard Methods for Estimation of Water and Waste water*, 19th Ed., American Public Health Association.
5) O.P.Vermani and A.K. Narula, *Applied Chemistry*, 2nd Ed., New Age International Publishers.
6) A.K.Shaha, *Combustion Engineering and Fuel Technology*, Oxford & IBH Publising Company.
7) D.A.Skoog, Holler and Nieman, *Principles of Instrumental Analysis,* 5th Ed., Saunders College publishing.
8) Hobart H.Willard, Lynne L.Merritt, John A.Dean and Frank A. Settle, *Instrumental Methods of Analysis*, 7th Ed., CBS Publishers & Distributors Pvt. Ltd.,

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PHARMACEUTICAL CHEMISTRY

Objectives

i. To understand the concepts and terminologies of pharmaceutical chemistry
ii. To know the mechanism of action and metabolism of drugs
iii. To study the functions of various drugs
iv. To know the important diseases and their treatment
v. To study the common diseases and important disorders of human beings and the drugs used in the treatment.

UNIT-I IMPORTANT TERMINOLOGIES, CLASSIFICATION AND ASSAY

Important terminologies - pharmacology, molecular pharmacology, pharmacophore , metabolites, antimetabolites, virus, bacteria, fungi, actinomycetes, mutation, pharmacognosy, pharmacotherapeutics, toxicology, chemotherapy – classification of drugs – nomenclature of drugs – nonproprietary names – sources of drugs – assay of drugs (biological, chemical, immunological)

UNIT-II MECHANISMS, METABOLISMS AND MEDICINAL PLANTS

Mechanism of drug action – absorption, drug delivery, drug excretion –Metabolism of drugs –chemical pathways of drug metabolism – phase – I (oxidative, reductive and hydrolytic reactions) and phase - II (conjugate reactions). Physiological effects of different functional groups in drugs –biological role of Na, K, Ca, Cu, Zn and iodine.

Indian medicinal plants – Tulsi, neem, Keezhanelli, adathode, thoothuvalai

UNIT- III DRUGS AND FUNCTIONS

Analgesics- narcotic analgesics- analgesic action, uses and structure activity of morphine. Non-narcotic analgesics –aspirin and paracetamol. Anaesthetics- local anaesthetics – procaine- General anaesthetics- chloroform and halothane. Antibiotics – Therapeutical values of penicillin, tetracyclines, chloramphenicol and streptomycin. Sulpha drugs – sulphanilide, sulphadiazine and cotrimoxazole. Antiseptics and disinfectants – phenols, chloramines and organicmercurials. Antidepressants – barbiturates – mechanism of action and uses.Antipsychotic drugs – piperazine and benzamides.

UNIT-IV DISEASES AND TREATMENT

Composition of blood – blood grouping and matching – Rh factor. Blood pressure – causes, control and treatment- antihypertension drugs- antianginal agents cardiovascular drugs, cardiacglycosides, vasodilators (one example for each). Aneaemia – causes and control – antianemic drugs. Diabetes – causes and control – hypoglycemic drugs – insulin – oral hypoglycemic drugs (tolubutamide and chlorpropamide). Cancer- causes and treatment – cobalt therapy - antineoplastic drugs (chlorambucil, methotrexate, plant products and hormones).

UNIT- V COMMON DISEASES AND HEALTH CARE MEDICINES

Common diseases – causes and treatment of insect borne diseases (Malaria and Filariasis), Airborne diseases (Diptheria, Whooping cough, Influenza, common cold, TB) and Water borne diseases (Cholera, Typhoid and Dysentery). Digestive disorder – Jaundice. Respiratory disorder –Asthma . Nervous system disorder – epilepsy. Other diseases – Leprosy.

Health care medicines – Sources and deficiency diseases of Vitamins A, B complex, C , D, E and K.

Reference books:

1. A text book of pharmaceutical chemistry, Jayashree ghosh, S. Chand, 2003.
2. Pharmaceutical Chemistry by S. Lakshmi, Sultan Chand & Sons, 3rd edition (2004).
3. Medicinal Chemistry, Ashutosh kar, New Age International, 1992
4. Pharmaceutical chemistry – G.R. Chatwal
5. Pharmacology and Pharmatherapeutics – R.S. Satoskar and S.D. Bhandarkar.
6. Drugs , G.L.D. Krupadanam, D.V. Prasad, K.V.Rao, K.L.N.Reddy and C.Sudhakar,Tata McGraw- Hill Publishing Company,New Delhi.
7. Medicinal chemistry, G.R.Chatwal, Himalaya Publishing House, New Delhi (2002)

INORGANIC CHEMISTRY – III

Objectives

To study the theories in coordination chemistry

To study the chemistry of metal carbonyls

To understand the role of metal ions in biological systems

To study the basic principles of photoinorganic chemistry

UNIT - I COORDINATION CHEMISTRY-I

Introduction: IUPAC nomenclature, Ligands- monodentate, bidentate, and polydentate ligands; coordination sphere; coordination number; nomenclature of mononuclear and dinuclear complexes. Structural and stereoisomerism in tetrahedral, square planar and octahedral complexes.Valance Bond theory – applications of valance bond theory to tetrahedral, square planar and octahedral complexes- Merits and limitations of VB theory.

UNIT – II CO-ORDINATION CHEMISTRY II

Crystal field theory - splitting of d-orbitals in octahedral and tetrahedral complexes - factors affecting the magnitude of crystal field splitting - effects of crystal field splitting - spectrochemical series - applications of CFT - magnetic properties and spectra of transition metal complexes - crystal field stabilization energy and their uses - limitations of CFT - effective atomic number rule - stability of complexes - step-wise and overall stability constants - factors affecting the stability of complexes - determination of stability constants.

UNIT – III CO-ORDINATION CHEMISTRY III

Labile and inert complexes - ligand substitution reactions in octahadral complexes: aquation, base hydrolysis and anation reactions - substitution reactions in square planner complexes - Trans effect - theories of trans effect - mechanism of substitution reactions - redox reactions: inner-sphere and outer-sphere electron transfer reactions.

UNIT - IV ORGANOMETALLIC CHEMISTRY

Introduction–History, Nomenclature of organometallic compounds, EAN rule and 18 electron rule. Structure and nature of M-L bond in metal carbonyls - metal nitrosyls. preparation of organo metallic compounds of Mg, Zn, Li, Cu, P, B, Ti, Fe and Co

Wilkinson's catalyst and alkene hydrogenation, hydroformylation, Mansanto acetic acid process, Ziegler – Natta catalyst and polymerization of olefins.

UNIT - V Inorganic photochemistry

Electronic transitions in metal complexes : selection rules - metal-centered and charge-transfer transitions - properties of excited states - bimolecular quenching and energy transfer - photochemical pathways : substitutional, reduction-oxidation and isomerisation processes - photosubsitution reactions of Cr(III) complexes - Adamson's rules - photoredox reactions of Co(III) complexes - photoismerisation in Pt(II) complexes. Photochemical conversion and storage of solar energy : photolytic cleavage of water into H_2 and O_2 - photoelectrochemical devices : photogalvanic cells and semiconductor based photovoltaic cells.

Reference books :

1. J.D. Lee, *Concise Inorganic Chemistry* 5th Ed., Blackwell Science Ltd.,
2. James E. Huheey, Elien A. Keiter and Richard L. Keiter, *Inorganic Chemistry : Principles Structure and Reactivity,* 4th Ed., Harper College Publisher.
3. F. Albert Cotton, Geoffrey Wilkinson, Carlos A. Marilo and Manfred Bochman, *Advanced Inorganic Chemistry*, 6th Ed., Wiley Interscience Publication.
4. Fred Basolo and Ralph G. Pearson, *Mechanisms of Inorganic Reactions : A study of metal complexes in solution,* 2nd Ed., John wiley and sons, Inc.,
5. David E. Fenton, *Biocoordination Chemistry,* Ist Ed., Oxford Science Publications.
6. Ivano Bertini, Harry B Gray, Stephen J Lippard, Joan Selverstone Valentine, *Bioinorganic Chemistry,* 1st Ed., Viva Books Pvt. Ltd.,
7. J.K. Rohatgi - Mukherjee, *Fundamentals of Photochemistry* - Wiley Eastern Revised Ed.,
8. *Journal of Chemical Education,* Vol.60, No.10, October 1983.
9. A.W. Adamson and P.D. Fleischauer, (Editors) *Concepts of Inorganic photochemistry,* John wiley and sons, New York, 1975.

ORGANIC CHEMISTRY-IV

UNIT-I CARBOHYDARATES

Classification-Monosaccharides- constitution of glucose and fructose. Reactions of glucose and fructose – Osazone formation, Mutarotation and its mechanism, cyclic structure, pyronose and furanose forms. Epimerisation-Chain lengthening and shortening of aldoses. Interconversions of aldoses and ketoses.

Disaccharides- sucrose- reactions and structure.

Polysaccharides – starch and cellulose (elucidation of structure not necessary).

UNIT-II PHENOLS, AROMATIC ALDEHYDES, KETONES AND ACIDS

Phenols

Acidic character of phenols- effect of substituents on acidity of phenols - Mechanisms of Kolbe's reaction and Riemer-Tiemen reaction. Preparation of cresols, catechol, resorcinol, quinol and euginol.

Aldehydes and ketones

Preparation and uses of cinnamaldehyde. Coumarin, vanillin, Michler's ketone, p-benzoquinone-Quinone mono oxime tautomerism. Mechanism of Cannizaro reaction, benzoin condensation, Perkin reaction, Claisen reaction, Knovenagel reaction,Gattermann aldehyde synthesis and Houben –Hoesch synthesis.

Aromatic acids

Ortho effect, preparation of mandelic acid, cinnamic acid and anthranilic acid. Preparation and uses of benzene-1,2- dicarboxylic acid, benzene-1,3- dicarboxylic acid and 1,4- dicarboxylic acid.

UNIT III REARRANGEMENTS

Rearrangement to electron-deficient carbon – 1,2 shift (Wagner-Meerwein rearrangement, pinacol rearrangement,Wolff rearrangement in Arndt-Eistert synthesis, benzil-benzilic acid rearrangement).

Aromatic rearrangements from oxygen to ring carbon (Fries rearrangement, Claisen rearrangement and benzidine rearrangement).

Rearrangement to electron-deficient nitrogen (Beckmann rearrangement, Schmidt rearrangement, Hofmann rearrangement, Curtius rearrangement).

Rearrangement to electron-deficient oxygen (Baeyer-Villiger oxidation, hydroperoxide rearrangement,cumene hydroperoxide-phenol rearrangement), Dakin reaction.

UNIT IV TERPENOIDS AND ALKALOIDS

Terpenes and terpenoids - classification - isoprene rule.

Elucidation of structure and synthesis of citral , limonene, menthol, α-terpineol and camphor.

Alkaloids: Introduction, classification and general methods for the determination of structure.

Structural elucidation and synthesis of conine,piperine and nicotine

UNIT-V ORGANIC SPECTROSCOPY

UV spectroscopy - chromophore – auxochrome – blue shift, red shift – hypochromic shift, hyperchromic shift – applications for studying functional groups,cis-trans isomerism and nature of double bonds- Woodward-Fischer rules as applied to conjugated enes and alpha and beta unsaturated ketones.

IR spectroscopy–characteristics of IR absorption frequencies – intermolecular and intramolecular hydrogen bonding – functional group detection.

NMR Spectroscopy - interpretation of NMR spectra of simple organic compounds such as acetone, anisole, benzaldehyde, isobutene, mesitylene, 1-chloropropane, ethyl methyl ketone, benzyl alcohol, and propionic acid.

Reference Books

1. K.S. Tewari, N.K. Vishil, S.N. Mehotra – A text book of org. chem – 1st edition, Vikas Publishing House Pvt Ltd., 2001, New Delhi.

2. P.L. Soni, Text Book of Organic chemistry, Sultans Chand, 1991, New Delhi,

3. Bahl and Arun Bahl, Organic Chemistry, S. Chand and Sons, New Delhi, 2005.

4. Gurdeep Chatwal, Reaction mechanisms and reagents in organic chemistry

5. O. P. Agarwal, Chemistry of Organic Natural Products, Vol 1 and 2, Goel Pub. House,2002.

6. Gurdeep Chatwal, Chemistry of Organic Natural Products, Vol 1 and 2, Goel Pub. House,2002

7. Y.R. Sharma, O.P. Vig, Elementary organic absorption spectroscopy – 1st edition, Goel Pulishers, 1997, Meerut

8. R. T. Morrison and R. N. Boyd, Organic Chemistry, 6th Edition, PHI Limited, New Delhi, 1992.

9. Jerry March, Advanced Organic Chemistry, 4th Edition, John Wiley and Sons, New York,1992.

10. S. H. Pine, Organic Chemistry, 5th Edition, McGraw Hill International Edition, Chemistry Series, New York, 1987.

Physical chemistry – IV

UNIT - I SPECTROSCOPY -II

Raman spectroscopy: Principle - Rayleigh and Raman scattering - Stokes and Anti-stokes lines - differences between IR and Raman spectroscopy - mutual exclusion principle – selection rule - applications.

NMR spectroscopy: Theory of NMR, modes of nuclear spin-relaxation process - shielding effect, hyperfine splitting, coupling constants, - chemical shift - factors affecting chemical shift - internal standard, δ and τ scale - applications of NMR and limitations of NMR.

ESR spectroscopy: principle - energy level splitting - presentation of ESR spectrum for methyl and benzene radicals, deuterium - applications

Mass spectroscopy: basic principles of mass spectrum - molecular peak - base peak - isotopic peak - meta stable peak - types of fragmentation - factors influencing the fragmentation - Mc-Lefferty rearrangement - applications

UNIT – II CHEMICAL KINETICS

Rate of reaction-Measuring rates of reaction-expressing reaction rates- factors influencing rate-rate constant-Rate laws, Stoichiometry, order and molecularity of reactions- First order, second order, third order and zero order reactions and example. Characteristics of I,II,III and Zero order reactions. Determination of order of reactions-expression for rate constant of first and second order reaction-derivation. Effect of temperature on rate constant. The activation energy - determination of Arrhenius frequency factor and energy of activation-The collision theory of reaction rates and its limitation. Lindemann theory of unimolecular reactions-The theory of Absolute reaction rates. Comparison of the collision theory with the Absolute reaction rate theory.

UNIT – III IONIC EQUILIBRIA

The Ostwald's dilution law-experimental verification-limitations-acids and bases-Lewis concept-dissociation of weak acids and weak bases-dissociation of water-pH scale-common ion effect- its applications-buffer solution-different types-calculation of pH value of buffer solution. Hydrolysis of salts - salts of weak acids & strong base, salts of weak base and strong acids, salts of weak acid and weak base - determination of degree of hydrolysis. Acid-base indicators- acid-base titration and use of indicators. Solubility product - Application of solubility product principle

UNIT-IV PHASE EQUILIBRIA

Phase rule - phase, component, degree of freedom - thermodynamic derivation of phase rule,

One-component system: Phase diagrams of Water and sulphur systems.

Two component system: (i) Simple eutectic: Lead-silver system and potassium iodide-water system. (ii) Formation of compound with congruent melting point: Magnesium – zinc system and ferric chloride – water system. Distribution Law-Statement and thermodynamic derivation-association of the solute in one of the solvents- dissociation of the solute in one of the solvents-applications of the distribution law-solvent extraction.

UNIT - V NANOCHEMISTRY

Definition - size dependent properties: magnetic, electrical and optical properties – quantum dots – metal oxides and metal nano particles - ceramic nano particles

Synthesis of nanomaterials - bottom-up and top-down approaches - thin film deposition - catalytic assisted growth - chemical vapour deposition - sol gel method - chemical reduction

Fullerenes - carbon nanotubes - single walled and multi walled nano tubes – structures - carbon nanofibre – nanocomposites.

Applications of nanoscience and nanotechnology.

Reference books :

1. Principles of Physical Chemistry - B.R. Puri and Sharma - Shobanlal Nagin Chand & Co.,
2. Text Book of Physical Chemistry - P.L. Soni - Sultan Chand.
3. Elements of physical chemistry - Glasstone and Lewis - Macmillan.
4. Physical chemistry - G.W. Castellan - Narosa publishing house.
5. Universal General Chemistry, C.N.R. Rao, Macmillan.
6. Nano: The Essentials Understanding Nano Science and Nanotechnology. T. Pradeep -. Tata Mc Graw-Hill Publishing Company Ltd. New Dehli.
7. Introduction to Nano technology, Charles P Poole Jr. & Frank J Owens, Wiley Interscience
8. Kemp, W. Organic Spectroscopy
9. Jag Mohan Organic Spectroscopy
10. Chemical Kinetics-K. J. Laidler, Tata McGraw Hill Publishing Company, NewDelhi

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc.Chemistry) / Semester – VI / Ppr.no.44(A)/

Elective –III (A)

GREEN CHEMISTRY

Objectives

To introduce the basics and need for Green Chemistry

To understand the principles and designing a green synthesis of selected compounds

To make the students familiar with the usage of green solvents and green catalysts in chemical reactions.

To learn the principles of the microwave and ultrasound assisted reactions.

UNIT- I Introduction to green chemistry

Definition – need for green chemistry – scope of green chemistry.

Concept of atom economy – yield – mass intensity and atom economy.

Calculation of atom economy, mass intensity, mass productivity and carbon efficiency.

Different types of reactions and atom economy - addition, substitution, elimination and rearrangements.

Concept of selectivity – enantioselectivity, chemoselectivity, regioselectivity and diasterioselectivity.

UNIT- II Green solvent

Super critical fluids – Introduction – extraction of super critical fluids – solvents of super critical fluid– advantages and applications.

Carbondioxide as a super critical fluid – features of technique for using super critical carbondioxide - advantages and applications.

Chemical reactions in supercritical water and Near – Critical Water (NCW)- Region.

Extracting natural products, dry cleaning, supercritical polymerization, hydrogenation and hydroformylation

lonic liquid as green solvent : Introduction – synthesis of ionic liquids - acidic ionic liquid and neutral ionic liquids – applications in organic synthesis.

Green reagents : Dimethyl carbonate and Polymer supported reagents.

UNIT- III Green catalyst

Catalysis over view : acid catalyst - basic catalyst – oxidation catalyst – polymer supported catalyst- photosensitized super acid catalyst and Tetra Amido Macrocylic Ligand (TAML) catalyst.

Biocatalyst : microbial oxidation, microbial reduction, enzyme catalyzed hydrolytic process, per fluorinated catalyst and modified biocatalyst.

Development of mesoporous supports by liquid crystal templating – neutral templating methods-heterogeneous catalyst – solid supported catalyst.

UNIT- IV Green synthesis

Green synthesis of the following compounds -Adipic acid, Catechol, Benzoyl bromide, Acetaldehyde, Citral, Ibruprofen and Paracetamol

Microwave assisted reactions in water – Hoffmann Elimination, Hydrolysis of benzyl chloride and methyl benzoate – oxidation of toluene and alcohols

Microwave assisted reactions in organic solvents – Esterification, Fries rearrangement, Clasien Rearrangement, Diels-Alder Reaction and Decarboxylation. Ultra sound assisted reactions – Esterification, Saponification, alkylation , oxidation, reduction, coupling reactions and Cannizaro reactions.

UNIT -V Green reactions invloving basic principle of green chemistry.

Twleve principle of green chemistry – choice of starting materials – biomimitic, multifunctional reagents – materials reagents.

Combinatorial green chemistry – green chemistry in sustainable developments.

Importance of Green chemistry in day to day life, versatile bleaching agents and analgeric drugs.

References

1. V.K.Ahluwallia &M.R Kidwai "New Trends in Green Chemistry", Anamalaya Publishers (2005)
2. P.T.Anaster &J.K.Warnerr " Oxford Green Chemistry,Theory and Practical",University Press(1998)
3. A.S. Matlack,'' Introduction to Green Chemistry"-Marcel Deckkar (2001)
4. V.K.Ahhluwallia, "Green Chemistry Environnmentally Benign Reaction"Ane Books Pvt.Ltd. New Delhi (2009)
5 Rashmi Sannghi &MM Srivastava, "Green Chemistry Environment Friendly Alternatives." Narosa Publishing House Pvt Ltd, New Delhi (2009)

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc.Chemistry) / Semester – VI/ Ppr.no.44(B)/

Elective –III (B)

NANO CHEMISTRY

Objectives

To give an insight into the basics of nanochemistry.

To understand the difference between bulk material and nanomaterial and learn the synthesis, application and fabrication of nanostructure.

To study the importance of nanocatalyst, nanocomposites and fibers.

To make the students familiar with the characterization and applications of nanomaterials.

UNIT- I Introduction to Nano chemistry.

Definition: nanoscience – nanotechnology – nanochemistry – significance of nanoscale - factors responsible for special properties of nanomaterials.

Nanomaterials: Different types of nanomaterials and structures- quantum wells – quantum wires – quantum dots – nanoclusters – nanocrystals – nanowires and nanotubes.
Feynman's Prophecy– manufacturing of nanomateris - top-down and bottom-up approaches.

UNIT-II Synthesis of nano particles.

Introduction – orientation of nanoparticles – synthesis of nanoparticles.

Physical methods: laser ablation, physical vapour deposition (PVD) and solvated metal atom dispersion (SMAD).

Chemical methods: thermolysis, sonochemical method, reduction methods, phase-transfer processes and biosynthesis of nanoparticles.

Synthesis of nanosized semiconductors: precipitation methods and thermal decomposition of complex precursors.

Synthesis of ceramics: physical methods, gas condensation method, laser method, chemical methods and sol-gel synthesis.

UNIT –III Nanocatalyst and carbon based nanomaterials

Inroduction – fundamentals of catalysis – adsorption of a molecule on a catalyst surface, adsorption theory- Langmuir adsorption isotherm.

Surface reactions – synthesis – synthesis requirements, example of a conventional synthetic technique, non traditional methods for preparing nanocatalyst.

Characterization of nanocatalyst : overview - bulk characterization technique and surface characterization technique

Carbon nanomaterials : structure and properties of graphite, diamond and fullerenes.

UNIT-IV Nanocomposites and fibers.

Introduction - Background - types of composite materials - The nano perspective.

Physical and chemical properties of materials – mechanical properties, thermal properties, electronic properties and chemical properties.

Natural nanocomposities - Skin of the sea cucumber and hard natural nanocomposites.

Carbon fibers and nanotubes – Types of fibers, Whiskers and nanotubes – synthesis of fibers and nanotubes - chemical modification and applications of carbon nanotube.

Metal and Ceramic nanocomposites - Metal nanocomposites, inorganic nanofibers and concrete.

Clay nanocomposite materials -polypropylene clay nanocomposite , mont morillonite clay nanocomposite and halloysite nanotube claycomposites.

UNIT-V Characterization and applications of nanomaterials.

Types of characterization methods – Electron probe method- Scanning electron microscopy – Transmission electron microscopy,
Spectroscopyic Methods, - UV – Visible adsorption and emission spectroscopy, Infra Red and Raman spectroscopy and X-ray diffraction methods.
Current applications: sunscreens and cosmetics – nano medicine, drug delivery and cancer drugs – food and drinks, textiles, chemical industry and electronic devices.
Short term applications - paints – fuel cells – displays – batteries – fuel additives and catalysts.
Long term applications- composites – lubricants – magnetic materials – medical implants – machinable ceramics – water purification and military battle suits.

References

1. Geoffrey A. Ozin and Andre C. Arsenault, “Nanochemistry: A chemical approach to nanomaterials”, RSC publishing, (2005), U.K.
2. Hari Singh Nalwa, “Nanostructured Materials and Nanotechnology”, Academic Press, New York,(2002).
3. C.N.R. Rao, A. Muller and A.K. Cheetham, “The Chemistry of Nanomaterials, Volume I & II”, Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim, (2004).
4. Kenneth J. Klabunde, “Nanoscale Materials in Chemistry”, Wiley-Interscience”, New York,(2001).
5. Gabor L.Hornyak, Harry F. Tibbals, Joydeep Dutta and John J Moore . “Inroduction to Nanoscience and Nanotechnology” CRC Press ,Taylor and Francis group London Newyork.

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc.Chemistry)/Semester-VI/ Ppr.no.45(A)/ Practical - 5

(V & VI SEMESTERS)

GRAVIMETRIC ESTIMATION & INORGANIC PREPARATIONS

Objectives

- To enable the students to understand the various techniques in gravimetric estimations
- To make the students thorough in inorganic complex preparations

Gravimetric Estimation

1. Estimation of lead as lead chromate
2. Estimation of barium as barium chromate
3. Estimation of nickel as nickel dimethylglyoximate
4. Estimation of zinc as zinc oxinate
5. Estimation of copper as copper thiocyanate

Inorganic preparations

1. Preparation of potash alum
2. Preparation of chrome alum
3. Preparation of Prussian blue
4. Preparation of sodium ferrioxalate
5. Preparation of tetrammine copper(II) sulphate
6. Preparation of tristhiourea copper(I)chloridedihydrate
7. Preparation of potassium trisoxalatoferrate(III)
8. Preparation of hexathiourea lead(II) nitrate

Internal – 25 marks

05 marks - Regularity

20 marks – Average of best (estimation-3 and preparation-5)eight experiments in regular class work

External -75 marks

15 marks – Record (atleast eight experiments estimation-3 and preparation-5)*

10 marks – Procedure (estimation-5 and preparation-5)

50 marks – Result (estimation-30 and preparation-20)

*Experiments done in the class alone should be recorded

(Students having a bonafide record only should be permitted to appear for the practical examination)

Reference books:

1. Sundaram, Krishnan, Raghavan, Practical Chemistry (Part III), S. Viswanathan Co. Pvt., 1996.
2. Vogel's Text Book of Quantitative Chemical Analysis. 5th Edi., ELBS/Longman England, 1989.
3. O.P. Pandey, D.N Bajpai, S. Gini, Practical Chemistry, for I, II & III BSc. Students. S.Chand & Company Ltd reprint 2009.
4. V.K.Ahluwalia, Sunitha Dhingra, Adarsh Gulate College Practical Chemistry, Universities Press (India) Pvt Ltd 2008 (reprint)

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc.Chemistry) / Semester -VI/ Ppr.no.46(B)/ Practical - 6

(V & VI SEMESTERS)

ORGANIC ANALYSIS & ORGANIC PREPARATION

Objectives

- To enable the students to understand the various procedures in organic analysis and organic preparation
- To create an awareness on microscale experiments in organic chemistry practicals

1. Organic analysis

Qualitative analysis of the given organic compound

a. Test for aliphatic and aromatic nature of substances
b. Test for saturation and unsaturation
c. Identification of functional groups (carboxylic acids, phenols, aldehydes, ketones, esters, amines, amides, anilides, nitrocompounds and carbohydrates)
d. Preparation of solid derivative to confirm the presence of functional group

2. Organic preparation

1. Preparation of salicylic acid from methyl salicylate (or) benzoic acid from ethylbenzoate
2. Preparation of benzoic acid from benzamide
3. Preparation of benzoquinone oxime from benzoquinone
4. Preparation of benzoic acid from benzaldehyde
5. Preparation of p-bromoacetanilide from acetanilide
6. Preparation of 2-naphthyl benzoate from 2-naphthol
7. Preparation of picric acid from phenol
8. Preparation of methyl orange from sulphanilic acid
9. Preparation of glucosazone from glucose

Internal – 25 marks

05 marks - Regularity

20 marks – Average of best (estimation-3 and preparation-5)eight experiments in regular class work

External -75 marks

15 marks – Record (atleast eight experiments in organic analysis and five preparations)*

10 marks – Procedure

50 marks – Result (analysis-30 and preparation-20)

*Experiments done in the class alone should be recorded

(Students having a bonafide record only should be permitted to appear for the practical examination)

Reference books:

1. N.S. Gnanapragasam and G. Ramamurthy, Organic Chemistry – Lab manual, S. Viswanathan Co. Pvt., 1998.
2. J.N. Gurthu and R. Kapoor, Advanced Experimental Chemistry (Organic), S. Chand and Co., 1987.
3. B.S. Furniss, A.J. Hannaford, P.W. G. Smith and A.R. Tatchell, Vogel's Text Book of Practical Organic Chemistry. 5th Edn., Pearson Education, 2005.
4. O.P. Pandey, D.N Bajpai, S. Gini, Practical Chemistry, for I, II & III BSc. Students. S.Chand & Company Ltd reprint 2009.
5. P.R.Singh, D.C.Gupta, K.S.Bajpal Experimental Organic Chemistry Vol.I and II, 1980.

(V & VI SEMESTERS)

PHYSICAL CHEMISTRY EXPERIMENTS

Objectives

- To enable the students to understand the principles of physical chemistry experiments

1. Determination of molar mass of the given substance by Rast macro method
2. Determination of molecular weight of the given substance by Transition temperature method
3. Determination of solubility of a substance at different temperatures and calculation of heat of solution
4. Study of adsorption of oxalic acid on charcoal and verification of Freundlich isotherm
5. Study of phase equilibrium – Simple eutectic
6. Estimation of HCl by conductometric method using standard oxalic acid (to be prepared) and link NaOH
7. Estimation of $MgSO_4$ by conductometric method using standard $MgSO_4$ (to be prepared) and link $BaCl_2$
8. Estimation of Fe(II) by potentiometric method using standard ferrous ammonium sulphate (to be prepared) and link $KMnO_4$
9. Estimation of $KMnO_4$ by potentiometric method using standard $K_2Cr_2O_7$ (to be prepared) and link ferrous ammonium sulphate
10. Determination of equivalent conductance of weak electrolyte and calculation of dissociation constant
11. Comparison of the strengths of acids by studying the kinetics of ester hydrolysis
12. Determination of CST of phenol-water system. Study of the effect of impurity on CST and determination of the strength of unknown

Internal – 25 marks

05 marks - Regularity

20 marks – Average of best eight experiments in regular class work

External -75 marks

15 marks – Record (atleast eight experiments)*

10 marks – Procedure

50 marks – Expriment

*Experiments done in the class alone should be recorded

(Students having a bonafide record only should be permitted to appear for the practical examination)

Reference books:

1. J.N. Gurthu and R. Kapoor, Advanced Experimental Chemistry, S. Chand and Co., 1987.
2. Sundaram, Krishnan, Raghavan, Practical Chemistry (Part II), S. Viswanathan Co. Pvt., 1996.
3. David P. Shoemaker, Carl W. Garland, Joseph W. Nibler, Experiments in Physical Chemistry, 5th Edi., McGraw- Hill Book company, 1989.
4. Alexander Findlay and J.A. Kitcher. Practical Physical Chemistry, Longmans
5. Y.B. Yadav, Practical Physical Chemistry, Goel publishing house

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI

UG COURSES – AFFILIATED COLLEGE

B.Sc., Computer Science

. (Choice Based Credit System)

(with effect from the academic year 2016-2017 onwards)

(44th SCAA meeting held on 30.05.2016)

V	I	29	Core - 6	Software Engineering and Testing	4	4	25	75	100	30	40
	II	30	Core - 7	Data Communication and Computer Network	4	4	25	75	100	30	40
	III	31	Core - 8	Dot NET Technologies	4	4	25	75	100	30	40
		32	Major Practical -V	Dot NET	8	4	50	50	100	20	40
		33	Major Elective – II (Select any one)	A) Mobile Computing B)Cryptography and Network Security C) Cloud Computing	6	5	25	75	100	30	40
	IV	34	Skill Based subject (Common)	Personality Development/ Effective Communication/ Youth Leadership	4	4	25	75	100	30	40
				Subtotal	30	25					
VI	III	35	Core - 9	Operating System	4	4	25	75	100	30	40
	III	36	Core - 10	Relational Database Management System	4	4	25	75	100	30	40
	III	37	Core - 11	Computer Graphics and Visualization	4	4	25	75	100	30	40
	III	38	Core - 12	Data Mining	4	4	25	75	100	30	40
		39	Major Practical -VI	RDBMS with Oracle Lab	8	4	50	50	100	20	40
		40	Major Elective - III (Select any one)	Big Data Analytics / Artificial Neural Network/Internet of Things	6	5	25	75	100	30	40
				Subtotal	30	25					

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Computer Science)

Semester-V/ Ppr.no.29 / Core - 6

Software Engineering and Testing

Unit I

Introduction:- Evolution – From an Art form on Engineering Discipline: Evolution of an Art into an Engineering Discipline. – Software Development of Projects: Program versus Product – Emergence of Software Engineering: Early Computer Programming – High Level Language Programming – Control Flow-based Design – Data Structure Oriented Design – Object Oriented Design. **Software Life Cycle Models:-** A few Basic Concepts – Waterfall Model and its Extension: Classical Waterfall Model – Iterative Waterfall Model – Prototyping Model – Evolutionary Model. – Rapid Application Development (RAD): Working of RAD. –Spiral Model.

Unit II

Software Project Management:- Responsibilities of a Software Project Manager – Project Planning- Project Estimation Techniques-Risk Management. **Requirements Analysis and Specification:-** Requirements Gathering and Analysis – Software Requirements Specifications (SRS):Users of SRS Document – Characteristics of a Good SRS Document – Important Categories of Customer Requirements – Functional Requirements – How to Identify the Functional Requirements? – Organisation of the SRS Document.

Unit III

Software Design:- Overview of the Design Process: Outcome of the Design Process – Classification of Design Activities. – How to Characterize a good Software Design? **Function-Oriented Software Design:-** Overview of SA/SD Methodology – Structured Analysis – Developing the DFD Model of a System: Context Diagram – Structured Design – Detailed Design. **Object Modelling Using UML:-** Basic Object Oriented Concepts: Basic Concepts – Class Relationships – Other Key Concepts – Related Technical Terms – Advantages and disadvantages of OOD. – Unified Modelling Languages (UML) – UML Diagrams – Class Diagrams – Interaction Diagrams – Activity Diagram – State Chart Diagram.

Unit IV

User Interface Design:- Characteristics of a good User Interface - Basic Concepts – Types of User Interfaces – Fundamentals of Components based GUI Development: Window System. **Coding and Testing:-** Coding – Software Documentation – Testing: Basic Concepts and Terminologies – Testing Activities. – Unit Testing – Black-box Testing: Equivalence Class Partitioning – Boundary Value Analysis. – White-box Testing – Debugging: Debugging Approaches. – Integration Testing – System Testing: Smoke Testing – Performance Testing.

Unit V

Software Reliability and Quality Management:- Software Reliability: Hardware versus Software Reliability. – Software Quality – Software Quality Management System – ISO 9000: What is ISO 9000 Certification? – ISO 9000 for Software Industry – Shortcomings of ISO 9000 Certification. – SEI Capability Maturity Model: Level 1 to Level 5. **Computer Aided Software Engineering:-** Case Environment – CASE Support in Software Life Cycle. **Software Maintenance:-** Characteristics of Software Maintenance: Characteristics of Software Evolution – Software Reverse Engineering.

Text Book:

Fundamentals of Software Engineering Fourth Edition by Rajib Mall – PHI Learning Private Limited 2015

Reference Books:

1. Software Engineering 2nd Edition by K L James PHI
2. Software Engineering 9th Edition by Ian Sommerville - Pearson Education Asia

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Semester-V/ Ppr.no.30/Core - 7

Data communication and Computer Network

Unit I

Introduction - Data communication – Networks-the Internet –Protocols and Standards – **Network Models** –Layered tasks –OSI model- layers in OSI model-TCP/IP protocol Suit-Addressing.

Unit II

Physical layer – Analog and digital – Transmission Impairment –Data rate limits-Performance-Transmission mode -**BandWidth Utilization**- Multiplexing Spread Spectrum- **Transmission media** – Guided and Unguided media.

Unit III

Switching – Circuit Switched Network-Datagram Network – Virtual Circuit Network-Structure of a Switch. **Using telephone and cable networks –** Telephone Network- Dial-Up Modem–Digital Subscriber lIne – Cable TV Network and Cable TV for Data transfer. **Data Link Layer :** Error Detection and Correction- Introduction- Checksum.

Unit IV

Data link control-Framing-Flow and Error Control-Protocols-Noiseless Channels-Noisy Channels. **Wired LANs**-IEEE standards-Standard Ethernet- Changes in the Standard – Fast Ethernet-Gigabit Ethernet. **Wireless LANs**: IEEE 802.11-Blue tooth. **Connecting LANs :** Connecting devices, Backbone networks. **Wireless WANs**: Cellular Telephony, Satellite Networks.

Unit V

Network Layer- IPv4 Address-IPv6 Address-Internetworking. **Transport Layer**-Process to Process delivery –UDP-TCP. **Application Layer-** Name space-DNS- DNS in the internet. **WWW and HTTP**-Architecture-web documents-HTTP.

Text Book

Data Communication and Networking –"BEHROUZ A FOROUZAN " , The McGraw- Hill- 4 th ed.

UNIT I : 1.1-1.4,2.1-2.5,

UNIT II: 3.1,3.4-3.6,4.3,6.1,6.2,7.1,7.2

UNIT III : 8.1-8.4,9.1-9.5,10.1,10.5

UNIT IV: 11.1-11.5,13.1-13.3,13.4,13.5,14.1,14.2,15.1,15.2,16.1,16.2

UNIT V: 19.1,19.2,20.1,23.1,23.2,23.3,25.1,25.2,25.4,27.1-27.3.

References

1.Data Communication and Computer Networks – " Prakash C.Gupta

2.Computer Networks Protocols,Standards and Interfaces- " Uyless Black

3. Data Communications and Computer Networks – Brijendra Singh

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Semester-V/ Ppr.no.31/ Core - 8

Dot NET Technologies

Unit I

The .NET Platform and the Web: The Web C;ient/Server Model – Components of ASP.NET and the .NET Framework – Overview of Internet Information Server – Overview of ASP.NET – The .NET Common Language Runtime and Class Library – Managed Components in .NET – Web Services – Language Independence in the .NET Framework – COM+ Component Services and .NET – Direction and plans for .NET. **The VB.NET:** What is VB.NET? – First VB application – Variables, Constants and Operators – Modularizing Code – Functions and Subroutines – Controlling Program Flow – Handling Errors and Exceptions – Object Oriented Programming – Multithread Programming.

Unit II

Working with ASP.NET: The features of ASP.NET – The Anatomy of ASP.NET Pages –Introducing Web Forms – VS.NET Web Applications and other IDE Basics – Separating Content and Code – the Code-Behind Feature – Application Configuration – Using HTML Forms – Using Web Controls – Web Controls for displaying and formatting data –Web Controls for creating buttons – Web control for inputting text – Web controls for selecting choices – Web controls for creating lists – Miscellaneous Basic Controls – Creating a simple ASP.NET Application – ASP.NET Page Directives – ASP.NET Rich Controls – Validation Controls – Data List Controls – User Controls - Saving state with the StateBag Object – ASP.NET Intrinsic Objects.

Unit III

Using the .NET Framework Class Library: Common Features of the .NET Framework Class Library – Using Data Collections – Handling File Input/output and Directories – Watching the File System for Changes – Using the Windows Event Log – Working with Active Directory Services – Using Message Queues – Communicating with Servers on the Internet – Manipulating XML Data – Sending Internet E-mail.

Unit IV

Building .NET Managed Components for COM+: The concept of Managed Code Execution – The Common Language Runtime – COM+ Component Services – Using VB.NET to develop Managed Components – Serviced Components – Building VB.NET Serviced Components. **Building Web Services:** The need for Web Services – Overview of Web Services – Web Service Description Language - Web Service Wire Formats – Web Services Discovery – Creating a simple Web Service – Calling Web Services with Proxy Classes – Creating a Client for a Web Service – Managing State in Web Services – Using Transactions in Web Services.

Unit V

Accessing Data with ADO.NET: Overview of Data Access on the Web – ADO.NET: The next generation of Data-Access Technology – ADO.NET Programming Objects and Architecture – Displaying Database Data – Programming with the DataList and DataGrid Controls – Working with the DataSet and DataTable Objects – Maintaining Data Integrity with the DataRelation Class – Using Manual Database Transactions – Working with Typed DataSet Objects. **Securing .NET Applications:** Windows Security – IIS Authentication and Authorization Security – A crash course in Cryptography – Implementing Data Encryption – ASD.NET Authentication Security.

Text Book

ASP.NET and VB.NET Web Programming –by Matt J. Crouch, Pearson.

Reference Books

1. Upgrading Microsoft Visual Basic 6.0 to .NET - by d Robinson, Michael Bond, Robert Ian Oliver, WP Publishers

2. Visual Basic.NET - by Shirish Chavan, Pearson

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Semester-V/ Ppr.no.32 / Major Practical - 5

Dot NET Practical Listing

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Build a homepage for XYZ Corporation using Web Controls.
2. Create a login page using user control in a web form.
3. Create a simple multiple choice questionnaire. Submit the answers and display the score.
4. Develop a project to input data through a web form to a database and retrieve the data. Use the calendar control to input date.
5. Develop a project to input data through a web form to a database and validate the data. Use the RequiredFieldValidator andRangeValidator Controls.
6. Check whether a given word or phrase is a palindrome using Web Service.
7. Create an online photo gallery using DataList and DataGrid Controls.
8. Develop code to send email from ASP.NET

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Semester-V/ Ppr.no.33(A)/ Major Elective - I (A)

Mobile Computing

Unit I

Basics of Communication Technologies: Components of a Wireless Communication System – Architecture of a Mobile Telecommunication System – Wireless Local Area Networks – Bluetooth Technology. **Introduction to Mobile Computing and Wireless Networking:** What is Mobile Computing ? Mobile Computing vs. Wireless Networking – Characteristics of Mobile Computing – Structure of Mobile Computing Application-Cellular Mobile Communication –Global System for Mobile Communications (GSM) – General Packet Radio Service (GPRS) – Universal Mobile Telecommunications System (UMTS).

Unit II

MAC Protocols: Properties required of MAC Protocols – Wireless MAC Protocols : Some Issues- A taxonomy of MAC Protocols –Fixed Assignment schemes – Random Assignment Schemes –Reservation based Schemes. **Mobile Internet Protocol:** Mobile IP – Packet Delivery – Overview of Mobile IP – Desirable features of Mobile IP- Key mechanism used in Mobile IP – Route Optimization – Dynamic Host Configuration Protocol.

Unit III

Mobile Transport Layer: Overview of TCP/IP – Terminologies of TCP/IP – Architecture of TCP/IP – An overview of the operation of TCP – Application Layer Protocols of TCP – TCP in Mobile Networks. **Mobile Databases** : Issues in Transaction Processing – Transaction Processing Environment –Data dissemination – Transaction Processing in Mobile Environment – Data Replication – Mobile Transaction Models – Rollback Process – Two-Phase Commit Protocol – Query Processing – Recovery.

Unit IV

Wireless Sensor Networks: WSN vs. MANET – Applications – Architecture of the Sensor Node – Challenges in the design of an effective WSN – Characteristics of Sensor Networks –WSN Routing Protocols –Target Coverage –Clustered Wireless Sensor Networks. **Operating Systems for Mobile Computing:** Special Constraints and requirements of Mobile O/S- A survey of Commercial Mobile Operating Systems – A Comparative study of Mobile OSs.

Unit V

Mobile Application Development and Protocols: Mobile Devices as Web Clients – WAP – J2ME – Android Application Development. **Mobile Commerce:** Applications of M-Commerce – Business-to-Business(B2B) Applications –Structure of Mobile Commerce –Pros and Cons of M-Commerce – Mobile Payment Systems.

Text Book

Fundamentals of Mobile Computing –by Prasant Kumar Pattnaik, Rajib Mall,, PHI.

Reference Books

1. Wireless and Mobile Communication, T.G. Palanivelu & R. Nakkeeran,PHI Learning Private Limited,2009
2. Wireless and Cellular Telecommunications, Third Edition William C.Y. Lee, McGraw Hill
3. Mobile Computing Technology, Applications and Service Creation, Asoke K. Talukder & Roopa R. Yavagal,TMH Publication
4. Wireless Communications and Networking made simple, Prof. Satish Jain, Vineeta Pillai, BPB Publications

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Semester-V/ Ppr.no.33(B)/ Major Elective – I (B)

Cryptography and Network Security

UNIT I

Services, mechanisms and attacks – The OSI Security architecture – A model for network Security – Symmetric Cipher model – Substitution techniques – Transposition techniques – Simplified DES – Block Cipher principles – the strength of DES – Block Cipher design principles and modes of operation.

UNIT II

Triple DES – Blow fish – RC5 – Advanced Symmetric Block Ciphers – RC4 Stream Cipher Confidentiality using Symmetric encryption – Introduction to Number theory – Public _ Key cryptography and RSA.

UNIT III

Key Management – Diffie Hellman Key exchange – Message authentication and hash function – Hash algorithms – Digital Signatures and authentication protocols – Digital signature standard.

UNIT IV

Authentication applications – Pretty good privacy – S\MIME – IP security – Web security considerations – Secure sockets Layer Transport layer security – Secure Electronic transaction.

UNIT V

Intruders – intrusion detection – Password management – Viruses and Related threats – Virus countermeasures – Firewall design principles - Trusted Systems.

Textbook :

William Stallings, “Cryptography and Network security Principles and Practice”, Fourth edition, Pearson Education Asia.

References:

1. Roberta Bragg, Mark Rhodes – Qusely , Keith Strassberg, “Network Security”, Tata McGraw-Hill, 2004.
2. Greg Holden , “Guide to Network Defense and counter measures”, Thomson Course Technology, 2003.

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Semester-V/ Ppr.no.33(C)/ Major Elective- I (C)

Cloud Computing

UNIT I:

Introduction Cloud Computing Introduction, From, Collaboration to cloud, Working of Cloud Computing, Pros and Cons, Benefits, Developing Cloud Computing Services, Cloud Service Development, Discovering Cloud Services.

UNIT II:

Cloud Computing For Everyone Centralizing Email Communications, Cloud Computing for Community, Collaborating on Schedules, Collaborating on Group Projects and Events, Cloud Computing for Corporation, Mapping Schedules Managing Projects, Presenting on Road.

UNIT III:

Using Cloud Services Collaborating on Calendars, Schedules and Task Management, Exploring on Line Scheduling and Planning, Collaborating on Event Management, Collaborating on Contact Management, Collaborating on Project Management, Collaborating on Word Processing, Spreadsheets, and Databases.

UNIT IV:

Outside The Cloud Evaluating Web Mail Services, Evaluating Instant Messaging, Evaluating Web Conference Tools, Creating Groups on Social Networks, Evaluating on Line Groupware, Collaborating via Blogs and Wikis.

UNIT V:

Storing And Sharing Understanding Cloud Storage, Evaluating on Line File Storage, Exploring on Line Book Marking Services, Exploring on Line Photo Editing Applications, Exploring Photo Sharing Communities, Controlling it with Web Based Desktops

TEXT BOOK:

Cloud Computing, Michael Miller, Pearson Education, New Delhi, 2009.

REFERENCE BOOK:

1. Cloud Computing, V. K. Pachghare, PHI Learning Pvt Ltd, 2016
2. Cloud Computing, Anthony T.Velte, Toby J.Velte, Pobert Elsenpeter, TMH, 2010
3. Cloud Computing Bible, Barrie Sosinsky, Wiley Publishing, Inc.

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Semester-VI/ Ppr.no.35/Core - 9

Operating Systems

Unit I

Introduction: What Operating system do – Computer System Organization – Computer System Architecture – Operating System Structures- Operating System Operation. **System Structures:** Operating System Services – System Calls – System Programs – Operating System Design and Implementation- Operation System Generation- System Boot.

Unit II

Process Concept: Process Concept- Process Scheduling –Operation on Processes- Inter Process Communication- Example of IPC System – Communication in Client – Server system. **Process Scheduling :** Basic concept-Scheduling criteria-Scheduling algorithm-Thread scheduling-Multiple Processor Scheduling-Real Time CPU Scheduling-Operating system example- Algorithm evaluation.

Unit III

Synchronization: Background - The Critical section problem-Peterson's solution - Semaphores – Classic problems of Synchronization. **DeadLocks:** System models-Deadlock Characterization-Methods for handling deadlock - Deadlock Prevention-Deadlock Avoidance-Deadlock detection - Recovery from deadlock.

Unit IV

Memory Management: Background – Swapping - Contiguous Memory allocation – Segmentation – paging. **Virtual Memory Management :** Background - Demand paging - Copy and Write-page replacement-Allocation of Frames - Thrashing.

Unit V

File System : File Concept-Access Method-Directory and Structure--File Sharing-Protection**. Implementing File System:** File System Structure - File System implementation-Directory implementation-Allocation Methods - Free Space Management**. Mass Storage Structure:** Overview of Mass Storage Structure-Disk Structure - Disk Scheduling - Disk Management

Text Book:

Operating System Concepts – Abraham Silberscartz, Peter Baer Galvin, and Greg Gange.

Addision Wesley Publishing Company – Ninth Edition.

Reference Books:

1. Operating System: Internal and Design Principles – Fifth Edition, William Stalling ,PHI Learning Private Limited.
2. Understanding Operating Systes: Ida M.Flynn ,Ann MclverMcHoes.

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Semester-VI / Ppr.no.36/Core – 10

Relational Database Management System

UNIT I

Introduction: Database - system applications-Purpose of Database Systems - View of Data- Database languages -Relational Databases - Database Design - Data Storage and Querying - Transaction Management - Database Architecture - Data Mining and Information Retrieval-Specialty Databases - Database Users and Administrators -– Intelligent Database System.

UNIT II

Introduction to the Relational Model and Introduction to SQL: Structure of Relational Databases -Database Schema-Keys-Schema Diagrams- Relational Query Languages-Relational Operations- Overview of the SQL Query Language -SQL Data Definition-Basic Structure of SQL Queries

UNIT III

SQL operations and Intermediate SQL : Additional Basic Operations-Set Operations-Null values-Aggregate functions- Nested Sub queries-Join Expressions – Views - Transactions-Integrity Constraints - SQL Data Types and Schemas-Authorization

UNIT IV

Entity-relationship(E-R) Modeling – Enhanced Entity-Relationship(EER) Model – Data Normalization

UNIT V

Implementation using Oracle: Creating Table-Modifying Table-Creating SEQUENCE-creating Views-PL/SQL- triggers-Stored procedures and Functions-cursors

Text Book:

1.Database System Concepts – Abraham Silberschatz, Henry F.Horth and S.Sudarashan, McGraw-Hill International Sixth Edition.

2. Essentials of Database Management Systems – Alexis Leon, Mathews Leon
(Chapter 4,5,8 – IV unit)

3. Oracle8i Jose A.Ramalho BPB Publications

Reference Books:

1. Database Management Systems, R.Panneerselvam, PHI Learning Private Limited
2. Database Management Systems, Ramakrishnan and Gehrke, Mc Graw Hill Publications
3. Relational Database Management Systems,P. Simon Navis, Ave Maria Publications
4. RDBMS Concepts and Database Designing, Dr. R.C. Goyal –Ebook url http://www.vssut.ac.in/lecture_notes/lecture1423726199.pdf
5. Fundamentals of Database Systems, Ramez Elmasri, Fourth Edition, Pearson Addison Wesley- EBook URL: http://www.uoitc.edu.iq/images/documents/informatics-institute/Competitive_exam/Database_Systems.pdf
6. An Introduction Relational Database Theory, Hugh Darwen, EBook URL: http://www.zums.ac.ir/files/research/site/ebooks/it-programming/an-introduction-to-relational-database-theory.pdf

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Semester-VI / Ppr.no.37 / Core - 11

Computer Graphics And Visualization

Unit I

Overview of Graphics System: Video Display Devices – Input Devices - Hard Copy Devices – Graphics Software. **Output Primitives**: Points and Lines –Line drawing algorithms – DDA algorithm- Bresenham's line algorithm- Circle drawing algorithms: properties of circles – Midpointcircle algorithm – Filled Area primitives.

Unit II

Attributes of Output Primitives: Line attributes – Curve attributes – Character attributes. **Two-Dimensional Geometric Transformation**: Basic Transformations – Matrix Representations and homogenous coordinates – Composite and other Transformations - Transformation between coordinate systems.

Unit III

Two-Dimensional Viewing: The viewing pipeline, Viewing co-ordinate reference frame – Window to view port co-ordinate transformation – Two-dimensional viewing function. **Clipping Operations**: Point clipping – Line clipping (only Cohen-Sutherland line clipping) – Polygon Clipping (only Sutherland-Hodgeman polygon clipping).

Unit IV

Interactive Input Methods: Input of graphical data – Input functions – Three dimensional display methods. **Three Dimensional Geormetric and Modeling Transformations**: Translation - Rotation - Scaling

Unit V

Three Dimensional Viewing: Viewing Pipeline, Projections. **Visible-surface deduction methods**: Back-face deduction – Depth buffer method-Scan Line Method.**Color Models and Color Applications**: RGB, YIQ, CMY and HSV color models

Text Book:

Computer Graphics C version, Second Edition, Donald Hearn, M.Pauline Baker, Pearson Publications.

Chapters: 2.1, 2.6, 2.7, 3.1, 3.2, 3.5, 4.1, 4.2, 4.5, 5.1 to 5.4, 6.1 to 6.8, 8.2, 8.3, 9.1,11.1 to 11.3, 12.1,12.3, 13.1 to 13.3,13.5, 15.4 to 15.7

Reference Books

1. Express Learning - Computer Graphics and Multimedia-ITL Education Solution Ltd.
2. Computer Graphics-A programming Approach 2/e-Steven Harrington-Mc Graw Hill Education Private Limited.
3. Computer Graphics, Multimedia and Animation - Malay K. Pakhira - PHI

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Semester-VI/ Ppr.no.38/Core - 12

Data Mining

Unit I

Introduction: What is Data Mining – why Data Mining Now – The data Mining Process – Data Mining Applications – Data Mining Techniques – Practical examples of Data Mining – The Feature of Data Mining – Guidelines for Successful Data Mining – Data Mining Software.

Unit II

Association Rule Mining: Introduction – Basics – The Task and Naïve Algorithm – The Apriori Algorithm – Improving the efficiency of the Apriori Algorithm – Apriori -TID – Direct Hashing and Pruning DHP-Mining Frequent Patterns without Candidate Generation – Performance Evaluation of Algorithms – Software for Association Rule Mining.

Unit III

Classification: Introduction – Decision Tree – Building a decision Tree- The Tree Induction Algorithm – Split Algorithm Based on the Information Theory – Decision Tree Rules – Decision tree summary – Naïve Bayes Method – Estimating Predictive Accuracy of classification Methods- Other Evaluation Criteria for classification methods – classification software.

Unit IV

Cluster Analysis: What is Cluster Analysis – Desires Features of cluster analysis – – Types of cluster analysis methods – Partitioned Methods – Hierarchical Methods – Density Based Methods- Dealing with Large Databases – cluster Analysis Software.

Unit V

Web Data Mining: Introduction – Web Mining- Web Technology and characteristics – Locality and Hierarchy in the web – Web content Mining – Web Usage Mining – Web Structure Mining – Web Mining Software.

Text Book:

Introduction to Data Mining with Case studies, G.K. Gupta, PHI Third Edition, 2015

Reference Books

1. Data Mining Concepts & Technologies, jiawei Han, Micheline kamber, Morgan Kaufmann, Second Edition, 2005.
2. Data Mining, vikram Pudi, p.Radha Krishna, OxfordUniversity Press, First Edition, 2009.
3. Data Warehousing – Reema Thareja Oxford University Press – 2009.
4. Insight into Data Mining Theory and Practice – K.p. Soman, Shyam Diwakar, V.Ajay, Prentice Hall of India – 2008

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Computer Science)

Semester-VI / Ppr.no.39/Major Practical - 6

RDBMS with Oracle Lab Listing

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Create an employee database with tables department, employee details, address, pay details and project details. Alter the tables and add constraints relevant to the fields in the tables. Insert records into all the tables.

2. Create queries to retrieve relevant information from a table.

3. Create a table from the existing tables. Create views from the tables.

4. Develop queries to retrieve information from more than one table. Develop summary queries to retrieve relevant information from the tables.

5. Create a partition table and query the records.

6. Create the table with abstract data type and query the records.

7. Write a PL/SQL program to print multiplication table

8. Write a PL/SQL program to check whether given string is palindrome or not

9. Write a PL/SQL program to print student details using Report

10. Create a procedure to calculate Electricity bill (use cursor)

11. Write a PL/SQL program to perform updation using various triggers

12. Write a PL/SQL program to find factorial of numbers using function and procedure

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Semester-V/ Ppr.no.40 (A)/ Major Elective - III (A)

BIG DATA ANALYTICS

UNIT I

What Is Big Data and Why Is It Important? - A Flood of Mythic "Start-Up" Proportions - Big Data Is More Than Merely Big - Why Now? - A Convergence of Key Trends - Relatively Speaking - A Wider Variety of Data - The Expanding Universe of Unstructured Data.

Industry Examples of Big Data: Digital Marketing and the Non-line World - Don't Abdicate Relationships - Is IT Losing Control of Web Analytics? - Database Marketers, Pioneers of Big Data - Big Data and the New School of Marketing - Consumers Have Changed. So Must Marketers. - The Right Approach: Cross-Channel Lifecycle Marketing - Social and Affiliate Marketing - Empowering Marketing with Social Intelligence

UNIT II

Fraud and Big Data - Risk and Big Data - Credit Risk Management - Big Data and Algorithmic Trading - Crunching Through Complex Interrelated Data - Intraday Risk Analytics, a Constant Flow of Big Data - Calculating Risk in Marketing - Other Industries Benefit from Financial Services' Risk Experience - Big Data and Advances in Health Care - "Disruptive Analytics" - A Holistic Value Proposition - BI Is Not Data Science - Pioneering New Frontiers in Medicine - Advertising and Big Data: From Papyrus to Seeing Somebody - Big Data Feeds the Modern-Day Donald Draper - Reach, Resonance, and Reaction - The Need to Act Quickly (Real-Time When Possible) -Measurement Can Be Tricky - Content Delivery Matters Too - Optimization and Marketing Mixed Modeling - Beard's Take on the Three Big Data Vs in Advertising - Using Consumer Products as a Doorway.

UNIT III

Big Data Technology : The Elephant in the Room: Hadoop's Parallel World - Old vs. New Approaches - Data Discovery: Work the Way People's Minds Work - Open-Source Technology for Big Data Analytics - The Cloud and Big Data - Predictive Analytics Moves into the Limelight - Software as a Service BI - Mobile Business Intelligence is Going Mainstream - Ease of Mobile Application Deployment - Crowdsourcing Analytics - Inter- and Trans-Firewall Analytics - R&D Approach Helps Adopt New Technology - Adding Big Data Technology into the Mix - Big Data Technology Terms - Data Size 101.

UNIT IV

Information Management : The Big Data Foundation - Big Data Computing Platforms (or Computing Platforms That Handle the Big Data Analytics Tsunami) - Big Data Computation - More on Big Data Storage - Big Data Computational Limitations - Big Data Emerging Technologies.

Business Analytics : The Last Mile in Data Analysis - Geospatial Intelligence Will Make Your Life Better - Listening: Is It Signal or Noise? - Consumption of Analytics - From Creation to Consumption - Visualizing: How to Make It Consumable? - Organizations Are Using Data Visualization as a Way to Take Immediate Action - Moving from Sampling to Using All the Data - Thinking Outside the Box - 360° Modeling - Need for Speed - Let's Get Scrappy - What Technology Is Available? - Moving from Beyond the Tools to Analytic Applications.

UNIT V

The People Part of the Equation : Rise of the Data Scientist - Learning over Knowing - Agility - Scale and Convergence - Multidisciplinary Talent - Innovation - Cost Effectiveness -Using Deep Math, Science, and Computer Science - The 90/10 Rule and Critical Thinking - Analytic Talent and Executive Buy-in - Developing Decision Sciences Talent - Holistic View of Analytics - Creating Talent for Decision Sciences - Creating a Culture That Nurtures Decision Sciences Talent - Setting Up the Right Organizational Structure for Institutionalizing Analytics.

Data Privacy and Ethics : The Privacy Landscape -The Great Data Grab Isn't New - Preferences, Personalization, and Relationships - Rights and Responsibility - Playing in a Global Sandbox - Conscientious and Conscious Responsibility - Privacy May Be the Wrong Focus - Can Data Be Anonymized? - Balancing for Counterintelligence – Now What?

TEXT BOOK

Michael Minelli, Michele Chamboss, Ambiga Dhiraj , "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for today's businesses" John Wiley , 2014

REFERENCE BOOKS

1. Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data, EMC Education Services

2. Bill Franks, Taming The Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics, Wiley, 2012

3. Arvind Sathi, Big Data Analytics: Disruptive Technologies for Changing the Game, MC Press, 2012

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Semester-V/ Ppr.no.40 (B)/ Major Elective - III (B)

ARTIFICIAL NEURAL NETWORKS

UNIT I

Introduction to Neural networks: Neural processing- Neural networks- an overview – the raise of neuro computing – introduction to artificial neural networks : introduction- artificial neural networks – historical development of neural networks – biological neural networks – comparison between the brain and the computer – artificial and biological neural networks – basic building blocks of artificial neural networks – artificial neural network terminologies.

UNIT II

Fundamental models of artificial neural networks: McCulloch-Pits neuron Model-Learning rules. Perceptron networks: Introduction –single layer perceptron –brief introduction to multi layer perceptron networks.

UNIT III

Feedback networks: Introduction- discrete Hopfield net-continuous Hopfield net-relation between BAM and Hopfield nets. Feed forward networks: introduction-back propagation networks.

UNIT IV

Kohonen self - organizing feature maps - counter propagation network: introduction-Full counter propagation network-Forward only propagation network.

UNIT V

Applications of Neural Networks: Applications of neural networks in Arts-Bioinformatics - Knowledge Extraction – Forecasting - Bankruptcy forecasting-Healthcare-Intrusion - Detection.

TEXT BOOK

Introduction to Neural Networks using MATLAB 6.0., S N Sivanandam S Sumathi S N Deepa Tata McGraw Hill, 2006

REFERENCE BOOKS

1.Artificial neural Networks B.Yegnanarayana, Prentice Hall India, 2005

2.Neural Networks Alogorithms, Applications and programming Techniques, James A Freeman David M Skapura, Pearson Education.

3.Neural Networks for Pattern Recognition, Christopher M. Bishop, Indian Edition, OXFORD University Press

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Semester-V/ Ppr.no.40 (C)/ Major Elective - III (C)

INTERNET OF THINGS

UNIT I

M2M to IoT-The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, A use case example, Differing Characteristics.

UNIT II

M2M to IoT – A Market Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies.

M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.

UNIT III

M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management

UNIT IV

IoT Architecture-State of the Art – Introduction, State of the art,

Architecture Reference Model- Introduction, Reference Model and architecture, IoT reference Model

UNIT V

IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.

Real-World Design Constraints- Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remote control.

TEXT BOOK

Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, **"From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence",** 1st Edition, Academic Press, 2014.

REFERENCE BOOKS

1. Vijay Madisetti and Arshdeep Bahga, **"Internet of Things (A Hands-on-Approach)",** 1stEdition, VPT, 2014.

2. Francis daCosta, **"Rethinking the Internet of Things: A Scalable Approach to Connecting Everything",** 1st Edition, Apress Publications, 2013.

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI

UG **COURSES – AFFILIATED COLLEGES**

B.Sc. Electronics
(Choice Based Credit System)

(with effect from the academic year 2016-2017 onwards)

(45th SCAA meeting held on 09.02.2017

Sem.	Pt. I /II/III/IV/V	Sub. No.	Subject status	Subject Title	Hrs./ Week	Credits	Marks				
							Maximum			Passing minimum	
							Int.	Ext.	Tot.	Ext.	Tot.
V	III	29	Core - 6	Microprocessors and Microcontrollers	4	4	25	75	100	30	40
		30	Core – 7	Medical Electronics	4	4	25	75	100	30	40
		31	Core - 8	Mathematics for Electronics	4	4	25	75	100	30	40
		32	Major Practical -5	Microprocessors and Microcontrollers Lab	8	4	50	50	100	20	40
		33	Major Elective –II (Select any one)	A)Television Engineering B)Communication System	6	5	25	75	100	30	40
	IV	34	Skill Based subject (Common)	Personality Development/ Effective Communication/ Youth Leadership	4	4	25	75	100	30	40
				Subtotal	30	25					

Sem.	Pt. I /II/III/IV/ V	Sub. No.	Subject status	Subject Title	Hrs./ Week	Cre-dits	Marks				
							Maximum			Passing minimum	
							Int.	Ext.	Tot.	Ext.	Tot.
VI	III	35	Core - 9	Power Electronics	4	4	25	75	100	30	40
		36	Core – 10	Semiconductor Fabrication Technology	4	4	25	75	100	30	40
		37	Core - 11	Robotics	4	4	25	75	100	30	40
		38	Core - 12	Mobile Communication	4	4	25	75	100	30	40
		39	Major Practical -6	Power Electronics and System Design Lab	8	4	50	50	100	20	40
		40	Major Elective -III	A) Hardware Development B) Embedded System & RTO'S	6	5	25	75	100	30	40
				Subtotal	30	25					

MSU/2016-17/UG-Colleges/Part-IV/(B.SC.ELECTRONICS)/
Semester-V/ Ppr.no.29/ Core - 6

MICROPROCESSORS AND MICROCONTROLLERS

UNIT I

Architecture of 8085 -Instruction set – Data Transfer, Arithmetic, Logical, Branching and I/O Instruction, Instruction types- various Addressing Modes. Different 8 bit & 16 bit processors Z80, MC 6800 & INTEL 8086, Timing sequence- Instruction cycle- Machine cycle- Halt wait state-. ALP- Mnemonic - simple Assembly language program flow chart stack and subroutines- Interrupts.

UNIT II

Peripheral device – Programmable peripheral Interface (8255 A) - Programmable Interrupt controller (8259 A) - USART- Serial Communication Interface. Programmable DMA Controller (8257), Interfacing –Analog to Digital Converter- Digital to Analog Converter-Traffic Light Controller- Stepper Motor – Key Board & Display Interface.

UNIT III

Intel 8051 microcontroller – Block Diagram, pin out – oscillator and clock – Program Counter and Data pointer, A and B registers, flags and program status word – Internal RAM – the Stack and Stack pointer –special functions registers – Internal ROM – I/O Pins, ports and circuits – External memory. Counters, Timers and Addressing Modes
Timer counter interrupts – Timing – Timer – Modes of operation – Counting – Addressing.

UNIT IV

Data exchanges – Logical operations – Byte level operation – Bit level logical operations – Rotate and swap operations – Arithmetic operations – Jump and call instructions – Jump and call program range – Jumps – Calls and subroutines – Interrupts and return.

UNIT V

Assembly Language programming for 8051 Micro controller family – Programs 8–Bit addition – 8–Bit subtraction – 8-Bit Multiplication – 8-Bit Division - Greatest and smallest number in an array – ascending and Descending – Delay –Routines – Calculation of Time delay – Block data transfer. Interfacing Keyboard –Scanning programs for small keyboards – Interfacing LED, LCD Display – Pulse measurement and pulse width measurement – A/D and D/A Interfacing.

REFERENCE BOOKS

1. Microprocessor and Interfacing: Programming and Hard ware, Douglas V.Hall,Mc GrawHill, New York (1988)
2. Microprocessor Architecture Programming and applications with 8085/ 8080A. S.Ramesh Goankar, Wiley Eastern Limited(1986)
3. Digital systems & Microprocessor Douglas V.Hall, Mcgraw Hill.
4. Microprocessor- Srinath, PHI Ltd.
5. 8051 Micro controller Architecture, Kennath J. Ayala, Programming and applications, Penram International Publishing
6. Microprocessor Principles and Applications – 2nd Edition, Gilmore – Tata McGraw Hill.

MSU/2016-17/UG-Colleges/Part-IV/(B.SC.ELECTRONICS)/
Semester-V/ Ppr.no.30/Core - 7

MEDICAL ELECTRONICS

UNIT I

Transducer and its principles –active transducers-passive transducers- transducers in bio medical applications-resting and action potentials-propagation of action potentials-bio electric potentials- bio potential electrodes.

UNIT II

The heart and cardio vascular system–blood pressure-characteristics of blood flow-heart sounds-electro cardio graphy ECG Recorder Principles-measurement of blood pressure, blood flow and cardiac output-pletnysmography- measurement of hearts sounds.

UNIT III

Patient care and monitoring- the elements of intensive care monitoring-diagnosis calibration and reparability of Patient monitoring equipment-pace makers-defibrillators.

UNIT IV

Psycho physiological measurements –testing motor responses-sensory measurements –bio feed back instrumentation-bio telemetry introduction physiological parameters- bio telemetry components-application of telemetry.

UNIT V

X-ray machine-computer tomography (CT scanner) - Magnetic Resonance Imaging system- Ultra sonic imaging system. Colour Doppler.

TEXT BOOKS

1. Bio medical instrumentation and measurements – Leslie Cromwell, Fred

   J.Weibell and Erich A Pfeiffer-PHI, second edition-1996

2. Hand book of Bio medical instrumentation- R.S.Khandpur, Tata McGraw Hill

   1997 (Unit V: Chapter 19, 20, 21).

MSU/2016-17/UG-Colleges/Part-IV/(B.SC.ELECTRONICS)/
Semester-V/ Ppr.no.31/Core - 8

MATHEMATICS FOR ELECTRONICS

UNIT I

Finite differences-difference table operator E, Δ, D-Relations between these operators-Difference equations- Linear difference equation Homogeneous linear difference equation with constant coefficients

UNIT II

Interpolation using finite differences-Newton Gregory formula for forward interpolation-Divided differences-properties-Newtons formula for unequal intervals-Lagranges formula-Relation between ordinary differences and divided differences

UNIT III

Solutions of algebraic and Transcedental equation iterative method, Bisection method, Newton raphson method. Solution of simultaneous Linear equations-Gauss method-Gauss Jordan method – Iteration method-Gauss Seidel method

UNIT IV

Theory of equation-relation between roots and coefficients-Transformation of equation

UNIT V

Reciprocal equation –approximate solution of equation-Newton's method and Horner's method

BOOKS FOR REFERENCE

1. Mathematics For Electronics-K.C Pillai
2. Numerical analysis-Armugam and Isaac
3. Numerical analysis-Gupta and Kapoor
4. Theory ofequation-Armugam and Isaac
5. Algebra-Manikavasagam pillai

MSU/2016-17/UG-Colleges/Part-IV/(B.SC.ELECTRONICS)/ Semester-V/ Ppr.no.32/ Major Practical -VI

MICROPROCESSOR AND MICROCONTROLLER LAB

All experiments have to be carried out compulsorily from A and B

A. Microprocessor Lab

1. Program for 8 Bit Addition and Subtraction
2. Program for16 Bit Addition and subtraction
3. Program for 8 Bit Multiplication and division
4. Program for 16Bit Multiplication and Division
5. Program for Square and Square root of a number
6. Program for Sorting and Searching
7. Program for Smallest and Largest number in a array.
8. Program for Reversing a String
9. Program for Fibonacci series.
10. Program for Factorial of a number
11. Program for B.C.D to Binary, Binary to B.C.D, A S C I I to Binary,
12. Binary to ASCI I Conversion
13. Six letter word display.
14. Rolling display
15. Interfacing seven segment display to display any character.
16. Program to display Time(Hours and Minutes)
17. Program for 1's complement and 2's complement of 8 bit and 16 bit data
18. Interfacing Traffic light controller
19. Interfacing Stepper motor control
20. Interfacing Matrix Keyboard
21. Interfacing A.D.C
22. Interfacing D.A.C
23. Study of 8255 chip and generation of
    1. Square wave
    2. Triangular wave
    3. Saw Tooth wave

B. Microcontroller 8051 Lab

1. Addition – 8 bit, 16 bit.
2. Subtraction – 8 bit, 16 bit.
3. Multiplication 8 bit
4. Division 8 bit
5. Array addition (multibyte)
6. Logical Operations – AND, OR, NOT
7. Decimal to ASCII and ASCII to Decimal.
8. Decimal to Hexa and Hexa to Decimal.
9. Ascending Order.
10. Descending Order
11. Up/down Counter
12. Block data transfer
13. Interfacing with LCD.
14. Interfacing with Matrix Keypad.
15. Square wave generator
16. Interfacing with ADC.
17. Interfacing with DAC.
18. Digital Clock.
19. Interfacing with Stepper Motor.

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MSU/2016-17/UG-Colleges/Part-IV/(B.SC.ELECTRONICS)/
Semester-V/Ppr.no.33 (A) / Elective – II (A)

TELEVISION ENGINEERING

UNIT I

Elements of Television system: Basic block schematic of television transmitter and receiver, Analysis of Television pictures, Scanning, human factor consideration, flicker, interlaced scanning, number of scanning lines, Horizontal and vertical resolution, maximum video frequency, Colour resolution and bandwidth, Composite video signal, video signal dimensions, vertical and horizontal synchronization signal dimensions, channel bandwidth, vestigial side band transmission, channel bandwidth and allocations for colour transmission.

UNIT II

Television camera and transmitters: Photoelectric effects, Working principle of image orthicon, vidicon, plumbicon, CCD, structure of CCD and its working, Monochrome and Colour television camera: block schematic explanation, TV transmitters: Positive and negative modulation and its comparison, high level and low level modulation and its comparison. Colour TV picture tubes: purity and convergence, Delta gun, PIL, Trinitron tubes, LCD screens.

UNIT III

Monochrome and colour reception, Monochrome receiver: Detailed block schematic, Yagi antenna, BALUN transformers, RF tuner, electronic tuning, SAW filters, IF conversion, VSB reception and correction, video detector, AGC: delayed AGC and Keyed AGC, video amplifier, cathode and grid modulation, sync separation, horizontal and vertical deflection circuits and wave forms, sound separation. Power supplies: SMPS and block schematic explanation, EHT generation.

UNIT 1V

Colour Television: Compatibility consideration, Colour response of human eye, Three colour theory, additive mixing of colours, chromaticity diagram, Luminance and chrominance, colour difference signal and its generation, Polarity of colour difference signal, Frequency interleaving and Colour burst signal, delay lines, Basic colour television systems: PAL and NTSC, Block schematic explanation.

UNIT V

Television applications: CCTV and its functional block schematic, Cable television: converters, cable connections, and and Satellite television: Dish antenna, LNB, down converters, Video discs: VCD and DVD, Digital recording, LASER source, High definition television.

BOOKS FOR REFERENCE

1. Monochrome and colour television: R R Gulati, Wiley Eastern.
2. Colour Television, Theory and Practice: S P Bali, Tata Mc Graw Hill.
3. Television engineering: A M Dhake, Tata Mc Graw Hill
4. Basic Television Engineering: Bernad Grob, Mc Graw Hill.

MSU/2016-17/UG-Colleges/Part-IV/(B.SC.ELECTRONICS)/
Semester-V/ Ppr.no.33 (B) / Elective – II (B)

COMMUNICATION SYSTEM

UNIT I

Introduction: communication systems – Modulation - need for modulation- bandwidth- Amplitude modulation - theory- mathematical representation- frequency spectrum - USB & LSB- power relation- Frequency modulation - theory- mathematical representation- frequency spectrum- Phase modulation- comparison of AM- FM- PM.

UNIT II

Radio transmitters: AM transmitter - block diagram - Solid state modulators - circuit explanation- FM transmitter - reactance modulator- varactor diode modulator- Amstrong modulator.

UNIT III

Radio receivers: Tuned radio frequency receiver- superheterodyne receiver - block schematic- selectivity- sensitivity- importance of IF - image frequency rejection - AM receivers - schematic explanation - RF amplifiers - circuit explanation - Mixer circuits - IF amplifiers - circuit explanation- simple diode detector - Automatic gain control circuit - simple and delayed AGC - FM receivers - block schematic explanation - amplitude limiting - FM demodulators: slope detectors- phase discriminator- ratio detectors.

UNIT IV

Side band communication: Single side band transmission - suppression of carrier - balanced modulator - filtering of unwanted sideband - SSB receivers - block schematic explanation - pilot carrier receiver - suppressed carrier receiver - Vestigial side band transmission - transmitter and receiver responses - advantages of VSB in television.

UNIT V

Telephone Systems - Telephone subscribers loop circuit - subscribers line interface circuit - Pulse and tone signaling - Frequency assignments - Electronic telephone - block schematic of a telephone set- block schematic of single line analog SLIC board - two wire repeaters - Electronic private automatic branching exchange - basic block schematic- Power line communication: block schematic explanation- Facsimile - FAX transmitter and receiver.

BOOKS FOR REFERENCE

1. Electronic communication Systems: Wayne Tomasi- Pearson Edn.
2. Electronic communication: Roody and Coolen- PHI.
3. Electronic Communication systems: George Kennedy- Mc Graw Hill.
4. Electronic and radio engineering: A P Mathur.
5. Telephony and Carrier current engineering: P N Das.
6. Modern communication Systems: Couch- PHI.

MSU/2016-17/UG-Colleges/Part-IV/(B.SC.ELECTRONICS)/ Semester-VI / Ppr.no.35 / Core - 9

POWER ELECTRONICS

UNIT I

Power Devices: Need for semiconductor power devices, Power diodes, Enhancement of reverse blocking capacity, Introduction to family of thyristors.

Silicon Controlled Rectifier (SCR): structure, I-V characteristics, Turn-On and Turn-Off characteristics, ratings, Factors affecting the characteristics/ratings of SCR, Gate-triggering circuits, Control circuits design and Protection circuits, Snubber circuit.

UNIT II

Diac and Triac: Basic structure, working and V-I characteristic of, application of a Diac as a triggering device for a Triac.
Insulated Gate Bipolar Transistors (IGBT): Basic structure, I-V Characteristics, switching characteristics, device limitations and safe operating area (SOA) etc.
Power MOSFETs: operation modes, switching characteristics, power BJT, second breakdown, saturation and quasi-saturation state.

UNIT III

Power Inverters: Need for commutating circuits and their various types, d.c. link invertors, Parallel capacitor commutated invertors with and without reactive feedback and its analysis, Series Invertor, limitations and its improved versions, bridge invertors.

UNIT IV

Choppers: basic chopper circuit, types of choppers step-down chopper, step-up chopper, operation of d.c. chopper circuits using self commutation, cathode pulse turn-off chopper, load sensitive cathode pulse turn-off chopper (Jones Chopper), Morgan's chopper Application of SCR: SCR as a static switch, phase controlled rectification, single phase half wave, full wave and bridge rectifiers with inductive & non-inductive loads; AC voltage control using SCR and Triac as a switch.

UNIT V

Heating – Resistance welding – Seam welding – Induction heaters – High voltage DC transmission – Fan regulator using TRIAC. Electromechanical Machines: Principle of operation Thyristor based speed control of dc motors, AC motor.

BOOKS FOR REFERENCE

1. Power Electronics, P.C. Sen, TMH
2. Power Electronics & Controls, S.K. Dutta
3. Power Electronics, M.D. Singh & K.B. Khanchandani, TMH
4. Power Electronics Circuits, Devices and Applications, 3rd Edition, M.H. Rashid, Pearson Education
5. Power Electronics, Applications and Design, Ned Mohan, Tore.
6. Power Electronics, K. HariBabu, Scitech Publication.
7. Power Electronics, M.S. Jamil Asghar, PHI.
8. A Textbook of Electrical Technology, B.L. Thereja, A.K. Thereja, S.Chand
9. Industrial electronics – G.K. Mithal, Khanna Publications – Delhi – 15th Ed. 1992.
10. Industrial and power electronics – C. Harish – Raj Umesh Publications – 4th Edn. 1992.
11. Basic electronics and linear circuits – N.N. Bhargava, D.C.Kulsheshtha and S.C.Gupta – Tata McGraw Hill - 1987.

SEMICONDUCTOR FABRICATION TECHNOLOGY

UNIT I

Introduction: General classification of integrated circuits – Scale of integration – Advantages over discrete components.

UNIT II

Thick film technology: Features of hybrid IC technology – Thick film conductors – Dielectric – Resistors – Thick film processing – Thick film substrate – Design ideas – Advantages and applications.

UNIT III

Thin film technology : Thin film conductors – resistors – dielectric – substrates – thin film processing – Advantages and applications – Monolithic IC process : Growth and refining of Si crystals – Substrate slicing and polishing – Wafer preparation – Diffusion – Ion implantation – Oxidation – Photolithography – CVD – Epitaxial grown – Metallization – Monolithic resistors and capacitors.

UNIT IV

Introduction – Modern VLSI devices – High field effect – MOSFET devices – long channel & short channel MOSFET.

UNIT V

Bipolar devices – n.p.n. transistor – characteristics of typical n.p.n. transistor – Bipolar device design – Design of emitter, base and collector region – concept of HDL.

TEXT BOOKS

1. Integrated Circuits (K.R. Botkar) . Unit (i, ii, iii).
2. Fundamentals of Modern VLSI Devices by Yuan Taur and Tak H. NING
   Cambridge Publishers. unit (iv and v)

BOOKS FOR REFERENCE

1. Basic VLSI Design Systems and Circuits by Dougles A. Pucknell and Kamran
   Eshragian, PHI.
2. Device Electronics for Integrated Circuits – Richard Maller.
3. Integrated Electronics – Millman & Halkars.
4. VLSI Technology – S.M. Sze.

MSU/2016-17/UG-Colleges/Part-IV/(B.SC.ELECTRONICS)/
Semester-VI/ / Ppr.no.37/Core - 11

ROBOTICS

UNIT I

Introduction Robotics and programmable automation, historical background, laws of robotics, robot definition, robot anatomy and systems, human systems and robotics. specification of robotics

UNIT II

Robot Drives, Actuators And Control Function of drive systems, general types of fluids, pump classification, pneumatic system, electrical drives, DC: motors, stepper motor and drives mechanisms

UNIT III

Robot End-Effectors Classification of end-effectors, drive system for grippers, mechanical, magnetic, vacuum and adhesive grippers, hooks, scoops and others devices, active and passive. Grippers

UNIT IV

Sensors And Intelligent Robots Artificial intelligence and automated manufacturing, AI and robotics, need for sensing systems, sensory devices, types of sensors, robot vision systems-Robot Languages and programming Different languages, classification of robot languages, computer control and robot software, VAL systems and languages

UNIT V

Application of Robots - Capabilities of robots - Robotics applications-Obstacle avoidance - Other uses of Robots - Robotic application in Computer Integrated Manufacturing environment - Robotics in india-Future of Robotics.

TEXT BOOK

l. Robotics techology and flexible automation by S.R. DEB Tata Mc Graw Hill

REFERENCE BOOKS

1. Robotics principles and practice by Dr. K.C. Jain and Dr. L.N Agarwal from Khanna publishers
2. Introduction to robotics, mechnics and control by John J. Craig from Addison Wesley;

MSU/2016-17/UG-Colleges/Part-IV/(B.SC.ELECTRONICS)/
Semester-VI/ / Ppr.no.38/Core - 12

MOBILE COMMUNICATION

UNIT I

Introduction to Cellular Mobile System, Performance criteria, uniqueness of mobile radio environment, operation of cellular systems, Hexagonal shaped cells, Analog and Digital Cellular systems, General description of the problem, concept of frequency channels, Co-channel Interference Reduction Factor, desired C/I from a normal case in a omni directional Antenna system, Cell splitting, consideration of the components of Cellular system.

UNIT II

Introduction to Co-Channel Interference, real time Co-Channel interference, Co-Channel measurement, design of Antenna system, Antenna parameters and their effects, diversity receiver, non-co channel interference-different types, Signal reflections in flat and hilly terrain, effect of human made structures, phase difference between direct and reflected paths, constant standard deviation, straight line path loss slope, general formula for mobile propagation over water and flat open area, near and long distance propagation antenna height gain, form of a point to point model.

UNIT III

Sum and difference patterns and their synthesis, omni directional antennas, directional antennas for interference reduction, space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, high gain antennas, Numbering and grouping, setup access and paging channels channel assignments to

cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells, non fixed channelassignment, Handoff, dropped calls and cell splitting, types of handoff, handoff invitation, delaying handoff, forced handoff, mobile assigned handoff. Intersystem handoff, cell splitting, micro cells, vehicle locating methods, dropped call rates and their evaluation.

UNIT IV

Second generation and Third generation Wireless Networks and Standards, WLL, Bluetooth, GSM, IS-95, DECT, GSM architecture, GSM channels, multiplex access scheme, TDMA, CDMA.

UNIT V

Intelligent Cell Concept, Advanced Intelligent Network, SS7 Network and ISDN for AIN, AIN for Mobile communication, Asynchronous Transfer Mode Technology, Future Public Land Mobile Telecommunication System, Wireless Information Superhighway.

BOOKS FOR REFERENCE

1. W.C.Y. Lee, "Mobile Cellular Telecommunications", 2nd Edition, Tata McGraw Hill, 2006.
2. Gordon L. Stuber, "Principles of Mobile Communications", 2nd Edition, Springer International, 2007.
3. Theodore. S. Rapport, "Wireless Communications", 3rd Edition, Pearson Education, 2003.
4. Lee, "Wireless and Mobile Communications", 3rd Edition, McGraw Hill, 2006.
5. Jon W. Mark and Weihua Zhqung, "Wireless Communication and Networking", PHI, 2005.
6. R. Blake, "Wireless Communication Technology", Thompson Asia Pvt. Ltd., 2004.

MSU/2016-17/UG-Colleges/Part-IV/(B.SC.ELECTRONICS)/ Semester-VI/ / Ppr.no.39/Major Practical -VI

POWER ELECTRONICS AND SYSTEM DESIGN LAB

All experiments have to be carried out compulsorily from A and B

A .Power Electronics Lab Practical

1. Characteristics of S.C.R
2. Characteristics of U.J.T
3. Characteristics of D.I.A.C
4. Characteristics of Triac
5. Characteristics of Power MOSFET
6. Characteristics of IGBT
7. R Triggering for Thyristors
8. R C Triggering for Thyristors
9. U.J.T Triggering For Thyristors
10. Speed control of D.C Motor
11. UJT Relaxation Oscillator
12. AC Power Control.

B. Electronics Design Lab Practical

Students must use dotted boards or Group boards and interconnect the joints by soldering.
Soldering Practice

1.Design and construction of fixed voltage power supply
2. Design and construction of Dual power supply
2.Design and construction of switching power supply
3.Design and construction of 1.5 to 12 V power supply using multi tap transformer.
4.Design and construction of Burglar alarm using L.D.R
5.Design and construction of Temperature switch using Thermistor
6.Design and construction of Light sensitive switch using Photo diode
7.Design and construction of Audio amplifier using LM 380
8.Design and construction of Timer circuit
9.Design and construction of Decade counter/ Seven segment decoder
10.Design and construction of Logic probe

MSU/2016-17/UG-Colleges/Part-IV/(B.SC.ELECTRONICS)/
Semester-VI/Ppr.no.40(A) / Elective – 3 (A)

HARDWARE DEVELOPMENT

Suggestions for Hardware skill development areas

1. Design of a 4-20 mA transmitter for a bridge type transducer.

Design the Instrumentation amplifier with the bridge type transducer (Thermistor or any resistance variation transducers) and convert the amplified voltage from the instrumentation amplifier to 4 – 20 mA current using op-amp. Plot the variation of the temperature Vs output current.

2. Design of AC/DC voltage regulator using SCR

Design a phase controlled voltage regulator using full wave rectifier and SCR, vary the conduction angle and plot the output voltage.

3. Design of process control timer

Design a sequential timer to switch on & off at least 3 relays in a particular sequence using timer IC.

4. Design of AM / FM modulator / demodulator

Design AM signal using multiplier IC for the given carrier frequency and modulation index and demodulate the AM signal using envelope detector.Design FM signal using VCO IC NE566 for the given carrier frequency and demodulate the same using PLL NE 565.

5. Design of Wireless data modem.

Design a FSK modulator using 555/XR 2206 and convert it to sine wave using filter and transmit the same using IR LED and demodulate the same PLL NE 565/XR 2212.

6. PCB layout design using CAD

Drawing the schematic of simple electronic circuit and design of PCB layout using CAD

7. Microcontroller based systems design

Design of microcontroller based system for simple applications like security systems combination lock.

8. DSP based system design

Design a DSP based system for echo cancellation, using TMS/ADSP DSP kit.

MSU/2016-17/UG-Colleges/Part-IV/(B.SC.ELECTRONICS)/
Semester-VI/ Ppr.no.40(B)/ Elective – 3 (B)

EMBEDDED SYSTEM AND RTOS

UNIT I

Introduction to Embedded systems: Embedded systems - Application of Embedded Systems - processors in the system - Other Hardware units - software embedded to a system - Exemplar embedded system - Embedded system – on - chip (SOC) and in VLSI circuit

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UNIT II

Devices and Buses for device network: I/O Device - timer and counting devices - serial communication using I^2C, CAN and USB. Parallel communication using PCI, PCIX and advanced parallel High Speed Buses.

UNIT III

Device drivers for device and interrupts serving mechanism: Device drives-parallel port devices drive in a system, serial port Device Drivers in a system, Drivers for internal programmable timing Devices – Interrupt servicing Mechanism – Context and the periods for context switching, Deadline and Interrupt Latency.

UNIT IV

Embedded Software Delopment using IDE: Introduction to Integrated development environment (IDE) – programming concepts and embedded programming in Assembly and C – creating a New project – Adding Files to a project – Building a project – Debugging and simulating the application – Getting Embedded software into the Target system.

UNIT V

Real Time Operating System (RTOS): Introduction to basic concepts of RTOS, Basics of real time& embedded system operating systems, RTOS-Interrupt handling, task scheduling; embedded system design issues in system development process-Action plan, use of target system, emulator,use of software tools.

TEXT BOOKS

1. Rajkamal,"Embedded System-Architecture, Programming, Design"Tata Mc Graw Hill 2006.
2. Daniel W.Lewis"Fundamentals of Embedded Software" Prentice Hall of India, 2004.

REFERENCE BOOKS

1. David E Simon," An Embedded Software Primer" person Education Asia, 2006.
2. Frank Vahid, Embedded System Design – A Unified hardware & Software Introduction John Wiley, 2002.
3. SriramV.Iyer,Pankaj Gupte,Embedded Real Time Systems Programming"Tata Mc Graw Hill, 2004.
4. Steve Heath," Embedded System Design"II edition, Elsevier, 2003.
5. Arnold Berger," Embedded System Design: An Introduction to processes, Tools, and Techniques", CMP Books, 2001.
6. Wayne Wolf, "Computers as components" Morgan Kaufmann Publishers, 2005.
7. Douglas V Hall, "Microprocessors and Interfacing: Programming and Hardware", Tata McGraw – Hill, Second Edition, 2001.

MANONMANIAM SUNDARANAR UNIVERSITY

TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES

B.Sc. Mathematics

(Choice Based Credit System)
(with effect from the academic year 2016-2017 onwards)
(44th SCAA meeting held on 30.05.2016)

V	I	25	Core - 7	Real Analysis –II	7	5	25	75	100	30	40
	II	26	Core - 8	Mechanics	7	5	25	75	100	30	40
	III	27	Major Elective-I	A) Numerical Methods B) Astronomy – I C) Discrete Mathematics	6	5	25	75	100	30	40
		28	Major Elective-II	A) Combinatorial Mathematics B) Operations Research C) Coding Theory	6	5	25	75	100	30	40
	IV	29	Skilled Based subject (Common)	Personality Development/ Effective Communication/ Youth Leadership	4	4	25	75	100	30	40
				Subtotal	30	24					
VI	I	30	Core - 9	Abstract algebra –II	6	5	25	75	100	30	40
	II	31	Core - 10	Complex Analysis	6	5	25	75	100	30	40
	III	32	Core – 11	Number Theory	6	5	25	75	100	30	40
		33	Core - 12	Graph Theory	6	5	25	75	100	30	40
	IV	34	Major Elective-III	A) Fuzzy Mathematics – I B) Astronomy – II C) Mathematics Modelling	6	5	25	75	100	30	40
				Subtotal	30	25					

MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics) / Semester-V/ Core - 7

REAL ANALYSIS - II (105 Hours) (JMMA52)

Unit I Metric spaces – Examples – bounded sets – open ball – open sets – subspaces – Interior of a set.

Unit II Closed sets – closure – Limit points – Dense sets – complete metric space – Cantor's intersection theorem – Baire's Category Theorem.

Unit III Continuous functions on metric spaces : Functions - continuous at a point on the real line – Functions - Continuous – uniform continuous in a metric space – Discontinuous function or R^1.

Unit IV Connectedness and compactness : Connectedness – connected subset of R – connectedness and continuity – compact metric spaces – compact subset of R^1 – Heine Borel theorem.

Unit V **Riemann Integral :**
Sets of measure zero – Existence of the Riemann integral – Derivatives – Rolle's theorem – Fundamental theorem of Calculus – Mean value theorem – Cauchy's mean value theorem – Taylor's theorem.

Text Books:

Arumugam & Others – Modern Analysis

* Malic .S.C – Mathematical Analysis, Wiley Eastern Limited, New Delhi.

Books for Reference :

1. Tom .M. Apostal – Mathematical Analysis, II Edition, Narosa Publishing House, New Delhi (Unit I) (1997)
2. Goldberg .R – Methods of Real Analysis Oxford and IBH Publishing Co. New Delhi (200)
3. Viswanath Naik .K – Real Analysis, Emerald Publishers, Chennai.
4. Malic .S.C and Savitha Arora (1991) - Mathematical Analysis, Wiley Eastern Limited, New Delhi.
5. Berberian .S.K – First course in Real Analysis, Springer Verlag, New York.

MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics) / Semester-V/ Core - 8

MECHANICS (90 Hours) (JMMA53)

Unit I **Forces acting at a point :** Forces acting at a point – types of forces – Triangle of forces – Polygon of forces – Lami's theorem – Parallel Forces and moments – Resultant of two like parallel forces, unlike and unequal parallel forces – moment of a force – Varignon's theorem of moments.

Unit II **Equilibrium of Strings and Chains :** Equilibrium of strings and chains – Common catenary – Suspension bridge.

Unit III **Projectiles :** Projectiles : Equation of Path – Maximum height – Time of flight – Range.

Unit IV **Simple Harmonic Motion :** Simple harmonic motion (SHM) in a straight line – Geometrical representation – Composition of SHM's of same period in the same line and along two perpendicular direction – SHM as a curve – Simple pendulum – Simple equivalent pendulum. The seconds pendulum.

Unit V **Motion under the action of Central Forces :** Velocity and acceleration in Polar co-ordinates – Differential equation of Central Orbit – Pedal equation of Central Orbit.

Text Books :

- Venkataraman .M.K., - Statics, Agastiar Publications 2002, Trichy.
- Venkataraman .M.K, -A text book on Dynamics, 2001, Agastiar Publications, Trichy.

Books for Reference :

1. Venkataraman .M.K., - Statics, Agastiar Publications 2002, Trichy.
2. Venkataraman .M.K, - A text book on Dynamics, 2001, Agastiar Publications, Trichy.
3. Duraipandian .P, Laxmi Duraipandian and Muthumizh Jayapragasam, Mechanics, 2003, S.Chand and Company.

MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics) / Semester-V/ Major Elective – I (A)

NUMERICAL METHODS

Unit I Solution of Numerical algebraic and Transcendental Equations : bisection method – Newton's method. Criterion of order of convergence of Newton's method. Regula False method – Gauss elimination – Gauss Jacobi – Gauss Seidal method

Unit II **Finite Difference :** First and higher order differences – Forward and backward differences – Properties of Operator – Differences of a polynomial –Factorial polynomial – Error propagation operator E and E^{-1}. Relation among Δ, E, δ and D

Unit III Interpolation : Newton's Forward – backward, Gauss forward – backward interpolation formula – Bessel's formula. Divided differences – Newton's divided difference formula – Legrange's interpolation formule – Inverse interpolation formula.

Unit IV Numerical Differentation and Integration : Newtons forward and backward differences for differentiation – Derivatives using Bessel's formula – Trapezoidal rule, simpson's 1/3 rule & 3/8 rule – Weddle's rule.

Unit V **Difference Equations :** Definition – order and degree of difference equation – Linear difference equation – Finding complementary function – particular Integral – simple applications.

Text Books :

- Venkataraman .M.L – Numerical methods in Science and Engineering National Publishing Company V Edition 1998.

Books for Reference :

1. Kandasamy .P.K. Thilagavathy and K. Gunavathy 'Numerical Methods' S. Chand & Company Ltd. Edn. 2006.
2. B. Stephen John – Numerical Analysis
3. Venkatraman .M.L - Numerical methods in Science and Engineering National Publishing Company V Edition 1998.
4. Autar Kaw and Egwwn Enc Kalu - Numerical methods with Application Abidet. Autokaw.com 2nd 2011.

MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics) / Semester-V/ Major Elective – I (B)

ASTRONOMY - I

Unit I **Spherical Trigonometry**

Spherical triangle – The fundamental formula of Spherical trigonometry, the sine, cosine, four parts and Napier formula (without proof) and simple problems.

Unit II **The celestial sphere**

Celestial co-ordinates – Diurnal motion – Rising and setting of a star – sidereal time – circumpolar stars – Morning and evening stars - Twilight.

Unit III Earth – length of a day – Refraction – Tangent formula – Cassini's formula – Effects of refraction

Unit IV Geocentric parallax – Effects – Heliocentric parallax – Effects – Aberration - Effects

Unit V Kepler's laws – verification of Kepler's laws – True anomaly, mean anomaly, Eccentic anomaly – Relation between them.

Text Books :

- Kumaravelu .S and Susheela Kumaravelu – Astronomy for degree classes, Rainbow Printers, Nagercoil (2005).

Books for Reference :

1. Ramachandran .G.V - Astonomy

MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics) / Semester-V/ Major Elective – I (C)

DISCRETE MATHEMATICS

Unit I **(Mathematical logic)** Statement and notation – Connectives – Negation – Conjunction – Disjunctions – Statement formula and truth table – conditional and Biconditional – Well defined formulae – Tautologies – Equivalence of formulae – Quality laws – Normal forms.

Unit II **(Algebraic Structures)**
Groups and Monoids – Simple properties – group codes.

Unit III **(Lattices and Boolean algebra)**
Lattices and Posets – Properties of lattices – special lattices – Boolean algebra – Gating networks – Minimal sums of products – Karnaugh maps.

Unit IV **(Languages)**
Finite state Machines language – the set theory and strings – Finite state machine – A first encounter – Finite state machine – second encounter.

Unit V **(Number system and codes)**
Decimal, Binary, octal, Hexadecimal – Conversion from one to another – Binary addition, subtraction multiplication and division – BCD – weighted excess time – Gray code – ASCII Code,

Text Book:

- Tremblay and Manohar – Discrete Mathematical Structures with application to Computer Science, (Tata McGraw Hill, New Delhi) 1997.

Books for Reference :

1. Ralph P. Grumaldi Pearson Edelen – Discrete and Combinatorial Mathematics – an applied Introduction (IV edition)
2. Maluino .A and Leech – Digital Principles and Application McgraHill.
3. Venkataraman .M.K. and others – Discrete mathematics 2000 The National Publishing Company.
4. Balaji .G – Discrete Mathematics – Balaji Publishers, Chennai (2013)
5. Veerarajan .T – Discrete mathematics – Tata McGraw Hill – (2009)

MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics) / Semester-V/ Major Elective – II (A)

Combinatorial Mathematics

Unit I Selections and Binomial coefficients – Permutations – Ordered Selections – Unordered Selections – Miscellaneous Problems.

Unit II Pairings Problems - Pairings within a set – Pairings between sets – An optional assignment problem.

Unit III Recurrence – Fibonacci – type relations. Using generating functions – Miscellaneous methods.

Unit IV The inclusion – Exclusion Principles – The Principle – Rook Polynomials

Unit V Block designs – Square Block designs

Text Books :

1. Ian Andersen – A first course in combinatorial Mathematics – Clarendon Press, Oxford.

MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics) / Semester-V/ Major Elective – II (B)

Operations Research

Unit I **Linear Programming Problem :** Mathematical formulation of LPP – Simplex Method – Artificial variable technique – Concept of Duality – Primal and Dual Problems – Duality – Dual Simplex Method.

Unit II **Transportation Problem :** North-West Corner Rule – Matrix Minima method – Vogel's Approximation Method – MODI Method – Degeneracy and Unbalanced Transportation Problem.

Assignment Problem : Hungarian Method – Unbalance Assignment Problem

Unit III **Games and Strategies :** Two Person Zero sum Games – The Maximin – Minimax Principle – Games without Saddle Points – Mixed Strategies – Graphical Solution of 2 x n and m x 2 games – Dominance Property.

Unit IV **Network scheduling by PERT / CPM :** Network and basic components – Rules of Network Construction – Time Calculation in network – Critical Path Method – PERT Calculation.

Unit V **Inventory Control :** Introductions – Types of Inventories – Inventory decisions – Deterministic inventory Problem – EOQ problems with shortages.

Text Book:

- KantiSwarup, P.K. Gupta and Manmohan – Operations Research – Sultan Chand & Sons – 2006, 12th edition.

Books for Reference :

1. Gupta .P.K and D.S. Hira – Operations Research – S. Chand and Company.
2. Mokhtar S. Bazaraa, John J. Jarvis and Hanif D. Sherali - Linear Programming and Network Flows, 2nd Ed., John Wiley and Sons, India, 2004.
3. Hillier, F.S. and G.J. Lieberman - Introduction to Operations Research, 9th Ed., Tata McGrawHill, Singapore, 2009.
4. Hamdy A. Taha, - Operations Research, An Introduction, 8th Ed., Prentice – Hall India, 2006.
5. Hadley .G. - Linear Programming, Narosa Publishing House, New Delhi, 2002.

MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics) /
Semester-V/ Major Elective – II (C)

Coding Theory

Unit I Basic assumptions – Correcting and detecting error patterns – information rate – effects of error correction and detection – finding the most likely code word transmitted.

Unit II Linear codes – two important – subspaces independence – basic, dimension – matrices – Bases for C and C^+ generating matrices on coding.

Unit III Parity check matrices – equivalent codes – distance of a linear code – Linear codes – cosets – MLD for linear codes – Reliability of IMLD for linear codes.

Unit IV Some bounds for codes – perfect codes – hamming codes – extended codes – The extended Golay code – decoding the extended Golay code – Golay code.

Unit V Polynomials and words – introduction to cyclic codes – introduction to cyclic codes – Polynomial encoding and decoding – finding cyclic codes – Dual cyclic codes.

Text Book :

1. Coding theory, the essentials – Marcel Dekker, Inc. Madtrison Avenue, Newyork.

MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics) / Semester-VI/ Core - 9

ABSTRACT ALGEBRA II (105 Hours) (JMMA51)

Unit I **Vector Spaces :** Definition and examples – elementary properties – subspaces – linear transformation – fundamental theorem of homomorphism.

Unit II Span of a set – linear dependence and independence – basis and dimension - theorems

Unit III Rank and nullity Theorem – matrix of a linear transformation
Inner product space : Definition and examples – orthogonality – orthogonal complement – Gram Schmidt orthognalisation process.

Unit IV **Matrices :** Elementary transformation – inverse – rank – test for consistency – solving linear equations.

Unit V Cayley Hamilton theorem – Applications of Cayley Hamilton theorem – Eigen values and Eigen vectors – Properties and problems.

Text Book: Arumugam & others – Modern Algebra

Books for Reference :

1. Shama .J.N and Vashistha .A.R, "Linear Algebra", Krishna Prakash Nandir, 1981.
2. John B. Fraleigh, "A First Course in Abstract Algebra", 7th edition, Pearson, 2002.
3. Strang G., "Introduction to Linear Algebra", 4th edition, Wellesly Cambridge Press, Wellesly, 2009.
4. Artin M., "Abstract Algebra", 2nd edition, Pearson, 2011.

MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics) / Semester-VI/ Core - 10

COMPLEX ANALYSIS

Unit I **(Analytic functions)**

Functions of a complex variable – Derivatives – Cauchy – Riemann equations – sufficient conditions – Polar form – Analytic functions – Harmonic functions.

Unit II **(Integrals)**

Definite integrals – Contours – Cauchy – Goursat theorem – antiderivatives and independence of path – Cauchy Integral formula – Morera's theorem.

Unit III **(Series)**

Taylor's series – Examples – Laurent's series – Zeros of analytic functions – Residues – Residue theorem – Principal part of functions – Residues at poles.

Unit IV **(Evaluation of Integrals)**

Evaluation of improper real integrals – improper integrals involving sines and cosines – Definite integrals involving sines and coines.

Unit V **(Transformations)**

Conformal mappings – basic properties – Bilinear maps – fixed points - Applications

Text Book :

- Arumugam .S and T. Issac –"Complex Analysis" – Scitech Publishing House – Chennai.

Books for Reference :

1. Churchill .R.V. and J.W. Brown – "Complex variables and Applications" – IV edition – McGraw Hill International Editions.
2. Ponnuswamy .S – "Foundations of Complex Analysis", Narosa Publication House, New Delhi, II edition 2005.
3. Duraipandian .P and Lakshmi Duraipandian – "Complex Analysis" – Emerald Publications, Chennai (2001)
4. Shakarchi .R, Problems and solutions of Complex Analysis. Springer – Verlag, New York 1999.

MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics) / Semester-VI/ Core -11

NUMBER THEORY

Unit I Peano's Axioms – Mathematical Induction – The Binomial Theorem – Early Number Theory.

Unit II Division Algorithm – GCD – Euclidean Algorithm – The Diaphantine Equation $ax + by = c$.

Unit III The fundamental Theorem of Arithmetic – The Sieve of Eratosthenes – The Goldbach conjecture.

Unit IV Basis properties of congruences – Linear congruence and the Chinese Remainder Theorem.

Unit V Fermat's Theorem – Wilson's Theorem – The Fermat – Kraitchik Factorization Method.

Text Book:

- David .M. Burton - Elementary Number Theory (Sixth Edition) Tata McGraw Hill Education Pvt. Ltd.

Books for Reference :

1. Ivan Niven and H, Zuckerman - An Introduction to Theory of Numbers.
2. Kumaravelu .S, and Susheela Kumaravelu - Elements Theory - Nagercoil, 2002.

MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics) / Semester-VI/Core – 12

GRAPH THEORY (90 Hours)

Unit I Finite and infinite graphs – degree – Isolated vertex, pendent vertex and null graph – walks, paths and cycles (Definite and examples only) subgraphs – connected and disconnected graph, Eulerian and Hamiltonian

Unit II Trees and fundamental circuits – properties of Trees - distance and centre, binary tree, spanning tree, cut set and cut vertices - properties – connectivity.

Unit III Planar and dual graphs - different representation of planar graphs – Detection of planarity.

Unit IV Graph operations (unions, composition, product) matrix representation – incident, adjacency matrix – rank – cell set matrix – Relations, path matrix

Unit V Chromatic number – chromatic partitioning. Chromatic polynomial – domination – Covering (definition and examples only) - colouring – five colour Theorem - Four Colour problem.

Text Book:

- Arumugam .S and S. Ramachandran - Invitation to Graph Theory - Scitech Publications India Pvt. Limited Chennai (2004 edition)

Books for Reference :

1. Narasing Deo – Graph Theory with applications to Engineering and Computer Science - Hall of India Pvt. Ltd.
2. Kumaravelu .S – Graph Theory – Edition 1
3. Gowthem - Graph Theory
4. Roberts .F.S - Graph Theory and its Applications to problems of Society - SIAM. Odyssey Press, New Hamphire 1978.

MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics) / Semester-VI/ Major Elective – III (A)

FUZZY MATHEMATICS

Unit I **Crisp Sets – Fuzzy Sets –** Basic Types – Basic Concepts – Characteristics and Significance of the Paradigm shift.

Unit II Additional properties of α-cuts – representations of fuzzy sets – Extension principle for fuzzy sets.

Unit III **Fuzzy set operations –** Fuzzy complements – Fuzzy intersections : t-norms – Fuzzy Unions : t-conorms – Combinations of operations – Aggregation operations.

Unit IV **Fuzzy Numbers –** Linguistic variables – Arithmetic operations on intervals – Arithmetic operations of fuzzy numbers – Lattice of fuzzy numbers – Fuzzy Equations.

Unit V Fuzzy Decision Making – Individual Decision Making – Multi-person decision making – Fuzzy linear Programming.

Text Book:

* George J. Klir and Bo Bo Yuan – Fuzzy sets and Fuzzy Logic Theory Applications, Prentice Hall of India, 2002, New Delhi.

Books for Reference :

1. George J. Klir and Tina .A Folger – Fuzzy sets, uncertainty and Informations – Prentice Hall of India, 2003, New Delhi.

MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics) / Semester-VI/ Major Elective – III (B)

Astronomy - II

Unit I Equation of time – Seasons – Convertion of time.

Unit II Moon – sidereal month, Lunation and relation between them – Phases of moon – Lunar Liberation - surface of moon – metonic cycle – Tides.

Unit III Eclipses – shadow cone – Minimum and maximum number of eclipses.

Unit IV Planetary Phenomena – Bode's law – Elongation – Sidereal period, synodic period and the relation between them – Phases – Stationary points – solar system.

Unit V Stellar Universe – A brief history of Astronomy. Astronomial instruments – Galaxies and constellations.

Text Book:

- S. Kumaravelu and Susheela Kumaravelu – Astronomy Rainbow Printers, Nagercoil (2005)

Books for Reference :

1. George - O - Abell – Exploration of the Universe (Second Edition)

MSU/2016-17/UG-Colleges/Part-IV (B.Sc. Mathematics) / Semester-VI/ Major Elective – III (C)

Mathematical Modelling

Unit I **(Mathematical modelling through O.D.E (First order))**
Linear growth and Decay models – Non-linear growth and Decay models – Compartment Models – Dynamics Problems – Geometrical Problems.

Unit II Population dynamics – Epidemics – Compartment Models – Economics, Medicine, Arms race, Battles and International Trade.

Unit III (**Mathematical Modelling through O.D.E. (Second order))**
Planetary motion – circular motion – Motion of satellites – Modelling through linear difference equations of second order.

Unit IV **(Mathematical Modelling through difference equations)**
Basic theory of difference equation with constant coefficients – Economics and Finance – Population dynamics and genetics – Probability theory.

Unit V **(Modelling through graphs)**
Solutions that can be modelled through graphs - models in terms of directed graphs, signed graphs – weighted digraphs and unoriented graphs.

Text Book:

- Kapur .J.N – Treatment as in "Mathematical Modelling" – New Age International Publishes, 2004.

Books for Reference :

1. Kapur .J.N – Mathematical Modelling in Biology and Medicine – East West Press – 1985.
2. Singh – Mathematical Modelling, International Book house – 2003.
3. Frank R. Giordano, Maurice D.Weir and William P. Fox, - A first course in mathematical modelling, Thomson Learning, London and New York, 2003.

MANONMANIAM SUNDARANAR UNIVERSITY

TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES

B.Sc. Physics

(Choice Based Credit System)

(with effect from the academic year 2016-2017 onwards)

(44th SCAA meeting held on 30.05.2016

Sem	Pt I/II/ III/IV V/VI	Sub No.	Subject status	Subject Title	Hrs/ week	Credits	Marks				
							Maximum			Passing minimum	
							Int.	Ext	Tot.	Ext	Tot.
V	I	33	Core - 7	Basic Electronics	4	4	25	75	100	30	40
	II	34	Core - 8	Solid State Physics	4	4	25	75	100	30	40
	III	35	Elective – 1 (Select any one)	A)Spectroscopy B) Mathematical Physics	5	5	25	75	100	30	40
		36	Elective - 2	A) Communication Electronics B) Numerical Methods	5	5	25	75	100	30	40
		37	Practical -5	Non Electronics (No examination in the Fifth Semester)	3	-	50	50	100	20	40
		38	Practical - 6	Electronics (No examination in the Fifth Semester)	3	-	50	50	100	20	40
		39	Practical - 7	Computer Programming with C ++ (No examination in the Fifth Semester)	2	-	50	50	100	20	40
	IV	40	Skill Based subject (Common)	Personality Development / Effective Communication	4	4	25	75	100	30	40
				Subtotal	30	22					

VI	I	41	Core - 9	Digital Electronics	6	4	25	75	100	30	40
	II	42	Core - 10	Atomic And Nuclear Physics	6	4	25	75	100	30	40
	III	43	Core - 11	Quantum Mechanics	5	4	25	75	100	30	40
		44	Elective – 3 (select any one)	A.) Medical Physics B.) Energy Physics	5	5	25	75	100	30	40
		45	Practical - 5	Non Electronics	3	4	50	50	100	20	40
		46	Practical - 6	Electronics	3	4	50	50	100	20	40
		47	Practical - 7	Computer Programming with C ++	2	4	50	50	100	20	40
				Subtotal	30	29					

BASIC ELECTRONICS

UNIT-I: **LINEAR CIRCUIT ANALYSIS**

Constant voltage source, constant current source, conversion of voltage source into current source - Maximum power transfer theorem - Thevenin's theorem - Norton's theorem - hybrid parameters - determination of h parameter - equivalent circuit - the h parameters of a transistor.

UNIT-II: **SEMICONDUCTORS DIODES AND DEVICES**

PN Junction - V – I characteristics of PN Junction - Crystal diode as a rectifier - Zener diode - V – I characteristics of Zener diode -Tunnel diode. Half wave rectifier, centre - tap full wave rectifier - Full wave bridge rectifier - Comparison of Rectifiers - Filter Circuits - Types (capacitor filter, choke input filter, Π filter) -Zener diode as voltage stabilizer.

UNIT-III: **TRANSISTOR AMPLIFIERS**

Transistor action - Transistor connections - common emitter - common base -common collector - Analysis of amplifiers using h- parameters - RC coupled amplifier - transformer coupled amplifier - power amplifier - classification of power amplifiers (Class A, Class B and Class C) - Push pull amplifier - FET parameters - JFET characteristics.

UNIT-IV: **OSCILLATIONS AND WAVE SHAPING CIRCUITS**

Feedback principle and Barkhauson criterion - Hartley, Colpitt's, and Phase shift oscillators using transistors – Astable - Monostable and Bistable multi vibrators using transistors - Schmitt trigger - clipping and clamping circuits - Differentiating circuit - Integrating circuit.

UNIT-V: **OPERATIONAL AMPLIFIER**

Op-Amp - pin diagram- characteristics of ideal Op - Amp - DC and A.C analysis of Op-Amp - Bandwidth of an Op-Amp - Slew rate - Frequency response - Op- Amp with negative feedback - applications - Inverting amplifier - Input and output impedance of Inverting amplifier - Non inverting amplifier - Voltage follower- Summing amplifier - Adder - Subtractor - Integrator – Differentiator-low pass ,high pass and band pass filters

Books for study

1. Principles of Electronics - V.K.Mehta & Rohit Mehta-S.Chand &Co.

Books for reference

1. Electronic fundamentals and applications - John D. Ryder –Prentice Hall

2. Electronic principles - Malvino

3. Electronic devices and circuits - David Bell- Prentice Hall

4. Basic Electronics - B.Basavaraj, H.N.Shivashankar-2 nd edition-Universities press

5. Physics of semiconductor devices - Dilip K.Roy - Universities press

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Physics)/Semester-V/ Ppr.no.34/Core-8

SOLID STATE PHYSICS

UNIT-I: **CRYSTAL LATTICES**

Seven classes of crystals - Bravais Lattice in three dimensions - crystal structure - Simple Cubic, Face Centered Cubic, Body Centered Cubic and Hexagonal Close packed structure - Sodium Chrloride, Zinc Blende and Diamond Structure. Miller Indices and crystal planes - procedure for finding Miller Indices - interplanar spacing - Diffraction of X-Rays - Bragg's Law - reciprocal lattices - reciprocal lattice to SCC, BCC and FCC lattices.

UNIT-II: **TYPES OF MAGNETIC MATERIALS**

Classical Theory of Diamagnetism - Langevin's Theory of Para magnetism - Weiss Theory of Para magnetism - Ferromagnetism - Explanation of Heisenberg's internal field and quantum theory of ferromagnetism - Domain theory of ferromagnetism - Anti ferromagnetism - ferrites - Fundamental Definitions of Dielectrics - Different types of Electric Polarizations- electronic, ionic, orientation and space charge Polarizations - Dielectric Loss - Internal Field - Clausius – Mosotti Relation

UNIT-III: **BONDING IN SOLIDS**

Types of bonds in crystals - Ionic, covalent, Metallic, Vander waal's and Hydrogen Bonding - Bond energy of sodium chloride molecule - Comparison between ionic and covalent solids - variation of inter atomic force with inter atomic spacing -cohesive energy - cohesive energy of ionic solids - application to sodium chloride crystal - evaluation of Madelung constant f or sodium chloride.

UNIT-IV: **SUPER CONDUCTIVITY**

Introduction - General Properties of Superconductors - effect of magnetic field -Meissner effect - effect of current - thermal properties - entropy - specific heat -energy gap - isotope effect - London equations - Josephson effect - AC & DC Josephson effects - applications - Type–I and Type–II Superconductors - Explanation for the Occurrence of Super Conductivity - BCS theory - Application of Superconductors - High T_C superconductors.

UNIT-V: **NANOTECHNOLOGY**

Nanomaterials-synthesis and classsification -–techniques used in synthesis of nanomaterials-chemical vapour deposition-sol-gel technieque-electro deposition method-ball milling method-charecterisation - properties and applications of nanomaterials- fullerence, grapphine and carbon nanotubes

Books for Study

1. Solid State Physics - P.K.Palanisamy - SCITECH Publications pvt Ltd.Chennai
2. Nano-essentials and understanding - Pradeep.T.Mc-Graw-Hill Ltd.

Books for reference

1. Introduction to Solid State Physics - Kittel - Wiley and Sons,New Delhi

2. Material Science and Engineering - V. Raghavan - PHI

3. Introduction to Solids -Azaroff - TMH

4. Material Science - M.Arumugam - Anuradha Publishers

5. Solid State Physics - H.C.Gupta -Vikas publishing house pvt.Ltd.

6. Principles of Nanoscience and technology - Shah M.A.Ahmed,Narosha publishing house pvt.Ltd.

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Physics) Semester-V/ Ppr.no.35(A)/

Major Elective – I (A)

SPECTROSCOPY

Unit - I

Microwave Spectroscopy

Rotation of molecules – Classification of molecules – Rotation spectra of diatomic molecules – Intensities of Spectral lines – Effect of Isotopic Substitution – Non-rigid rotator – Spectrum of a Non-Rigid Rotator –Polyatomic Molecules – Symmetric Top molecules – Asymmetric Top molecules -Techniques and Instrumentation – Chemical analysis by Microwave spectroscopy.

Unit – II

Infrared Spectroscopy

I.R. Spectroscopy – Vibrating diatomic molecules – Simple Harmonic Oscillator - Anharmonic oscillator – Diatomic vibrating rotator – IR Spectrum of carbon monoxide - Interaction of rotations and vibrations – Vibration of Polyatomic molecules – Analysis by IR techniques.

Unit – III

Raman Spectroscopy

Raman effect: Discovery – Quantum theory of Raman effect – Classical theory of Raman Effect – Pure rotational Raman Spectra- Linear molecules – Raman Spectrum of symmetric top molecules - Vibrational Raman spectra – Rule of mutual exclusion – Overtone and Combination Vibrations - Rotational Fine Structure – Polarization of light and the Raman Effect - Structure determination from IR and Raman spectroscopy.

Unit – IV

Electronic spectroscopy

Born - Oppenheimer approximation – Vibrational coarse structure: Progressions – Frank-Condon principle – Dissociation energy and Dissociation products – Rotational Fine Structure of Electronic Vibration Transitions - Fortrat diagram - Predissociation – Diatomic molecules.

Unit – V

5. Instrumentation

Instrumentation and Techniques in Infrared spectroscopy – Sources – Monochromators – Sample cells – Detectors – Single beam Infra red spectrometer – Double beam Infra red spectrometer.

Book For Study

Fundamentals Of Molecular Spectroscopy - Colin N Banwell Elaine- M Mccash Fifth Edition

Book For Reference

1.Molecular structure and spectroscopy - G. Aruldhas, PHI Learning Pvt. Ltd, India.

2.Hand book of Analytical Instruments -R.S. Khandpur, Tata MC Grow Hill Ltd.

3.Spectroscopy -G.R. Chatwal and S.K. Anand, Himalaya publishing House, New Delhi.

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Physics)/Semester-V/ Ppr.no.35(B)/

Major Elective – I (B)

MATHEMATICAL PHYSICS

UNIT-1 – VECTORS

Vectors and scalars-Vector algebra-The scalar product-The vector (cross or outer) product-The triple scalar product-The triple vector product-The linear vector space Vn- Vector differentiation -Space curves - Motion in a plane - A vector treatment of classical orbit theory - Vector differential of a scalar field and the gradient - Conservative vector field - The vector differential operator - Vector differentiation of a vector field - The divergence of a vector - The operator ∇^2, the Laplacian - The curl of a vector.

UNIT – 2: DIFFERENTIAL EQUATION

First-order differential equations - Separable variables -Exact equations-Integrating factors - Bernoulli's equation- Second-order equations with constant coefficients - Nature of the solution of linear equations - General solutions of the second-order equations - Finding the complementary function - Finding the particular integral - Rules for D operators - The Euler linear equation - Solutions in power series.

UNIT – 3: MATRIX

Definition of a matrix - Four basic algebra operations for matrices - Equality of matrices - Addition of matrices - Multiplication of a matrix by a number - Matrix multiplication - The commutator - Powers of a matrix - Functions of matrices - transpose of a matrix - Symmetric and skew-symmetric matrices - The matrix representation of a vector product - The inverse of a matrix - A method for finding A-1 - Systems of linear equations and the inverse of a matrix - Complex conjugate of a matrix - Hermitian conjugation - Hermitian/anti-Hermitian matrix - Orthogonal matrix (real) - Unitary matrix - Rotation matrices - Trace of a matrix.

UNIT – 4: LAPLACE TRANSFORMATION

Definition of the Laplace transform - Existence of Laplace transforms - Laplace transforms of some elementary functions - Shifting (or translation) theorems - The first shifting theorem - The second shifting theorem - The unit step function - Laplace transform of a periodic function - Laplace transforms of derivatives - Laplace transforms of functions defined by integrals - A note on integral transformations.

UNIT -5: PARTIAL DIFFERENTIAL EQUATIONS

Linear second-order partial differential equations - Solutions of Laplace's equation: separation of variables - Solutions of the wave equation: separation of variables - Solution of Poisson's equation. Green's functions - Laplace transform solutions of boundary-value problems

Books for study

Mathematical Methods for Physicists: A concise introduction, - *TAI L. CHOW* **- CAMBRIDGE UNIVERSITY PRESS.**

Books for Reference

1.Mathematical physics- Piyoosh kumar tyagi , RBSA Publishers

2. **Mathematical physics-** Satya prakash-Sultan Chand & Co:

3.**Mechanics and mathematical physics** -R.Murugesan- Sultan Chand & Co:

4. **Mathematical physics-Gupta-** Sultan Chand & Co:

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Physics)/Semester-V/Ppr.no.36(A)/

Elective -II (A)

COMMUNICATION ELECTRONICS

Unit – I Amplitude Modulation and Transmission

Introduction – Amplitude Modulation – AM envelop – AM frequency spectrum and bandwidth – Phasor representation of AM with carrier – Coefficient of modulation or percentage modulation or modulation index – Degrees of modulation – AM power distribution – AM Current relation and efficiency - Modulation by complex information signal - Doubleside band suppressed carrier AM - Single side band suppressed carrier AM – Vestigal side band amplitude modulation – AM modulator circuits – Emitter modulations or low power AM – Collector modulator or medium and high power AM modulator - AM transmitters – Broadcast AM transmitters – Low level of AM transmitter – High level AM transmitter.

Unit – II Amplitude Modulation Reception

Comparison of AM system – Quadrature amplitude modulation – Principles of AM detection – AM receivers – Receiver parameters – Tuned radio frequency (TRF) receiver or straight receiver – Principles of superhetrodyne –Double frequency conversion AM receiver.

Unit – III Angle Modulation – Transmission

Introduction – Frequency modulation – Phase modulation – Phase deviation and modulation index – Multitone modulation – Transmission band width of FM – Conversion of PM to FM or frequency modulator – Conversion of FM to PM / phase modulators – Commercial broadcast FM – Phasor representation of an FM and PM – Average power of an AM/FM wave – Generation of FM – Direct method of FM generation – Reactance tube modulator – Indirect method of FM wave generation – FM transmitters – Indirect method – Comparison of AM and FM.

Unit – IV FM Reception

FM detectors – Balanced slope detector – Foster seely discriminator – Ratio detector – FM super heterodyne receiver – FM noise suppression – Threshold extension by FMFB technique.

Unit – V Digital modulation techniques

Introduction – BFSK – Binary phase shift keying – Quadrature PSK – Differential PSK – Performance comparison of digital modulation schemes – M ary FSK – Correlative coding – Duobinary encoding.

Book For Study

Principles Of Communication Engineering-Dr. K.S. Srinivasan, Second Edition : 2010.

Book For Reference

1. Electronic communication systems – George Kennedy & Bernard Davis, Tata Mcgraw Hills, 4th edition, 2008
2. Electronic communication Systems – Blake, Joseph J. Adams ki, Sun Yifeng, Delamer publication, 2nd edition, 2012 (Rupa Publication, India).
3. Fundamentals of Electrical engineering – Wayone tomasi

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Physics)/Semester-V/Ppr.no.36(B)/

Elective -II (B)

NUMERICAL METHODS

UNIT-I: Errors and Root of equations

What is Numerical analysis-Numbers and their accuracy-errors-measurement of errors-round off error-truncation error-absolute error-relative error-percentage error-inherent error-accumulated error-general error formula-convergence

Root of equations-Iteration method-Maclaurin's series method-Newton-Raphson method-Von-Mises Formula-Bisection method

UNIT-II: **Matrix and linear equations**

Introduction- Pivotal condensation method- system of linear equations- Gauss Elimination method-Gauss Seidal Iteration Method-Gauss Jordan elimination method- Matrix Inversion method

UNIT-III: **Interpolation and approximation**

Linear Interpolation –Qudratic Interpolation - Lagrange's interpolation –Richardson's Extrapolation –Aitken's iterated Interpolation

UNIT-IV: Numerical Differentiation and Integration:
Numerical Differentiation-Approximation of derivatives using interpolation polynomials-Taylor series method
Numerical Integration - trapezoidal rule-simpson's 1/3 and 3/8 rules

UNIT –V: **Differential Equations**

Introduction-Euler's method (Adams Bashforth first order method)- Backward Euler method-Taylor' s series method- Runge-kutta method - Predictor corrector methods

Books for study and Reference:

1. Introductory methods of numerical analysis – S.S. Sastry, Prentice Hall of India, New Delhi (2000)
2. Numerical methods – A. Singaravelu, Meenakshi Agency, Chennai (2001).
3. Numerical method in Science and Engineering – M.K. Venkataraman, PHI – New Delhi (1997)
4. Mechanics and Mathematical methods, R. Murugesan, S. Chand & Co, New Delhi (1999).

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Physics)/Semester-VI/Ppr.no.41/Core – 9

Digital Electronics

Unit 1: Number systems, Binary arithmetic and Codes

Decimal , binary, Octal, decimal and hexadecimal number systems and their inter- conversions - Binary arithmetic-Binary addition-binary subtraction-1's and 2's complements-- BCD codes, ASCII code, Excess-3code, Gray code.

Unit 2 : Boolean algebra and Logic gates

Boolean algebra-De Morgan's theorem –Positive logic and negative logic systems-Basic logic gates, OR, AND, NOT (symbol, Boolean equation, truth table, circuit diagram and working)-NAND, NOR, EX-OR (symbol, Boolean equation, truth table only)-NAND and NOR as universal building blocks.

Unit 3 : Arithmatic circuits„Flip-flops and multivibrators

Half and full adders- Half and full subtractors-RS Flip-flop-clocked RS Flip-flop, JK Flip-flop, JK master slave Flip-flop, D Flip-flop, T Flip-flop

555 timer-Astable multivibrator, monostable multivibrator-Frequency divider

Unit 4 : Karnaugh map and combinational circuit applications

Karnaugh map - 2,3and 4 variables –simplification-SOP and POS form of Boolean functions - - Don't care conditions-Multiplexer, Demultiplexer, Encoder, Decoder, parity generator and checker.

Unit 5 : Shift Registers and Counters

Types of registers- Serial in –Serial out-Serial in-Parallel out- Parallel in- Serial out- Parallel in-Parallel out-Asynchronous counters and Synchronous counters- Ring counter- Binary counter- Up-Down counter- Mod-5 counter- Mod-10 counter (decade counter)-A/D and D/A converters

Books for study

Digital principles and applications - Albert Paul Malvino & Donald P.Leach

Books for reference

1.Digital logic and computer design-Morris Mano-Prentice Hall of India,Pvt.Ltd.

2.GothmannW.H.,Digital Electronics- Prentice Hall of India,Pvt.Ltd.

3.Metha V.K.Mehtha.R.Principles of electronics,S.Chand &Co.

4.Fundamentals of Digital Electronics and Microprocessors - Anokh singh, A.K.Chhabra, S.Chand & Co.

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Physics)/Semester-VI/Ppr.no.42/Core-10

ATOMIC AND NUCLEAR PHYSICS

Unit I :Atomic Structure : Introduction –Vector atom model –Quantum numbers associated with vector atom model– coupling schemes –L-S- and J-J couplings- Pauli‟s exclusion principle-application to periodic table-magnetic dipole moment due to orbital motion of the electron- magnetic dipole moment due to spin-Stern and Gerlach experiment –optical spectra-spectral notation-selection rules-fine structure of sodium D line-Zeeman effect-experimental arrangement for the normal Zeeman effect-Quantum mechanical explanation of the normal Zeeman effect- Anomalous Zeeman effect – stark effect

Unit II Introduction to the Nucleus

General properties of the nucleus- nuclear binding energy –BE/A curve and its significance-mass defect and packing fraction—proton electron hypothesis- proton neutron hypothesis -Nuclear forces –charecteristics –Meson theory of nuclear forces –Models of Nuclear structure – Liquid drop model –Binding Energy formula – Shell Model –nuclar reactions-Q-value of nuclar reactions .

Unit III Radio activity

Natural radio activity –alpha,beta and gamma rays-properties-Soddy Fajan's displacement law-natural radio active series-law of radio active disintegration-half life period –mean life period – Radio carbon dating-law of successive disintegration– range of α particle – Geiger Nuttal law-theory of α decay-. β decay- β- ray spectra –neutrino theory of β decay-neutrino and its properties-electron capture. ϒ decay-nuclear isomers- Mossabauer effect and its applications-radio isotopes and their uses.

Unit IV :Nuclear reactors,Particle accelerators and detectors

Nuclear fission –energy released in fission-. Nuclear reactor-uses of reactor- Nuclear fusion – Thermo nuclear reactions-controlled thermo nuclear reaction-Principle and action of atom bomb and hydrogen bomb-fusion reactor –Detectors-G.M.Counter-scintillation counter-bubble chamber-wilson cloud chamber-Accelerators-cyclotron-synchrocyclotron-betatron-synchrotrons

Unit V :**Cosmic rays and elementary particles**

Cosmic rays-introduction-discovery-lattitude,altitude and azimuth effects-Longitudinal effect-north –south effect-seasonal and diurnal changes-primary and secondary cosmic rays-nature of Cosmic rays- Cosmic ray showers-van allen belt- origin of Cosmic radiation.

Elementary particles-introduction-particles and antiparticles-antimatter-the fundamental interaction-elementary particle quantum numbers-conservation laws and symmetry-the quark model

Book for study

1. Modern Physics- R.Murugesan, S. chand & Co

Ref erence Books

1. Modern Physics- Seghal Chopra & Seghal, Sultan chand & Co 1998
2. Perspective of Modern Physics-Arther Beiser –Tata-Mc Graw Hill Publishing Company
3.Atomic and Nuclear Physics-Shatendra Sharma-Pearson Publications
4. Atomic Physics-Gupta and Kum ar -S. chand & Co
5.Fundamental Physics-Halliday and Resnick

QUANTUM MECHANICS

Unit –I DEVELOPMENT OF QUANTUM MECHANICS

Inadequacy of classcal mechanics-Black body radiation – Theoretical laws of Black body radiation (Wein's displacement law –Wein's Radiation formula – Rayleigh Jeans law) – Planck's Quantum hypothesis – photoelectric effect-Einstein's explanation for photoelectric effect-Compton effect – Einstein's quantum theory of specific heat-Quantum states of energy .

Unit – II WAVE PROPERTIES OF MATTER

Wave particle duality-Phase and Group Velocity – Analytical expression for a Group of waves – Wave packets formed by Superposition of Number of Plane waves – De Broglie Hypothesis – Derivation of De Broglie relation – Phase velocity of De Broglie Waves – Relation between De Broglie wave and Phase velocity – Davision and Germer's experiment on electron diffraction-Diffraction of Atoms and Molecules

Unit – II I HEISENBERG UNCERTAINTY PRINCIPLE

Uncertainty Principle - Elementary Proof of Heisenberg's Uncertainty Relation and its Physical significance – Elementary Proof of the Heisenberg's Uncertainty Relation between energy and Time-Illustration of uncertainity relation by Thought experiments-consequences of uncertainity relation

Unit – IV SCHRODINGER'S WAVE EQUATION:

Basic postulates of Quantum mechanics –Schrodinger's equation – 1D and 3D wave equation into the Time-dependent and Time-independent part – Physical Interpretation of the Wave Function ψ – Operators in quantum Mechanics,Eigen Function, Eigen value and Eigen Value equation – Expectation values – Orthogonality of Energy Eigen function - Schrodinger's Wave equation for the Complex Conjugate Wave function $\psi^*(x, y, z, t)$ – Probability current Density – Ehrenfest's Theorem – Momentum wave function for free particle – Momentum Eigen function – Exact statement and proof of Uncertainty Principle for One Dimensional wave packet

Unit –IV APPLICATIONS OF QUANTUM MECHANICS

Free particle – Potential step – Rectangular Potential barrier- Tunnel effect – emission of α particles from Radioactive element - Square well potential- free states-Particle in 1D box – Particle in 3D box – simple harmonic oscillator – 1D simple harmonic oscillator in quantum mechanics – Particle in 1 D square well potential of finite Depth.

Books for Study

Elements of Quantum Mechanics, **Kamal Singh** & **S P Singh**-Chand &Co;

Books for Reference

1.Mathews P.M. and Venkatesh k. Quantum Mechanics Tata McGraw Hill Publishing Ltd.

2.Gipta,Kumar,Sharma -Quantum Mechanics-JaiPrakash Nath Company

3. Quantum Mechanics-G.Arul Das-PHI Private Learning Ltd.

4. Quantum Mechanics-V.Murugan-Pearson publication

5. Quantum Mechanics-Mahesh C.Jain- PHI Private Learning Ltd

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Physics)/Semester-VI/ Ppr.no.44(A)/ ELECTIVE – 3(A)

MEDICAL PHYSICS

UNIT-I: X-RAYS

Electromagnetic spectrum - production of x-rays - x-ray spectra - Brehmsstrahlung - Characteristic x-ray - X-ray tubes - Coolidge tube - x-ray tube design - tube cooling - stationary mode - Rotating anode x-ray tubes - Tube rating - quality and intensity of x-ray. X-ray generator circuits - half wave and full wave rectification - filament circuit - kilo voltage circuit - high frequency generator - exposure timers - HT cables.

UNIT –II:RADIATION SAFETY AND HEALTH PHYSICS

Introduction to Radioactivity-Artificial and natural - radioactivity -Physical features of radiation-units of radiation- conventional sources of radiation, Interaction of different types of radiation with matter -penetration power in living cells-radiation damage to the cell-effect of radiation on cells-measurement of ionizing radiation- measurement of biological damage-Linear energy transfer(LET)-radiation risk-radiation dosimetry-security of radio active material-radio active waste management

UNIT –III:BIO MEDICAL INSTRUMENTATION

Development of biomedical instrumentation-biometrics-introduction to the man-instrument system-components of man-instrument system-transducers for biomedical applications-biomedical computer applications-computer analysis of ECG-computerized axial tomography(CAT) Scanners

UNIT-IV: MEDICAL IMAGING PHYSICS

Radiological imaging - Radiography - Filters - grids - cassette - X-ray film - film processing - fluoroscopy - computed tomography scanner - principle function -display - generations - mammography. Ultrasound imaging - magnetic resonance imaging - thyroid uptake system - Gamma camera (Only Principle, function and display)

UNIT-V : LASERS IN MEDICINE

Introduction to laser-principle and production of laser- effects of laser radiation on tissues, - photo thermal effects, photochemical effects –photodynamic therapy, Laser applications in therapy and diagnosis-opthalmology,Fibreoptic endoscopy and dentistry.Laser as a beautician's tool-laser hazards-biological effects,

Books for study

1. Basic Radiological Physics Dr. K. Thayalan - Jayapee Brothers Medical Publishing Pvt. Ltd. New Delhi (2003)

2. The essential physics of Medical Imaging: Bushberg, Seibert, Leidholdt and Boone Lippincot Williams and Wilkins, Second Edition (2002)

3..Biomedical instrumentation-Leslie Cromwell,Fred J.Weibel-Erich A.Pfeiffer-
Pearson Publications

4.Lasers in Medicine-R W Wayanant, Plenum Publishing Co

Books for Reference

1. Nuclear medicine physics: Chandra - Lippincot Williams and Wilkins (1998)

2. The Physics of radiology: John R Gunni ingham and Johns - Charles C Thomas USA (1990)

3. Medical Imaging Physics : William R Hendee - Mosby, 3rd edition (1992)

4. Advanced Medical Radiation Dosimetry: Govindarajan KN Prentice - Hall of India Pvt. Ltd. New Delhi (1992) .

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Physics)/Semester-VI/ Ppr.no.44 (B)/ Elective - 3 (B)

ENERGY PHYSICS

UNIT I - INTRODUCTION TO ENERGY SOURCES

World's reserve of Commercial energy sources and their availability-India's production and reserves-Conventional and non-conventional sources of energy, comparison – Coal- Oil and natural gas –applications - Merits and Demerits

UNIT II – SOLAR THERMAL ENERGY

Solar constant -Solar spectrum-Solar radiations outside earth atmosphere - Solar radiation at the earth surface-Solar Radiation geometry-Solar radiation on tilted surfaces-Basic Principles of Liquid flat plate collector –Materials for flat plate collector - Construction and working- Solar distillation–Solar disinfection - Solar drying-Solar cooker(box type)-Solar water heating systems – Swimming pool heating.

UNIT III - PHOTOVOLTAIC SYSTEMS

Introduction-Photovoltaic principle-Basic Silicon Solar cell- Power output and conversion efficiency-Limitation to photovoltaic efficiency-Basic photovoltaic system for power generation-Advantages and disadvantages-Types of solar cells-Application of solar photovoltaic systems - PV Powered fan – PV powered area lighting system – A Hybrid System.

UNIT IV- BIOMASS ENERGY

Introduction-Biomass classification- Biomass conversion technologies-Bio-gas generation-Factors affecting bio-digestion -Working of biogas plant-Advantages and disadvantage of floating and fixed dome type plant-Bio-gas from plant wastes-Methods for obtaining energy from biomass- Thermal gasification of biomass-Working of downdraft gasifier- Advantages and disadvantages of biological conversion of solar energy.

UNIT V - WIND ENERGY AND OTHER ENERGY SOURCES

Wind Energy Conversion-Classification and description of wind machines, wind energy collectors-Energy storage-- Energy from Oceans and Chemical energy resources-Ocean thermal electric conversion-Basic principle
tidal power, advantages and limitation of tidal power generation-Energy and power from waves-wave energy conversion devices- Fuel cells- and application of fuel cells- batteries- advantages of battery for bulk energy storage- Hydrogen as alternative fuel for motor vehicles.

Books for study

1. Kothari D.P., K.C. Singal and Rakesh Ranjan, Renewable energy sources and emerging Technologies, Prentice Hall of India, 2008.
2.Solar Energy-principles of thermal collection and storage-S.P.SUKHAME-tata-McGraw-Hill publishing company ltd.

Books for References

1. Chetan Singh Solanki, Solar Photvoltaics Fundamentals, Technologies and Applications, 2ndEdition, PHI Learning Private Limited, 2011.
2. Rai G. D, Non conventional Energy sources, 4th Edition, Khanna Publishers, 2010.
3. Jeffrey M. Gordon, Solar Energy: The State of the Art, Earthscan, 2013.
4. Kalogirou S.A., Solar Energy Engineering: Processes and Systems , 2nd Edition, Academic Press, 2013.
5. Zobaa A.F.and Ramesh Bansal, Handbook of Renewable Energy Technology, World Scientific, 2011.

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Physics)/Semester-VI/ Ppr.no.45/
Major Practical - 5

NON ELECTRONICS

(**12 experiments compulsory)**

1. Youngs modulus of glass-Elliptic fringes
2. Spectrometer-Cauchy's constants
3. Spectrometre-Hartman's formula
4. Spectrometre-i_1-i_2 curve
5. Spectrometre-Biprism
6. Newton's Rings – determination of R_1,R_2 and f of the lens
7. Absolute determination of capacitance -BG
8. Absolute determination of mutual inductance & comparison of mutual inductance -BG
9. High resistance by leakage-BG
10. Potentiometre-calibration of volt meter(high range)
11. Potentiometre-temperature coefficient of resistance
12. Network theorems (thevenins&nortons)- verification
13. Thermoemf-Mirror Galvanometre
14. Conversion of galvanometer into voltmeter&ammeter
15. Self inductance-Anderson's bridge

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Physics)Semester-VI/ Ppr.no.46/ Major Practical - 6

ELECTRONICS

(**12 experiments compulsory**

1. Dual power supply using IC
2. Diode charecteristics(pn diode & zener diode)
3. Transistor charecteristics
4. FET charecteristics
5. NAND &NOR as universal building block
6. Half Adder &Full Adder
7. Colpitt's Oscillator and Hartley Oscillator
8. Single stage amplifier-with and without feedback
9. OPAMP-Adder&Subtractor
10. OPAMP-Differentiator & Integrator
11. OPAMP-Low pass and high pass filter
12. Astable multivibrator using IC555
13. Monostable multivibrator using IC555
14. Wienbridge oscillator
15. Full wave rectifier without and with filters.

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Physics)/Semester-VI/ Ppr.no.47/
Major Practical - 7

Computer Programming IN C++

1.a. Arithmetic operations--use do while loop

b.To test the validity of any entered character whether it belongs to the alphabetical set or a number or a special character.

2.To find the sum of series using for loop.

a. Sum = 1+3+5+……+n.

b. Sum = $x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \ldots\ldots\ldots\ldots\frac{x^n}{n!}$

c. Sum = $1^2 + 2^2 + 4^2 + \ldots\ldots\ldots\ldots + n^2$

3.To find the factorial of a number by using function declaration with/without using the return statement.

4.To read a set of numbers from a standard input device and to find out the largest number in the given array using function declaration. Also sort them in the ascending or the descending order.

5.To read the elements of the given two matrices of order m*n and to perform the matrix addition and display the transpose of the result.

6.a.To display the name of the day in a week depending upon the number entered through key board using Switch-Case statement

b)To read the data variables (such as Day, Month and Year) of the class by the member function and display the contents of class objects on the screen in the format DD/MM/YYYY.

7. To generate a series of Fibonacci numbers using constructor

8. To read the following information from the keyboard in which basic class consists of Name, Roll No. and Sex. The derived class contains the data members Height and weight. Display the contents of the class. Use inheritance concept.

9. a. An OOP to find the period of a pendulum of given length L, in a gravitational field. Accept the required values using the keyboard. Also display the results.

b. Develop a program in C++ to calculate the Young's modulus of a material from the data obtained from uniform bending method.

10. Solve Quadratic equation.

11. Multiplication of two matrices.

12. Define a class to represent a bank account details

Data members

1. Name of the depositor
2. Account name
3. Type of account
4. Balance amount in the account

Member function

1.to assign initial values
3.to withdraw an amount
4.to display name and balance

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES

B.Sc. Plant Biology & Plant Biotechnology

(Choice Based Credit System)
(with effect from the academic year 2016-2017 onwards)
(44th SCAA meeting held on 30.05.2016)

V	I	33	Core - 7	Morphology and Taxonomy of Angiosperms	4	4	25	75	100	30	40
	II	34	Core – 8	Biochemistry & Biophysics	4	4	25	75	100	30	40
	III	35	Elective – 1 (Select any one)	A)Biotechnology & Genetic Engineering B) Biodiversity & Climate Change	5	5	25	75	100	30	40
		36	Elective – 2 (Select any one)	A)Horticulture and Plant Breeding B) Forestry	5	5	25	75	100	30	40
		37	Practical -5	Core – 7 Practical	3	-	Practical exams in the even semester				
		38	Practical – 6	Core -8 Practical	3	-	Practical exams in the even semester				
		39	Practical – 7	Elective 1 & 2 (Practical)	2	-	Practical exams in the even semester				
	IV	40	Skill Based subject (Common)	Personality Development/ Effective Communication / Youth Leadership	4	4	25	75	100	30	40
				Subtotal	30	22					

VI	I	41	Core - 9	Plant Physiology	6	4	25	75	100	30	40
	II	42	Core – 10	Genetics, Evolution & Biostatistics	6	4	25	75	100	30	40
	III	43	Core - 11	Plant Ecology & Phytogeography	5	4	25	75	100	30	40
		44	Elective - 3	A) Marine Biotechnology B) Environmental Biotechnology	5	5	25	75	100	30	40
		45	Practical -5	Morphology of Angiosperms, Taxonomy, Elective I & II	3	4	50	50	100	20	40
		46	Practical -6	Biochemistry, Biophysics, Plant Ecology and Phytogeography	3	4	50	50	100	20	40
		47	Practical - 7	Plant Physiology, Genetics, Evolution and Biostatistics and Elective - III	2	4	50	50	100	20	40
				Subtotal	30	29					

MORPHOLOGY AND TAXONOMY OF ANGIOSPERMS

Unit I

Morphology – Modification of Root, Stem and Leaf. Leaf - Simple, Compound; Phyllotaxy; Inflorescence- Types; Flower - Floral parts; Fruits –Types.

Unit II

Principles ofTaxonomic Hierarchy (Order, Family, Genus and Species Level). Systems of Classification (with merits and demerits) - Natural- Bentham and Hooker system, Phylogenetic – Engler and Prantl System; Binomial Nomenclature - ICBN, Dichotomous Key, Preparation, Maintenance and Significance of Herbarium.

Unit III

Critical study of the following Families and their Economicimportance: Annonaceae, Sterculiaceae, Rutaceae, Caesalpiniaceae, Cucurbitaceae, Apiaceae, Rubiaceae, Sapotaceae.

Unit IV

Convolvulaceae, Asclepiadaceae, Apocynaceae, Lamiaceae, Euphorbiaceae, Amaranthaceae, Liliaceae, Cannaceae and Poaceae.

Unit V

Binomial, Family, Useful Part and Uses ofthe Following Plant Products: Fibres- Jute, Cotton and Hemp; Timber- Teak, Rosewood and Neem; Resin - Camphor and Canada balsam ; Cosmetics – *Aloe*, Sandalwood and Turmeric; Beverages – Tea, Coffee and *Cocoa*; Oil – Coconut oil, *Eucalyptus* oil and *Pongamia* oil; Fruits & Vegetables- Banana, Jackfruit, Pineapple; Medicinal plants - *Adhatoda*, Clove and *Acorus calamus.*

Practical

1. Morphological identificationof plant parts and their modifications.
2. Technical description of plant parts with reference to the families prescribed in the syllabus.
3. Dissection of floral parts of plant belongs to the families prescribed in the syllabus.
4. Field trips (minimum of 2 days) to places under the guidance of teachers to study plants in their natural habitat and submit a report.
5. Preparation of dichotomous key.
6. Identify and comment on the useful plant parts and plant products prescribed in the syllabus.
7. Preparation and submission of 10 herbarium and photographs of any four rare/endangered plants belong to the families prescribed in the syllabus.

References:

1. Datta S. C. Systematic Botany, 4th Ed, Wiley Estern Ltd., New Delhi, 1988.
2. Eames A. J. Morphology of Angiosperms - McGraw Hill, New York.
3. Jain. S. K. 1981. Glimpses of Indian Economic Botany. Oxford.
4. Jeffrey C .J. and A.Churchil - An introduction to Taxonomy – London.
5. Lawrence - Taxonomy of Vascular Plants - Oxford & I B H, New Delhi.
6. Naik V.N., Taxonomy of Angiosperms, 1991. Tata McGraw-Hill Pub.Co. Ltd., New Delhi.
7. Pandey, S. N, and S.P. Misra (2008)-Taxonomy of Angiosperms.
8. Radford A B, W C Dickison, J M Massey & C R Bell, Vascular Plant Systematics, 1974, Harper & Row Publishers, New York.
10. Singh V. & Jain - Taxonomy of Angiosperms - Rastrogi Pub., Meerut.
11. Singh G.1999. Plant systematics: Theory and Practice. Oxford and IBH, pvt. Ltd. New Delhi.
12. Sivarajan V. V - Introduction to Principles of taxonomy - Oxford &I B H New Delhi.
13. Takhatajan - Flowering Plants - Edinburg, Oliver & Boyd.
14. Venkateswaralu, V. - Morphology of Angiosperms - Chand & Co.

BIOCHEMISTRY & BIOPHYSICS

Unit I

Biomolecules: Carbohydrates- structure, Occurrence, and Biological Importance of Monosaccharides – Glucose and fructose; Disaccharides – Sucrose and Lactose; Polysaccharides – Starch and Cellulose.

Unit II

Aminoacids – Classification, Essential & Non-Essential Aminoacids – Sources, Structure, Chemical Reactions & Properties. Proteins – Classification, Properties– Solubility, Denaturation, Renaturation, Structural Organization of Proteins -Primary, Secondary, Tertiary and Quaternary Structure and Properties of Proteins, Monomeric and Oligomeric Proteins (Myoglobin and Hemoglobin), Conjugated Proteins – Glycoproteins and Lipoproteins.

Unit III

Lipids– Definition, Classification, Structure, Properties & Biological Significance; Fatty Acids - Saturated and Unsaturated Fatty acids; Simples Lipids - Fats & Oil; Compound Lipids - Phospholipids – Lecithin, Cephalin, Sphingomyelins; Derived Lipids –Ergosterol,Terpenes – Carotenoids, Rubber; Enzymes: General Classification, Nomenclature, Mechanism of Enzyme Action; Enzyme Inhibitors-Competitive,Non-Competitive; Enzyme Immobilization; Application of enzymes in Industry and Medicine.

Unit IV

Techniques in Biochemistry- pH metry, Colorimetry, Centrifugation and Chromatography – Paper Chromatography, Thin Layer Chromatography and Ion Exchange Chromatography.

Unit V

Bioinformatics – An Overview, Definition & History; Scope and Application of Bioinformatics ; Major Biological Databases – Nucleic Acid Sequence Databases – EMBL, Genbank; Protein Sequence Database – SWISS-PROT; Databases Similarity Search Tools – BLASTA, FASTA; Database Retrieval Tools – ENTREZ - Locus Link - Pubmed (Publishers on Medicine).

PRACTICALS

1. Preparation of Buffer.
2. Titration of Weak Acid – Acetic Acid against Strong Base
3. Determination of Complementary Color.
4. Verification of Beer's Law.

5. Estimation of Starch in Plant Tissues by Colorimetry-Lugol's Iodine Method.
6. Estimation of Sugar in Plant Tissues by Colorimetry – Anthrone Reagent Method.
7. Separation of Dyes from a mixture by Circular Paper Chromatograpy.
8. Qualitative Tests (Demonstration Only) for Carbohydrates and Proteins.
9. Spotters:
    a. .Instruments: pH meter, Electrodes of pH meter, Colorimeter, Centrifuge, Chromatogram.
    b. Chemicals: Chemical Structure to be given for Glucose, Fructose, Sucrose, Cellulose, Starch, Protein (Primary and Secondary Structure).
    c. Models / Charts:

        Lock and Key Model of Enzyme Action
        Induced Fit Model of Enzyme Action.
        Enzyme inhibition – Competitive and Non-Competitive.
10. Maintain the Record Note for External and Internal Evaluation.

References

1. Conn & Stumph – Outlines of Biochemistry
2. Denise R. Ferrier, 2014. Lippincott's Illustrated Reviews: Biochemistry Published by Wolters Kluwer (India) Pvt. Ltd, New Delhi.
3. Ghosal, S. and Srivastava, A.K. 2015. Fundamentals of Bioanalytical Techniques and Instrumentation, PHI Learning Pvt. Ltd., New Delhi.
4. Jain J.L. Sanjay Jain & Nitin Jain 2005. Fundamentals of Biochemistry. S. Chand & Company Ltd, New Delhi.
5. Lehninger A.L.1987. Biochemistry, CBS Publishers, New Delhi.
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9. Vasudevan D.M. 2007. Textbook of Biochemistry for Medical Students. Jaypee Brothers Medical Publishers (P) Ltd.

Biotechnology and Genetic engineering

Unit1

Introduction: definition, history, scope and importance of plant tissue culture, Totipotency of cells, Tissue culture laboratory- organization and requirements, Sterilization techniques, Nutrient media- composition and preparation.

Unit 11

Types of tissue culture- Callus culture, apical meristem culture; Protoplast isolation, fusion, selection of hybrids and regeneration; Cybrids – production and applications, Artificial seed production – advantages and disadvantages.

Unit 111

Techniques of genetic engineering: Isolation of specific genes, enzymes used in gene cloning, Cloning Vectors - Plasmids,Cosmids, Phagemids; cDNA Libraries;Agrobacterium mediated gene transfer in plants; Ti plasmids.

Unit 1V

Methods of direct gene transfer:PEG stimulated, Microinjection and Macro infection, Electroporation, Ultrasonification, Liposome mediated Particle bombardment gun method,GM plants - BtBrinjal, Bt Cotton, Golden rice. Bioethical issues.

Unit V

Hybridization techniques: Southern, Northern and Western Blotting, Identification of recombinants using selective medium and reporter genes, Colony hybridization.

Practicals:

Spotters/Photographs

i. Callus culture from Carrot Explant.
ii. Protoplast Isolation.
iii. Plasmids – Ti plasmids
iv. Gene cloning in E. Coli.
v. Agrobacterium mediated gene transfer.
vi. Blotting Techniques.
vii. Colony Hybridization technique.
viii. Transgenic Plants prescribed in the syllabus.

BIODIVERSITY AND CLIMATE CHANGE

Subject Code: JMPB5B **5hrs/week**

Unit I

Types- Genetic, species and ecosystem diversity; global biodiversity.Plant diversity- crop plants and their relatives, trees and forests.Genetic Diversity- Plant genetic resources, mega-centres of origin of genetic diversity.World's major plant gene banks.

Unit II

Endangered flora- their identification and documentation- Red Data Book.Conservation strategies; *In situ* approach, biosphere reserves, reserve forests, parks and sanctuaties.*Ex situ* approach: Gene bank, seed bank and cryopreservation. International organizations in conservation- IUCN, IBPGR, WWF, UNEP and FAO.

Unit III

Components of the atmosphere, the greenhouse gases and green house effect, global warming and climate change, consequences and evidence of climate change. Greenhouse gas emissions and the causes- electricity generation, transport. Burning fossil fuels, deforestation.

Unit IV

CO_2capture and storage methods: Geological storage, Ocean storage, Mineral storage and Leakage. Co_2 reuse mechanisms- CO_2- Methanol, CO_2- hydrocarbons and CO_2.CO hydrocarbons. CCS projects.

Unit V

Climate change adaptation and mitigation: Strategies for emission reduction- Alternative energy sources and Energy efficiency and conservation. Kyoto protocol, Bali Action Plan- IET, CDMs and JI.Carbon credits and carbon economics, carbon footprints; UNFCC and IPCC, climate change conference- Copenhagen and Mexico.

Practicals

Prepare maps showing forest types in India and Tamil Nadu.

Collect and study the remote sensing images showing forest vegetation in India and Tamil Nadu.

Photographs of three local endangered plants.

HORTICULTURE & PLANT BREEDING

UNIT - I

Scope and Branches of Horticulture –Nursery– Preparation and Layout; Seed Bed; Transplantation; Organic manures; Fertilizers; Irrigation; Plant Protection Measures; Growth Regulators in Horticulture.

Unit – II

Garden and Gardening- Vegetative Propagation – Cuttage – Stem, Leaf and Root Cuttings; Layerage – Simple, Compound and Air Layering; Graftage–Tongueand Approach Grafting; Budding – "T" Budding and Patch Budding; Advantagesand Disadvantages of Vegetative Propagation;Garden Components – Hedge, Edge, Flower Beds, Arches, Rockery, Lawn, Topiary, Bonsai,Water Garden; Types of Gardens - Indoor Garden – Hanging Baskets, Terrarium, Bottle Garden; Kitchen Garden – Establishment of Kitchen Garden and its importance.

UNIT - III

Production technology - Cultivation of Vegetables - Brinjal, Tomato and Onion; Cultivationof Fruits - Banana, Mango and Apple; Cultivation of Plantation Crops - Tea, Cardamom and Coffee; Cultivation of Medicinal Plants - Periwinkle, Sarpagandha and Pepper.

UNIT – IV

Nature and Scope of Plant Breeding; Objectives; Selection Methods – Pure Line and Mass Selection. Hybridization and Hybridization Techniques – Emasculation – Bagging, Crossing, Labelling and Harvesting of Hybrid Seeds and Raising F_1Generation.

UNIT V

Plant Breeding: Production of New Varieties; Breeding for Disease Resistance, Mutation Breeding – Physical and Chemical Mutagens; Procedure and Practices of Mutation Breeding.

Practical

Demonstration/Photograph

1. Preparation of Nursery and Seed Bed.
2. Vegetative Propagation – Stem, Leaf and Root Cuttings; Air Layering, Budding and Grafting Techniques.
3. Designing Kitchen Garden and Ornamental Garden.
4. Garden Components – Rockery, Hanging Basket, Topiary, Bonsai and Water Garden.
5. Plant Breeding: Emasculation and Bagging methods.
6. Visit to Public Gardens, Agricultural and Horticultural Research and Plant Breeding Centres.
7. Maintain a Record Notebook for Internal and External Evaluation.

REFERENCES

1. Bhattacharya. S K. Vistas in Horticulture, Gene Tech Books., New Delhi.
2. Bose, T.K. and Mukherjee, D. 1982. Gardening in India, Oxford and IBH Publishing Co., New Delhi.
3. Chatopadhya, S. K. Commercial Floriculture. Gene Tech Books, New Delhi.
4. Chaudhury, Vegetables –Narosa Pub., NewDelhi.
5. Chaudhary, R.C. 1984. Plant Breeding Published by Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
6. Chaudhary, H.K. 2000. . Plant Breeding Published by Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi. Gelhot. D. Organic Farming JV Publi. House., Jodhpur.
7. Kumar N. 2010. An introduction to Horticulture, Narosa Pub., New Delhi.
8. Mandal R. C. Weed control, J V Publi. House.,Jodhpur
9. ManibhusanRao, 2005. Horticulture, Macmillan India Ltd., New Delhi.
10. Mohanan, K.V. 2010. Essentials of Plant breeding. PHI Learning Pvt. Ltd., New Delhi.
11. Sharma, J.K. 1984. Principles and Practices of Plant Breeding, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
12. Singh, B.D. 1999. Textbook of Plant Breeding , Kalyani Publishers, New Delhi.
13. Trivedi, P. Home Gardening, Narosa Pub., New Delhi.

Elective –II (B)

FORESTRY

UNIT-1

Forest – Definition – Scope – Classification - Importance/Functions of forest. Forest as a Balanced Eco system, Types and Distribution of Forest with reference to India(Champion and Seths- Classification)

UNIT II

Forest Degradation- Damage caused by Fire, Climatic Factors and Injuries by Insects, Plants, Animals and Diseases, activities of Man including Encroachment and Shifting Cultivation; Measures to Protect the Forest Damage caused by various Factors.

UNIT III

Forest Management and Conservation – Regeneration- Tending Operations, Sustainable Utilization of Forest Resources - Forest Organization, Role of Remote Sensing in Forest Management.

UNIT IV

Agroforestry – Objectives- Advantages and Disadvantages- Energy Plantation; Recreational Forestry- Role of Botanical Gardens, Zoos, National Parks and Sanctuaries in Conservation of Wild life.

UNIT V

Forest Utilization – Conservation, Storage and Disposal of Wood in Forest; Major and Minor Forest Products; Forest based Industries- Paper and Pulp Industry; Resin tapping and Turpentine manufacture.

DEMONSTRATION

1. Identify and find out the uses of wood samples of common timbers.
2. Prepare maps showing forest types in India and Tamilnadu.
3. Prepare photographs of different forest types and nature of forest degradation.
4. Study of commonly used forest products.

REFERENCES

1. Benu Singh, 2010. A modern book on Forestry and horticulture, Vista Interanational Publications, India.
2. Jerram, M. R. K. 1983. A Book on Forest Management; Periodical Expert Book Agency, Delhi.
3. Johnston, D.R., Grayson, AJ and Bradley, R T 1978. Forest planning, Natraj Publishers, Dehradun.
4. Nagi, S. S. 1980. Indian Journal of Forestry Series I to X.
5. Pathi G S. 1982; Forestry in India. Published by R P S Book distributors, Dehradun.
6. Richard P Tucker, 2011. A Forest History of India. Sage Publications, India.
7. Sharma L C. 1980. Forest economic planning and management. Bishen Singh publications, Dehradun.
8. Tribhavan Mehta, 1981, A Hand book of forest utilization. International Book Distributers, Dehradun.

PLANT PHYSIOLOGY

UNIT I

WaterRelationsof Plants– Imbibition, Diffusion and Osmosis ; Water Potential- Definition, Components, Measurement and Relation of Water Potential; Absorption of Water – Mechanism and Factors affecting Water Absorption; Transpiration - Definition, Types, Significance and Mechanism of Stomatal Transpiration.

UNIT II

Ascent of Sap –Definition, Path of Ascent of Sap, Mechanism- Transpiration Pull and Cohesion of Water Theory.Mineral nutrition - Macro and Micro Nutrients-Absorption of Mineral Salts – Mechanism; Translocation of Organic Solutes - Mechanism of Phloem Transport.

UNIT III

Mechanism of Light and Dark Reactions - Photosynthetic Electron Transport Chain and Photophosphorylation- Carbon Assimilation: C3, C4 and CAM Pathways- Photorespiration and its Significance. Respiration: Glycolysis and TCA cycle – Oxidative Phosphorylation.

UNIT IV

Growth and Development –Growth Curves-Phases; Physiological Effect and Practical Application of the Following Phytohormones: Auxin, Gibberellic acid, Cytokinin, Ethylene, Abscisic acid. Photoperiodism and Vernalization.

UNIT V

Seed Dormancy- Causes and Methods of Breaking Dormancy. Stress Physiology - Classification– Bioticand Abiotic, Stress Factors- Response of Plants to Salt, Drought, Frost, Heat.

PRACTICALS

1. Water Potential by Gravimetric Method.
2. Water Potential by Falling Drop Method.
3. Osmotic Potential by Plasmolytic Method.
4. Quantitative Estimation of Total Chlorophyll Content in Leaves.
5. Quantitative Estimation of Carotenoid Content in Flowers.
6. Rate of Photosynthesis in Different Concentrations of Bi-Carbonate – Bubble Method.

7. Measurement of Stomatal Index.
8. Effect of Temperature on Permeability of Plasma Membrane.
9. Separation of Chlorophyll Pigments by Ascending Paper Chromatography.

DEMONSTRATION:

1. Tissue Tension
2. Suction due to Transpiration
3. Ganong's Photometer
4. Fermentation
5. Arc Auxanometer
6. Clinostat
7. Phototropism

Spotters

1. Absorption Spectrum of Chlorophylls
2. Growth curve.

REFERENCES:

1. Devlin and Withan (1986), Plant physiology, CBS Publishers and distributors., Delhi.
2. De Robertis, E.D.P, De. Robertis ,D.M.P (1980) Cell and Molecular Biology, Saunders college; Philadelphia.
3. Frank .B, Salisbury F.B. And Cleon W Ross., Plant physiology, Published by Jain for CBS Publishers and distributors, BholaNath Nagar, Delhi.
4. Jain, V.K. (2006) Fundamental of Plant physiology, S.Chand & Company Ltd., New Delhi.
5. Noggle and Fritz (2002) Introductory plant physiology, Prentice Hall of India, Pvt.Ltd., New Delhi.
6. Pandey, K.K. and Sinha, B.K. (1988) Plant physiology, Vikas Publications, New Delhi.
7. Subhash Chandra Datta, (1994) Plant Physiology, Wiley Eastern Ltd., New Age International Ltd, New Delhi.
8. Taiz&Zeiger (2006) Modern Plant Physiology, Sinauer Publishers.
9. Verma, P.S and Agarwal, V.K. (2004) Cell biology, S. Chand and company ltd., New Delhi.

GENETICS, EVOLUTION AND BIOSTATISTICS

Subject code: JMPB62 **6hrs/week**

Unit-I

Monohybrid and dihybridcross,testcross,back cross, Mendel'slaws,Deviation from Mendelian ratio –incomplete dominance,lethalfactor,complementaryfactor,supplementaryfactor,duplicate and inhibitory. Polygenic inheritance- Inheritance of Wheat Kernel and ear length in Maize.

Unit-II

Linkage - crossing over and recombination. Sex determination in plants. Extra nuclear inheritance - male sterility in corn; Population genetics - Hardy – Weinberg's principles, factors affecting.

Unit-III

Watson and Crick model of DNA, DNA as genetic material, DNA replication, Genetic code, Gene regulation in prokaryotes, Operon Concept*, Lac* Operon.

Unit-IV

Origin of life – chemosynthetic theory–evidences (any five). Evolution: Evolutionary theories of Lamarck, Darwin, De Vries, Modern synthetic theory of evolution. Speciation – concept of species-Allopatic and Sympatic; Isolation mechanisms.

Unit-V:

Collection and interpretation of data. Measures of central tendencies: Mean, Mode and Median. Measures of dispersion: Standard Deviation, Chi-square test.

Practicals :

1. Simple genetic problems in monohybrid crosses, incomplete dominance and lethal genes.
2. Simple problems on dihybrid ratio and interaction of factors.
3. Using available data, calculate the Mean and Standard deviation.
4. Spotters:
   Linkage and Crossing over
   DNA model/ Photograph

Spotters pertaining to the syllabus- Evolution (Origin of life, Speciation).

5. To maintain an observation note book for external valuation.

PLANT ECOLOGY AND PHYTOGEOGRAPHY

UNIT – I

Biotic and abiotic factors and their influence on vegetation- a brief account of microbes, plants, animals, soil,wind, light, temperature, rainfall and fire. Bio geo chemical cycles (Nitrogen and Carbon).

UNIT – II

Ecosystem- Concept, processes and components. Food chain and food web, ecological pyramids. Types of ecosystems – Pond and grass land. Ecological Classification of Plants, Morphological, anatomical and physiological adaptations of plants with special reference to Hydrophytes and Xerophytes.

UNIT – III

Autecology and Synecology- Vegetation – Units of vegetation- Formation, Association, Consociation, Society-development of vegetation, Migration-ecesis, colonization, Methods of study of vegetation- Quadrat and transect; Plant Succession: Definition,Hydroxere and Xeroxere.

UNIT – IV

Biomonitoring-Biodegradation of Xenobiotics using microbe, Types of Bioremediation: *in situ* and *ex situ*, Phytoremediation, Biosensors and Bioindicators , Bioleaching.

UNIT – V

Phytogeography – Principles, continental drift, endemism. Vegetations of India- Evergreen forest, Deciduous forest, Mangrove forest in detail -Forest types in Tamil Nadu. Remote Sensing and its uses.

Practicals

1. Analysis of herbaceous vegetation - by using quadrate / line transect method to find out frequency, density, abundance and interpret the vegetations in terms of Raunkaier's frequency formula.
2. Estimation of dissolved oxygen content in the given water sample.
3. Estimation of primary production in the given water sample by the light-dark bottle method.
4. Morphological adaptations of hydrophytes and xerophytes (each 6).
5. Study of anatomical adaptations of hydrophytes and xerophytes and correlate to their particular habitat.
   Hydrophytes: Nymphaea, Hydrilla
   Xerophytes: Nerium, Casuarina.
6. Morphological adaptations of Halophytes-Vivipary and Pneumatophore.
7. Permeability (Percolation, Total capacity as well as rate of movement) of different soil samples.
8. A study of plant distribution maps - endemic distribution and continental drift.
9. Map of Vegetation types of India.
10. Study of satellite maps.
11. Maintain an observation note book for external valuation.

MARINE BIOTECHNOLOGY

UNIT I

Classificationof Marine Environment – Horizontal and Vertical ; Physical Properties- Temperature, Light, Transparency, Turbidity, Tides and Waves. Acoustic Properties of Sea Water, Chemical Properties: Dissolved Oxygen, pH (Oceanic Acidification), Nutrients, Calcification and its Biological and Non Biological impact, Trace elements (Nature & Composition of Seawater) Zonation: Types and lives in different zones; Oceanography interrelationship.

UNIT II

Phytoplankton – Different groups, Algal Bloom, Toxins, Red tide, Biological Pump, Iron Fertilization, CLAW and Anti-Claw hypothesis, Global Pattern of Thermal Adaptation inMarine Phytoplankton.

UNIT III

Mariculture, Sea Ranching, Marine Natural Products – Marine Organisms: an Alternative Source of Potentially Valuable Natural Products; Pharmaceuticals from Marine Organisms - Anti-cancer, Diagnostic and Therapeutic.

UNIT IV

Industries Based on Seaweed Products; Marine Flora and its Potential Role in Research; Antibiotics, Vitamins, Bio adhesives and Thermostable Enzymes, Confectionaries, Food Dyes, Biopolymers and Agar Agar.

UNIT V

Marine Pollution - Heavy Metals and Radioactive Wastes, Marine Microorganisms, GMO capable of degrading and detoxing Chlorinated Hydrocarbons and other Pollutants; Biofouling Organisms – Problems due to Biofouling – Antifouling Paints - Biotechnological approach to Control Biofouling.

Practicals

Demonstration

1. Qualitative and Quantitative Analysis of Phytoplanktons.
2. Estimation of Salinity and
3. Estimation of pH (Acidity) of marine water.

Photographs

1.Algal Bloom

2. Heavy Metal Pollution.

Spotters

1. Pharmaceuticals from Marine organisms – Any two

2. Marine Products – Agar-Agar, Gelidium.

References :

1. Clark, R. B. 2001. Marine pollution, Published by Oxford University Press, USA.
2. Eric Hyatt, D. 1992. Biological Populations as Indicators of Environmental Change. Published by Environmental Protection Agency, US.
3. Frank J. Millero, 2005. Chemical Oceanography.
4. Goldberg, E.D. 1976. The Health of the Oceans Published by UNESCO Press, Virginia.
5. Kenneth A. Chandler, 1985. Marine and Offshore Corrosion Published by Butterworths, University of Michigan.
6. Sharma, B.K. and Kaur, H. 1994. Thermal and Radioactive Pollution, Krishna Prakashan Media, Meerut.

ENVIRONMENTAL BIOTECHNOLOGY

UNIT I

Environmental Spheres – Hydrosphere, Geosphere, Biosphere and Anthrosphere. Aims and Scope of Environmental Biotechnology, Pollution Measurement – Biotechnological Methods for Measurement of Pollution, Criteria for Biomonitoring of Pollution; Molecular biology in Environmental Monitoring and Role of Biosensors in Pollution Monitoring; Biotechnological Methods for management of Metal Pollution.

UNIT II

Biofuels: Biogas – Production of Biogas, /stages of Methanogenesis, Methane production from Hydrocarbons, Uses of Biogas, Hydrogen production – Importance of Biological Production of Hydrogen, Microbial production of Hydrogen, Uses of Hydrogen Production Technology. Petroleum Plants – *Calotropis, Euphorbia tirucalli, Jatropha curcas*

UNIT III

Sewage Treatment – Biotechnological Methods for Sewage and Waste Water Treatment - Primary, Secondary (Aerobic – Trickling filter and Activated Sludge Process; Anaerobic – Anaerobic digestion and Anaerobic Filter) and Tertiary Treatment (Ion Exchange Method); Water Recycling, Soil Conservation and Restoration;Sustainable Agricultural Management.

UNIT IV

Biodegradation and Bioremediation – Solid Waste Treatment and Disposal, Biodegradation of Hydrocarbons, Pesticides and Herbicides. Bioremediation- Types of Bioremediation: *in situ* and *ex situ*, Phytoremediation, Biosensors and Bioindicators , Bioleaching, Types of Reactions in Bioremediation, Genetically Engineered Microorganisms in Bioremediation.

UNIT V

Global Environmental Problems – Green House Effect and Global Warming, measures to Control Green House Effect. Ozone Depletion -Effects and Control Measures. Acid rains - Effect of Acid Rain – Causes, Effects and Control Measures; Remote Sensing and its Applications in Ecology.

Practical

Photographs/Model/Demonstration

1. Biosensor
2. Biogas Plant
3. Sewage Treatment
4. Acid Rain
5. Green House Effect

Spotters

Petro Plants

i. *Calotropis,*
ii. *Euphorbia tirucalli,*
iii. *Jatropha curcas*

References

1. Das, H.K. 2005. Text Book of Biotechnology.Wiley Dreamtech India Pvt..Ltd., New Delhi.
1. Dubey, R.C. 2005. A Text Book of Biotechnology, S.Chand and Company, New Delhi.
2. Kumaresan, V. 2009. Biotechnology, Saras Publication, Nagercoil.
3. Mishra, D.D. 2008. Fundamental Concepts in Environmental Studies. S. Chand and Company, Ltd., New Delhi.
4. Saha, T.K. 2008. Ecology and Environmental Biology. Books and Allied (P) Ltd. Kolkotta.
5. Satyanarayana, U. 2008. Biot3echnology Books and Allied (P) Ltd, Kolkata.
6. Shukla, R.S. and Chandel, P.S. 2007. A Text Book of Plant Ecology. S. Chand and Company, Ltd., New Delhi.
7. Singh, H.R. Environmental Biology. S. Chand and Company, Ltd., New Delhi.
8. Tyler Miller Jr. G. 2004. Environmental Science: Working with the3 Earth. Thompson Asia Pvt.Ltd., Singapore.
9. Vijaya Ramesh, K. 2004. Environmental Microbiology, MJP Publishers, Chennai.

MSU/2016-17/B. Sc Plant Biology & Plant Biotech/ Semester -VI/Ppr.no.45/ Practical - 5

Morphology of Angiosperms, Taxonomy & Economic

Botany and Elective I (Horticulture & Plant breeding / Forestry)

& Elective II (Marine Biotechnology / Environmental Biotechnology)

Time: 3 Hours **Maximum : 75 Marks**

1	Refer specimens 'A' and 'B' to their respective families giving reasons. Write the systematic position. Sketches not required.	10
2	Describe Specimen 'C' in technical terms, draw labeled sketches, dissect, display the floral parts and submit the slide for valuation.	10
3	Identify, draw labeled sketches, useful part and uses of 'D'	5
4	Prepare the Dichotomous key of A, B and C	6
5	Identify, draw labeled sketches and write notes on E, F, G, H, I and J.	24
6	Write the botanical name and family of K and L	4
7	Herbarium + Field note book	5+1
8	Record Note Book	10
	Total	75

Key and Scheme of Evaluation

Key

1. A and B specimens from the families prescribed in the syllabus.
2. C - Any specimen from the families prescribed in the syllabus.
3. D – Materials / products prescribed in the Economic Botany syllabus.
4. Dichotomous key preparation of A, B and C
5. E. F and G – Spotters pertained to Elective (Horticulture and plant breeding / Forestry) H, I and J spotters pertained to Elective II (Marine Biotechnology / Environmental Biotechnology).
6. K and L plants from the prescribed families.
7. Herbarium sheets with field notebook
8. Record note book.

Scheme of Evaluation

1	A and B. Identification – 1; Systematic position – 1 reasons – 3	2 x 5 = 10
2.	C : Description – 3; Sketch – 3; Floral diagram – 1 Floral formula – 1 ; Display of floral parts – 2	10
3.	D : Genus – ½ , Species – ½ , Sketch – 1, description of the useful part 1, uses 2	5
4.	Dichotomous key preparation	6
5.	E, F, G, H, I and J : Identification – 1, diagram – 1, Notes – 2	6x4= 24
6.	K and L : Genus ½, Species ½ , family 1	2x2=4
7.	10 Herbarium specimens with field notebook	5+1
8.	Record Note book	10

MSU/2016-17/B. Sc Plant Biology & Plant Biotech/ Semester -VI/ Ppr.no.46/ Practical - 6

Biochemistry, Bioinformatics, Plant Ecology and Phytogeography

Time: 3 Hours **Maximum : 75 Marks**

1	Take a lot from the given set of experiments. Write the procedure. Perform the experiment. Collect data and interpret the results.	20
2	Identify, draw labeled sketches and write notes on 'A' and 'B'	4x2=8
3	Analyse the herbaceous vegetation using quadrat / line transect method. Find out frequency, density, abundance and interpret the vegetation in terms of Raunkiaer's frequency formula.	12
4	Make suitable micro preparation of C and D in glycerin. Draw labeled sketches and write notes giving anatomical adaptations.	14
5	Comment on the morphological adaptation of 'E'	5
6	Identify, draw labeled sketches and write notes on 'F' and 'G'	2x3=6
7	Record note book	10
	Total	75

Key and Scheme of Evaluation

Key

1. Experiment prescribed in the syllabus
2. Biochemistry
   i. Instrument
   ii. Model / Chart
3. Quadrat / Line transect method
4. C and D (Hydrophytes / Xerophytes)
5. E. Halophytes – Vivipary / Pneumatophores
6. Phytogeography
   F and G (Maps / Photographs)
7. Record Note Book

Scheme of Valuation

1	Biochemistry Experiment ; Requirement – 2; Procedure – 6; Tabulation – 3. Calculation and results – 5; interpretation – 4	20
2.	A – Any instrument specified in the syllabus B – Model / Chart prescribed Identification – 1, diagram -1, Notes – 2	4x2=8
3.	Vegetation Analysis– 4, frequency – 2, density – 2, abundance -2, interpretation – 2	12
4.	C and D, Identification – 1, Section – 2, diagram – 1, Notes– 3	2 x 7=14
5.	E – Identification -1, diagram – 1, notes – 3	5
6.	F and G Identification -1 , Notes - 2	2x3=6
7.	Record Note book	10

Plant Physiology, Genetics, Evolution and Biostatistics and Plant Biotechnology and Genetic Engineering

Time : 3 Hours Maximum : 75 Marks

1	Take a lot from the given set of experiments. Write the procedure; Perform the experiment; Collect data and interpret the results	20
2	Comment on the Plant Physiology Experimental set up A	5
3	Solve the given genetic problem B and C and interpret	B - 4, C - 8
4	Work out the frequency distribution, Mean and standard deviation for the data provided in D	12
5	Identify , draw diagram and write notes on E, F, G and H	4x4=16
6	Record Note book	10
	Total	75

Key and Scheme of Evaluation

Key

1. Experiment prescribed in the syllabus
2. A - Plant Physiology Experimental set up
3. B - Monohybrid cross / Incomplete dominance
4. C - Dihybrid cross / Interaction of Factors.
5. D - Work out the given biostatistics data
6. E, F, G, and H – Spotters from Plant Biotechnology and Genetic Engineering/Genetics /Evolution.
7. Record Note book.

Scheme of Evaluation

1	Plant Physiology experiment – 5, setup – 7, observation and Tabulation – 5, interpretation – 3	20
2.	Experimental set up from Plant Physiology identification -1, diagram – 1, Notes – 3	5
3.	B – Mono hybrid cross problems– 4 C – Dihybrid cross /Interaction of Factors– 8	12
4.	D – Bio statics Problem- Frequency distribution – 5, Mean – 2, Standard Deviation – 5	12
5.	E, F, G and H spotters - Identification – 1, Diagram – 1, Notes – 2	16
6.	Record Note book	10
	Total	75

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES

B.Sc. Zoology

(with effect from the academic year 2016-2017 onwards)
(44th SCAA meeting held on 30.05.2016)

Sem.	Pt. I/II/ III/ IV/ V	Sub No.	Subject status	Subject Title	Hrs./ week	Cre dits	Marks				
							Maximum			Passing minimum	
							Int.	Ext	Tot.	Ext.	Tot.
V	I	33	Core - 7	Animal Physiology	4	4	25	75	100	30	40
	II	34	Core - 8	Animal Biotechnology	4	4	25	75	100	30	40
	III	35	Elective - 1	(**Select any one**) A). Sericulture B). Economic Entomology C). Dairy Farming	5	5	25	75	100	30	40
		36	Elective - 2	(**Select any one**) A). Apiculture B).Food and Food Processing Technology C). Poultry Science	5	5	25	75	100	30	40
		37	Practical -5	Exam at the end of the sixth semester	3	-	50	50	100	20	40
		38	Practical - 6	Exam at the end of the sixth semester	3	-	50	50	100	20	40
		39	Practical - 7	Exam at the end of the sixth semester	2	-	50	50	100	20	40
	IV	40	Skill Based subject (Common)	Personality Development/ Effective Communication/ Youth Leadership	4	4	25	75	100	30	40
				Subtotal	30	22					

Sem.	Pt. I/II/ III/ IV/ V	Sub No.	Subject status	Subject Title	Hrs./ week	Cre dits	Marks				
							Maximum			Passing minimum	
							Int.	Ext	Tot.	Ext.	Tot.
VI	I	41	Core - 9	Evolution	6	4	25	75	100	30	40
	II	42	Core - 10	Immunology and Microbiology	6	4	25	75	100	30	40
	III	43	Core - 11	Biostatistics, Computer applications & Bioinformatics	5	4	25	75	100	30	40
		44	Elective - 3	**(Selective any one**) 1. Aquaculture 2. Medical Laboratory Technology 3. Marine Biology	5	5	25	75	100	30	40
		45	Practical -1	Exam at the end of the sixth semester	3	4	50	50	100	20	40
		46	Practical - 2	Exam at the end of the sixth semester	3	4	50	50	100	20	40
		47	Practical - 3	Exam at the end of the sixth semester	2	4	50	50	100	20	40
				Subtotal	30	29					

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Zoology) Semester -V/Core -7

ANIMAL PHYSIOLOGY

OBJECTIVE

Carving an integrated approach to chemistry related to the functional significance of the various organs and organ systems of animals.

UNIT I

- Introduction – Animal physiology and Biochemistry
- Carbohydrates – Classification – Structure and functions of glucose, fructose, sucrose and glycogen
- Proteins – classification – structure and function of albumin and glyco proteins.
- General structure of amino acids – essential, non essential amino acids.
- Lipids – classification – structure and functions of lecithin, Cephalin, glycol lipids and cholesterol
- Prostaglandins – Introduction – Structure – Classification – Functions.

UNIT II

- Enzymes – classification – Nomenclature and properties – Mechanism of enzyme action.
- Digestion – Role of enzymes in carbohydrate,Protein and Fat Digestion in man absorption of digested food materials in man.
- Metabolism – Carbohydrates – Glycogenesis, glycogenolysis, glycolysis – Krebs's cycle.
- Protein's – Deamination – Transamination – Urea cycle.
- Lipids – β-Oxidation.

UNIT III

- Respiration – respiratory pigments – Distribution – composition – properties – Functions – Transport and exchange of oxygen and carbon-di-oxide - Anaerobiosis-Respiratory Quotient.
- Circulation – Origin and conduction of heat beat – cardiac cycle – ECG – Blood pressure – Heart diseases – Artherosclerosis, Angiogram.
- Excretion – kinds of excretory products – structure of kidney – Nephron – Mechanism of urine formation in man – composition of urine – Nephritis – Dialysis.

UNIT IV

- Muscle Physiology – types of muscles - Ultra structure of skeletal muscle – properties – mechanism of muscle contraction – Tetanus – Muscle fatigue
- Nerve Physiology – structure, types and functions of neuron.
- Nerve impulse – Definition – Conduction of nerve impulse through nerve – Saltatory conduction – Synapse – Synaptic transmission of impulses – Neurotransmitters – Neuromuscular junction.

UNIT V

- Endocrine system – Fine structure and functions of Pituitary, thyroid, Parathyroid, Adrenal, Islets of Langerhans – Testis, Ovary.
- Reproductive Physiology - Ovary, Graafian follicles, menstrual cycle, pregnancy,lactation, menopause - the role of hormones.

PRACTICALS

- Rate of Oxygen consumption in a fish.
- Effect of temperature on the opercular movement of fish – Calculation of Q10.
- Action of salivary amylase in relation to enzyme concentration.
- Qualitative test for carbohydrate (glucose), protein and lipid.
- Demonstration of blood pressure using sphygmomanometer.
- Estimation of Haemoglobin – demonstration only.
- Counting of different kinds of blood cells using haemocytometer – demonstration only.
- Qualitative test for ammonia,Urea and Uric acid.

SPOTTERS

- Slides, models and charts – glucose, fructose, glycogen, sucrose, Aminoacid, Cholesterol, Intestinal Villi, Haemoglobin, myoglobin, ECG, Sphygmomanometer, Haemometer, Haemocytometer, Kymograph, Cardiac Muscle, Striated and Non – Striated Muscle, Simple Muscle Twitch.

REFERENCE BOOKS: ANIMAL PHYSIOLOGY

1. Agarwal, R.A, A.K. Srivastava and Kaushal Kumar. Animal Physiology and Biochemistry (third edition).S.Chand & Company Limited, New Delhi.
2. Arora, M.P. Animal Physiology (sixth edition) Himalaya Publishing house, Ramdoot, Dr. Bhalerao Marg, Girgaon, Mumbai.
3. Berry, A.K. A Text Book of Animal Physiology with related Biochemistry (6th Edition). EMKAY Publications, Post box No.9410. B – 19 East Krishna Nayar, Swami Dayanad Marg, Delhi.

4. Das, A.K. Medical Physiology, Vol. I and Vol. II Books and allied (P) Limited, No.1 E/2 Shubam Plaza (1st Floor), 83/1 Beliaghata Main Road, Kolkata.
5. Goyal, K.A and K.V. Sastry, Animal Physiology,6th Revised Edition, Rastogi Publication, Gangotri, Shivaji Road, Meerut.
6. Guyton, A.C. (1981).Text Book of Medical Physiology, W.B. Saunders co.
7. Hill. Animal Physiology, ANE Books India, Anantika Niwas,19 Doraiswamy Road, T-Nagar,Chennai.
8. Hoar, W.S.(1975). Text Book Of Medical Physiology, W.B.Saunders Co.
9. Juneja, Kavita, Animal physiology. Anmol Publications Pvt. Ltd, 4374/4B Ansari Road, Daryaganj. New Delhi
10. Nagabhushanam, R.M.S. Kodarkar and R. Sarogini. Text Book of Animal Physiology 2nd Edition. Oxford & IBH Publishing Company Private Limited, S – 155, Panchshila Park, New Delhi.
11. Nigam, H.C. Animal Physiology. Vishal Publishing Company, Books Market Old Railway Road, Jalandhaar.
12. Prosser, L. and A. Brown Comparative Animal Physiology. Saunders & Co. Philadelphia.
13. Prosser,C.L.(1978). Comparative Animal Physiology. W.B. Saunders co.
14. William, S. Hoar, General and Comparative Physiology. Prentice – Hall of India, M-97 Connaught Circus, New Delhi.

REFERENCE BOOKS:BIO CHEMISTRY

1. Agarwal , G.R. Kriran Agarwal and O.P Agerwal, Text Book of Biochemistry (Physiological chemistry),Krishna Prakashan Media (P) Limite ,11 Shivaji Road, Meerut.
2. Berry, A.K. A Text Book of Biochemistry. EMKAY Publications, Post Box No.9410, B -19 East Krishna Nager, Swamy Dayanand Marg, Delhi.
3. Deb, A.C Concepts of Biochemistry (Theory + Practical).Books and Allied (P) Limited, Nol – E/1, Shubham Plaza (1st Floor) 83/1, Kolkata.
4. Jain, J.L, Sanjay Jain and Nitin Jain, Fundamentals of Biochemistry (6th Edition).S. Chand & Company Limited,7361 Ram Nager, New Delhi.
5. Jeyaraman, K. Laboratory Manual in Biochemistry, New Age International Publishers,4835/24 Ansari road,Darya Ganj, New Delhi.
6. Power and Chatwal.Biochemistry. Himalaya Publishing House, Ramdoot, Dr.Bhalerao Marg, Giragaon, Mumbai.
7. Rastogi, S.C. Biochemistry. Tata Mc Graw Hill Publishing Company Limited,No.444/1 Sri Emabara Naicker Industrial Estate, Alapakkam, Porur, Chennai.
8. Satyanarayana, U.Biochemistry. Books and Allied (P) Limited, Nol – E/1,Shubham Plaza(1st floor) 83/1,Kolkata.
9. Weil ,J.H General Biochemistry, New Age International Publishers,4835/24 Ansari Road, Darya Ganj, New Delhi.

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Zoology)/Semester-V/ Core - 8

ANIMAL BIOTECHNOLOGY

UNIT: I

Definition, History old and new Biotechnology, Scope and importance of biotechnology. Biotechnology in India. Research promotions and priorities in India, Restriction enzymes; enzymes useful for genetic engineering.

Steps in Gene cloning – preparation of desired DNA, Isolation of Plasmid vector, Insertion of desired gene into vector DNA, Introduction of recombinant DNA into host cells - prokaryotic and Eukaryotic animal cells. (Transformation, Transfection, Transduction, Microinjection, Biolistics, Electroporation, Liposome fusion). Screening and selection of recombinants. (Insertional inactivation, blue-white selection, Direct selection), Hybridization techniques (Colony hybridization), Blotting techniques (Southern, Northern and Western).

UNIT: II

Genomic library, DNA probe, cloning vectors: Plasmids – types, characteristic features, properties of an ideal gene cloning vector. Plasmid vector ($_{p}$BR 322,$_{p}$UC8, Ti plasmid), Bacteriophage vector (Lambda phage and M13), cosmid, phagemid, plant viral vector (CaMV), Animal Viral Vector (SV40); Yeast artificial chromosome, Transposons as vectors. Gene Amplification through PCR.

UNIT: III

Animal cell and Tissue culture: Requirements for animal cell culture laboratory, substrate, liquid media and gases; Maintenance of aseptic condition, Explant, Isolation of Explant, culture of Explant, disaggregation of Explants; Primary culture, secondary culture, subculture, prevention of contamination storage of animal cells (cryopreservation) Large scale culture – (Mono layer culture), Bioreactors – (CSTB and Air lift Bioreactor), Organ Culture: Techniques, advantages, applications Artificial skin & Cartilage. Stem cell culture.Hybridoma technology / Monoclonal antibody production.

UNIT: IV

Transgenic animal technology – Introduction, Methods of trans genesis (Any 3 methods), Dolly, applications.Gene therapy – Definition, classification, Bone marrow and Liver transplantation.Enzyme technology: Definition, Production of β Galactosidase enzyme, Enzyme immobilization and their application.

Bioethics: Intellectual property right, patenting of Biotech products. Bio safety – definition, Biosafety guidelines in India.

UNIT: V

Applied Biotechnology:-

Biotechnological methods of sewage water treatment – primary, secondary and tertiary treatment.

Bioremediation: Definition, types, Role of genetically engineered organisms in bioremediation (Super bug, phyto remediation)

Biofuel: - Ethanol, Biogas.

Aqua culture technology: - DOT-ELISA, Gene probe PCR.

Human genome project; DNA finger printing techniques and its application in forensic medicine,

Microarrays, Biochip, Bioweapons.

PRACTICAL

1. Isolation of genomic DNA – Demonstration.
2. Isolation of plasmid – Demonstration
3. Protoplast preparation and fusion – Demonstration
4. Estimation of Co_2 in any three effluent / sewage water samples – (Individual)
5. Isolation of Protein by PAGE – Demonstration.
6. Models / charts / photos**:**PBR 322, PUC 8, Ti plasmid, Lambda Phage, M13 Phage, SV40, CaMv, Restriction enzyme, recombinant DNA, Gene cloning, Electroporation, Microinjection, Lipofection, Southern blotting, Monoclonal antibody, stem cells, Dolly, Trans genesis, Animal cloning, organ culture, Anaerobic digester, Fermentor.

REFERENCE BOOKS:

1. Prof.V. Kumaresan,"Animal Biotechnology", Saras Publication, A.R.P. Camp Road, Periavilai, Kottar P.O.,Nagercoil, K.K.Dist., - 629 002.
2. Kumar H.D." A text book of Biotechnology,Affiliated East – West Press(P) Ltd., New Delhi.
3. Animal Biotechnology,2006,R.Sasidhara,MJP Publishers,Chennai.
4. Dubey R.C "A text book of Biotechnology"S.Chand & Co.,Ltd.,New Delhi.

SERICULTURE

OBJECTIVE

To explore the scope for students adopting sericulture as a vocation after their graduation as it is rural based and welfare oriented agro based industry.

UNIT I

Importance of sericulture, sericulture industry in India, sericulture as cottage industry, role of Central Silk Board, Moriculture, Mulberry varieties – High yielding varieties – Varieties for rainfed conditions. Morphology of mulberry plant, methods of propagation, irrigation, manuring – Biofertilizers – Green manuring – Triacontanol for increased mulberry productivity – Seriboost, pruning, harvesting and storing of mulberry leaves, package of practices for mulberry cultivation.

UNIT II

Diseases of mulberry – fungal diseases – fungal root diseases, fungal shoot diseases, Bacterial diseases – leaf blight disease, rot disease, Viral disease – mulberry leaf mosaic disease, dawn disease, Neamatode disease - root knot disease, Deficiency diseases – nitrogen deficiency, phosphorus deficiency, potassium deficiency, magnesium deficiency and calcium deficiency. Pests of mulberry – leaf eating insect pests and borer pests one example each.

UNIT III

Classification of mulberry silkworm, habit and habitats of silkworm, voltinism, races of silkworms, life cycle of mulberry silkworms, structure of egg, larva, pupa and adult, sexual dimorphism digestive system, circulatory system, excretory system, respiratory system, nervous system and reproductive system, endocrine glands, glands of silkworm.

UNIT IV

Rearing of silkworm: Rearing house – Rearing appliances – Rearing operation – Disinfection – Brushing – Maintenance of optimum conditions, Feeding – bed cleaning – spacing. Rearing of young ages – Chawki rearing - Rearing of late age larva: Shelf rearing. Floor rearing, shoot rearing. Application of sampoorna. Mounting: Methods – precautions, Cocoon marketing: Characteristics of cocoon – defective cocoons – methods of harvesting.

UNIT V

Diseases of silkworms; Protozoan – pebrine, Viral – Flacherie, gattine, grasserie Bacterial – Flacherie, septicemia, sotto, court, Fungal – Muscardine, Pests – Uzy fly, dermestid beetle of silkworm.Silk reeling: cocoon stifling – types, storage of stifled cocoons, sorting, cocoon, boiling and deflossing – brushing, Process of reeling: Different methods, silk waste and byproducts of silk reeling. Raw silk and marketing.

PRACTICALS:

1. Dissection of silk glands, digestive and nervous systems.
2. Dissection of male and female reproductive system.
3. Selection of mulberry leaves according to different stages.
4. Life history – egg, larva, pupa and adult.
5. Sexual dimorphism in larva, pupa and adult.
6. Mulberry varieties such as MR2, S30, S36, V2.
7. Chandrike.
8. Rearing tray and rearing stand.
9. Raw silk.
10. Report on field visit to sericulture farm.

REFERENCE BOOKS:

1.Ganga, G. and I. Sulochana Chetty, An introduction to Sericulture.Oxford & IBH Publishing Company Private Limited,S -155,Panchshila Park,New Delhi.

2.Ganga,G. Comprehensive Sericulture,Volume – 2 Silkworm Rearing and Silk Realing. Oxford & IBH Publishing Company Private Limited,S -155,Panchshila Park,New Delhi.

3.Dandin, S.B, Jayant Jayaswal and K.Giridhas, Hand Book of Sericultural Technologies,Central Silk Board,Madivala,Bangalore – 68.

4.Kamile Afifa. S and Masoodi M. Amin,Principles of Temperate Sericulture,Kalyani Publishers, B – 1/1292,Rajinder Nagar,Ludhians.

5.Kesary,M and M.Johnson,Sericulture,Department of Zoology,N.M.Christian College,Marthandam.

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Zoology)
Semester-V/ Elective – 1(B)

ECONOMIC ENTOMOLOGY

UNIT I

Structure and salient features

Brief account of external morphology of head, thorax and abdomen; Classification and development (metamorphosis) of insects; Salient features (up to order) and economic important of Thysanura, Orthoptera, Odonata, Thysanoptera, Isoptera, Coleoptera, Lepidoptera, Hemiptera, Diptera, Hymenoptera, Dermaptera

UNIT II

Productive insects

Sericulture- Types of Silkworm, Life cycle and rearing of mulberry silkworm, *Bombyx mori*; Economic importance of silkworms

Apiculture – Types of honey bees, Life cycle and culture methods, bee product and its economic importance

Lac culture – Lac insect,*Laccifer lacca* - Life cycle, Lac processing, Lac products and Economic Importance

UNIT III

Beneficial insects

Biological control agents –Characters and different between parasitoids and predators (common Indian insects); General characters and beneficial role of scavengers, pollinators, weed killers; Medicinal and Aesthetic value of insects; Insect as human food (general account only)

UNIT IV

Insects of medical importance

General account on Personal Pests (Lice, Fleas, Bedbugs, Ticks, Scabies mites), Housefly, Cockroach, Biting insects (Mosquitoes, Biting Midges, Sandflies, Black flies, Horse Flies, Stable flies), Major insect-born disease and their management; Recent development in Forensic entomology

UNIT V

Pest management

Components of pest control – physical, mechanical, cultural, chemical and biological control; Pesticide applicators; Pesticide poisoning and first aids; Banned pesticides; General Principles, advantages and disadvantages of Integrated Pest Management; Recent advances in pest control – sterilization techniques, liquid vaporizers, pheromones, RNA interferences, kairomones

PRACTICALS:

1. Head sclerites, thoracic segments, abdominal segments of cockroach
2. Types of antennae. Filiform, Moniliform, Aristate, Capitate, Clavate, Clubbed, Plumose, Pilose, Pectinate, Bipectinate, Setaceous and Geniculate, Lamellate, Serrate. (Any two mountings and rest for study with photo/permanent slides) (Preferably pests)
3. Halter and wing of house fly
4. Types of legs- Typical, Cursorial, Fossorial, Saltatory, Natatorial and Scansorial (Mountings of any two and rest for study with photo/permanent slides).
5. Abdominal appendages- Styles, cerci of cockroach.
6. Mouthparts of Cockroach
7. Malpighian tubules (cockroach)
8. Collection, preservation and display of 5 insect types (Collection and preservation of insects other than pests be discouraged)
9. Common Insecticide formulations (display of samples)
10. Field visit / Assignment / Play and ponder. Give actual handling of bees/ silk moth / lac insect or visit to any one of these units.

REFERENCES BOOKS

1. Abhishek Shkula, 2009. A Handbook on Economic Entomology, Daya Publishing House, India
2. Ganga, G. & Sulochana Chetty, J. 1997. An introduction to Sericulture. Oxford & IBH Publ. Co. pvt. Ltd., India.
3. David, B.V.& Ramamurthy,V.V. 2016. Elements of Economic Entomology, 8th Edition, Brillion Publishing, India

DAIRY FARMING

UNIT I

Importance of the study – Live stock in India – Live stock reproduction – Organs – Fertilization – Artificial Insemination – Inheritance – Hybrids – Hybrid Vigor – Grading – Pure breeds – Inbreeding.

UNIT II

Nutrition – Nutritive values of common feeds – Commercial and mixed feeds – Balance ration.

UNIT III

Dairy animals – Cattle – Cow – Buffaloes – Goat – Their economic importance – Productivity.

UNIT IV

Live stock diseases – Common parasites in India – Treatment.

UNIT V

Marketing the diary products – Milk and other dairy products – Nutritive values of fresh and preserved products – Combating spoilage of milk – Souring – Gassy Curdling – Robiness – Sweet curdling – Pasteurization.

PRACTICALS:

1. Visit to pasteurization plant and reporting.
2. On the spot tests of pure milk – Specific gravity,total soilds and adulteration of milk.
3. Demonstration of Dairy products – Cream,Butter,Ghee,Khoa, and Ice cream.
4. Identification of cattle diseases – Prevention and Cure-Method of taking temperature in cows.
5. Preparation of Cattle Feed-Balanced food – Identification of different feed plants.
6. Artificial insemination – Common Surgical Instruments and their uses.
7. Periodical visit to a Good Dairy Farm and Reporting.

REFERENCE BOOKS:

1. Principles of Dairy Chemistry. Janness, Robert and Sturte Patton; Wiely Eastern.
2. Artificial Insemination in Farm animals: Perry Enos (Eds.) Oxford & IBH.
3. Breeding and Improvement of Farm animals: Rice, Victor, Arthur; Tata MC Graw Hill.
4. Livestock and Poultry Production: Singh, Herbans and Earl Moore; Prentice Hall in India.

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Zoology)
Semester-V/Elective – 2 (A)

APICULTURE

Objective: To examine the scope for self employment opportunities after their graduation account of the rural based and welfare oriented nature of this vocation.

UNIT I

Definition, Scope, Classification of bees, Rock bee, Indian bee, Little bee and Dammer bee- their identification and habits, choice of species in Apiculture.

Bee colony-Distinctive features, Identification and Functions of queen,drones and workers, Structure and functions of Legs, mouth parts and sting of worker bee.

Development of Honey bee-egg,larva and pupa-time taken for the development of queen,drone and worker.Food of the bee- honey and pollen-royal jelly.

Artificial feeding.Behaviour of bees-dances

UNIT II

Principles of apiculture, Arranging an apiary, position-space-direction,acquiring bees-care of newly captured colonies-handling the bees.

Bee keeping-Primitive methods and their Advantages and Disadvantages. The bee comb and its architecture-Different kinds of cells-Burr comb.

Different types of Modern hives – Architecture- Parts of artificial hive and its advantages -other appliances used in apiaries.

UNIT III

Honey bee products.

Honey- Collection and Extraction, Preservation and storage –Physical properties,Chemical composition,nutritive value, medicinal values-honey as daliy food.

Bee wax-Production , method of extraction-characteristics and uses.

Bee venom-method of collection -composition of venom- its uses.

UNIT IV

Enemies of bees-Greater wax moth,lesser wax moth,ants,wasps,lice,beetles, birds and their management.Diseases of bees-adult and brood diseases- Bacterial,Fungal,Viral & Protozoan; Prevention and Control measures.

UNIT V

Swarming-Prevention and control.
Robbing and Fighting-Prevention and control.
Uniting stocks-Different methods.
Queen rearing.
Supersedure.
Foraging, inter-relationships of plants and bees

PRACTICALS

1. Mountings of Legs, mouth parts and sting.
2. Spotters:
   Queen, worker, Drone, Artificial hive,Queen excluder, smoker, honey extractor, honey, Bee comb and Comb foundation sheet.
3. Report on field visit to apiary.

REFERENCE BOOKS:

1. Mishra,R.C. and R. Garg. Perspectives in Indian Apiculture. Agrobios (India) behind Nasrani Cinema, Chopasani Road, Jodhpur-342 002.
2. Abrol,D.P. Bee Keeping in India. Kalyani Publishers, B-1/1292, Rajinder Nagar,Ludhiana-141 008.
3. Cherian, M.C. and Ramachandran. Bee Keeping in South India.
4. Philips, E.F. Bee Keeping,Agrobios (India) behind Nasrani Cinema, Chopasani Road,Jodhpur-342 002.
5. Sadar Singh, Bee Keeping in India Kar Delhi.
6. Sharma P.L and Singh, S.(controller) Hand Book of bee Keeping, printing and Stationery, Chandigarh.
7. Webb,A. Bee Keeping for profit and Pleasure, Agrobios (India), Behind Nasrani Cinema, Chopasani Road, Jodhpur-342 002

FOOD AND FOOD PROCESSING TECHNOLOGY

Objective:

To understand the physical and chemical properties of food stuff,the methods of preparation of palatable diets and the techniques employed to increase their shelf – life.

UNIT I :FOOD CHEMISTRY

Food chemistry: Definition and importance, water in food, water activity and shelf life of food. Carbohydrates: Chemical reactions, functional properties of sugars and polysaccharides in foods. Lipids: Classification and use of lipids in foods, physical and chemical properties, effects of processing on functional properties and nutritive value. Protein and amino acids: physical andchemical properties, distribution,amount and functions of proteins in foods, functional properties. Effects of processing- Losses of vitamins and minerals due to processing. Pigments in food, food flavours, browning reaction in foods. Enzymes in foods and food industry, Bio-deterioration of foods, food contaminants,additives and toxicants.

UNIT II: PRINCIPLES OF FOOD PROCESSING

Scope and importance of food processing – National and International perspectives. Principles and methods of food preservation – freezing, heating, dehydration, canning, additives, fermentation, irradiation, extrusion cooking, hydrostatic pressure-cooking, dielectric heating, microwave processing, aseptic processing, hurdle technology.Storage of food, modifiedatmosphere packaging. Refrigeration , freezing and drying of food, Minimal processing, Radiation processing.

UNIT III :

Definition of milk, composition, physical and chemical properties of milk Constituents and nutritive value of milk, Factors affecting composition of milk, Types of milk.Fluid Milk Processing. Receiving, Filtration & Clarification, Straining, Standardization, Homogenization and its Effects, Pasteurization and various systems of pasteurization ; LTLT, HTST , UHT methods, Pasteurizes(Heating and Cooling systems ,Flow controller regenerator,Flow division valve) sterilization, packaging of fluid milk. Coagulated Milk Products.Channa, Paneer, Classification and manufacturing process of cheese, butter and ghee and its storage. Condensed Milk-Types and factors affecting the quality of Condensed Milk , Storage of condensed milk - Methods of drying milk.(Drum and Spray drying) factors affecting the quality of dry milk. Introduction to instant non-fat dry milk, packaging of dry milk products.

UNIT IV :FRUITS AND VEGETABLES TECHNOLOGY

Cleaning, sorting, grading, peeling, and blanching methods and their Equipments, Ingredients and Processes for the manufactures of jam, jellies, marmalade, preserves, pickles and chutneys.Defects and factors affecting the quality of above. Thermal Processing of Fruits and Vegetables: History, definition,various techniques of thermal processing and their effects on the quality of fruits and vegetable products, thermal process time, introduction to concept of thermal process calculations,types of containers and their selection,spoilage of canned food.Dehydration of fruits and vegetables, equipment and process for dehydration of plums, apricot, apple , fig, grapes, peach, cauliflower,potato, mushroom, tomato. Freezing process of selected fruits and vegetables: Peas, beans, cauliflower, apricot and mushroom.

UNITV :TECHNOLOGY OF MEAT,FISH AND POULTRY PRODUCTS

Slaughter of meat animals,differentcutsof lamb and their uses,post-mortem inspection – postmortem changes- Loss of homeostasis, post-mortem glycolysis and pH decline, Rigor mortis. Preparatory operations of meats and meat products: Abattior- definition and construction, Basic preparatory procedures (commintion, emulsification, preblending). Cured and smoked meats,sausage products- classifications, processing steps and canned meat,meat pickles.Handling and Dressing of poultry: Inspection of poultry birds,dressing and preparation of ready to cook poultry, factors affecting the quality-Egg and Egg products-structure, chemical composition and nutritive value, spoilage of eggs and preservation of whole eggs and egg products,preparation of egg powder. Fish and fish products: Types of fish, composition and nutritive value, judging and freshness of fish,fish grading and cooking of fish, smoking, pickling, salting and dehydration , preservation of fish and processed fish products. Frozen storage of fresh and processed meat,fish and poultry. Byproducts of fresh and processed meat,fish,poultry and egg industry.

PRACTICALS:

1. Determination of Protein, Starch, Sugar, Amino acids, Crude fibers, Total minerals, Crude fat in food stuff.
2. Estimation of Vitamins – Ascorbic acid, Thiamine.
3. Browning reaction in food,Analysis of lipid-saponification value,acid value & Iodine Value.
4. Determination of Tannins-chemical residues and Aflatoxins,Estimation of Preservative and Antioxidants.
5. Platform test of Milk.
6. Determination of SNF, Specific gravity and total solids of milk.
7. Determination of moisture and fat content of milk powder.
8. Detemination of adulterants in milk like Water,Urea,Neutralizes,Preservatives and Starch.
9. Preparation of Channa and Paneer.

10. Preparation of different types of milk products and their evaluations.
11. Preparation of fish, Meat, Egg and Vegetable pickles – Demonstration.
12. Estimation of iron sulphide formation in cooked egg.
13. Visit to a Dairy Unit,Different fruit and vegetables processing unit,Slaughter house and observation of different types of cuts made and demonstration of slaughtering,fish processing unit and submit a report.
14. Equipments and appliances used in various food processing industries-observation.

REFERENCE BOOKS:

1. Food processing and nutrition – Bender A.E. – 1978 Academic Press,London.
2. Food processing technology: Principles and Practices.Fellows,P. and Ellis, A.1990,New York.
3. Introduction to food processing – Jelen,P.-1985.Prentice Hall,Reston Virginia,USA.
4. Food Chemistry – Awrand. W and Woods,A.E.1973.AVI,Westport.
5. Food Chemistry – Meyer,L.H.-1973.East West Press Pvt.Ltd,New Delhi.
6. Outlines of Dietary technology – Woarnes.
7. Preservation of fruits and Vegetables – Vijayakhader kalyani.
8. Preservation of fruits and Vegetables Srivastava,IBD Co.Lucknow.
9. Fish Preservation – S.K Kulsherestha.
10. Fish Processing and Preservation – C.L.Cutting.
11. Processed Meat- Pearson and Glite – CBS publishes.
12. Poultry,Meat and Egg Products – Parkursht and Mountney.CBS Publishers

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Zoology)
Semester-V/Elective – 2 (C)

POULTRY SCIENCE

UNIT I

Poultry industry in India – a brief introduction.Choosing a commercial laying stock –sexing in one day old chicks.Poultry housing – General principles of building poultry house.
Deep litter system – Droppings pit – Feeders , Waters – Nest boxes.Laying cages – Californian cages – Management of cage birds

UNIT II

Poultry manure – Volume, Composition and values.Nutritional content of eggs.
Management of Chicks, Growers, Layers and Broilers.
Lighting for Chicks, Growers, Layers and Broilers.Summer and winter management.
Debeaking –Forced moulting

Unit III

Poultry nutrition : Protein and Amino acid requirements for chicks , growers ,layers and broilers – Symptoms of excessive dietary levels and deficiency.
Carbohydrates and Fat requirements for Chicks, Growers, Layers and Broilers – Symptoms of excessive dietary levels and deficiency.Fibre requirement for poultry feeds.Requirements of vitamins and inorganic minerals for Chicks, Growers and Layers – Deficiency Symptoms.

UNIT IV

Importance of feed additives in a poultry feed.Preparation of supplementary feed for poultry-South Indian feed ingredients in relation to M.E level, Protein level, Amino acid, Minerals (ca &p) and Fiber content.

UNIT V

Poultry diseases – Causes, Symptoms,Transmission, Treatment, Prevention and Control of the following diseases : Viral diseases - Ranikhit disease, Fowl pox, Infection and control bronchitis and Gumboro disease. Bacterial disease – Fowl typhoid, Paratyphoid, Pullorum, fowlcholera, Coryza and Mycoplasmosis. Fungal diseases – Aspergillosis and Aflatoxicosis. Parasitic disease – Coccidiosis. Nematode infections. Tape worm infections. External parasites of chicks – Ticks, mites and lice.

PRACTICALS :

1. Identification of Ectoparasites of poultry studied in the theory.
2. Identification of Endoparasites.
3. Feeders – Different types.
4. Waterers – Different types.
5. Cage house – Model
6. New castel disease, Fowl pox, Coryza, Coccidiosis- Diagrams or models
7. Debeaking
8. Visit to a poultry farm and reporting.

REFERENCES :

- Poultry keeping – M.R. Gnanamani
- The Rearing of pullets – Bulletin No. 54, Her majesty's stationary office, London
- Intensive Poultry management for egg production. Bulleting No. 152. Her majesty 's stationary office , London.
- Nutrition of Chicken - M.L Scott et al .,
- Disease of Poultry – Biester Oxford&IBH

EVOLUTION

UNIT I ORIGIN OF LIFE

Chemical origin of life – Biological experimental evidences.

Evidences in favour of evolution :

-Homologous organs and Analogous structures.

-Embryological evidences – palaeontology-geological scale – biochemistry and physiology.

UNIT II

Lamarckism and Neo – Lamarckism

Darwinism and Neo – darwinism.

Mutation theory of De vries

Modern concept of evolution :Natural selection – types and mechanism.

UNIT III :

Variations and Sources of Variability.

Isolation and Isolating mechanisms.

Population genetics and evolution :

- Hardy – weinberg law
- Species concept and speciation – types and mechanism

UNIT IV:

Mimicry and Protective Colouration .

Adaptations : Cursorial , Fossorial , Arboreal, Volant , Aquatic , Desert , Cave.

UNIT V :

Evolution of Horse.

Evolution of man- Ancestry of man-Salient features of Apes and Man- Trends in Human Evolution – Causes for Human Evolution- Evolution of man as seen in the fossil record.

Cultural Evolution of Man.

Animal distribution (Geographical) – Patterns of Distribution - Zoogeography of Palaearctic , Nearctic , Neotropical , Ethiopian , Oriental and Australian region.

PRACTICALS:

Museum specimens,slides,models and charts.

Animals of evolutionary significance: Peripatus,Archeopteryx,Limulus.

Colouration:Mimicry- Lycodon and Krait; Mutation-Peppered Moth, Ancon sheep,Stick insect,Leaf insect.

Reference books

- Organic Evolution- N.Arumugam
- Evolution- M.P.Arora
- Moody,Introduction To Evolution.
- Dobzhansky, Th.:Genetics And The Origin Of Species 1951,Columbia Uty.Press.
- Dodson, Evolution – Process and Product.

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Zoology)/Semester-VI/ Core - 10

IMMUNOLOGY & MICROBIOLOGY

UNIT I

Historyand Scope of Immunology.Immunity-Type of Immunity-Innate & acquired,passive & active.Lymphoid organs –primary & secondary (Thymus, Bone marrow, Bursa of fabricius , Spleen, Tonsil, Lymph node, Peyer's patches) – Structure and Functions.

UNIT II

Immunoglobulin-Structure, Function, Biological properties of Ig classes.Interaction of Antigen and antibody.Salient features of antigen- antibody reaction.Types of antigen-antibody reaction – Agglutination, Precipitation, Opsonization, Cytolysis

UNIT III

Immune response-Lymphocyte as unit of immune system, stem cells - Structure and lineage, T cells, B cells & Macrophages.Humoral immune response- primary & secondary responses-B cell activation.Cell-Mediated immune response- Type of T cells & functions.Tumour immunology.

UNIT IV

Introduction : History & Scope of microbiology.General structure of microbes (Bacteria, virus).Bacterial growth : Culture media & selective media; Continuous & batch culture techniques, growth curve.

UNIT V

Food microbiology :Food poisoning ; Food spoilage & preservation.Industrial microbiology : production of Antibiotic penicillin.Soil microbiology : Role of soil microbes in N2 fixation.Medical microbiology : Diseases caused by bacteria in different systems of man as given below**:** Dermal – Streptococcal inflammation : - Tuberculosis; Gastro-intestinal-dysentery**:**Reproductive – Gonorrhea.Viral diseases with reference to causative organisms, symptoms, impact on the host & control measures,AIDS ,Rabies,Chicken pox,Measles,Influenza & polio.

PRACTICALS:

I .IMMUNOLOGY:

1.ABO blood grouping and Rh blood grouping.

2.Lymphoid organs in Rat(Demonstration only)

Spotters:

Charts, slides and figures:Stem cells, Phagocytes, Thymus, Bone marrow, Spleen, Lymph node, Immunoglobulin.

II . MICROBIOLOGY:

1.Simple staining of bacteria.

2.Gram-Staining of bacteria.

3.Serial dilution techniques.

4.Microscopic examination of living bacteria - hanging drop method.

5.Microscopic counting of microbes using haemocytometer (Demonstration only)

6. Measurement of microbes using ocular & stage micrometers (Demonstration only)

7. Preparation of culture media for microbes.

8. Distribution of microorganisms in nature-soil, water, & air.

9. Aseptic transfer of microbes & pure culture of bacteria and cultural characteristics of Micro-organisms.

Spotters:

Charts, slides and figures-Autoclave, Hot air oven, Agar plate, Agar stab, Agar slant, Inoculation needle.

REFERENCE BOOKS:

IMMUNOLOGY

1. Roitt, I. : Essential Immunology (ELBS).
2. Kuby : Immunology (W.H.Freeman)

MICROBIOLOGY

1. Pelczar, Reid & Chan: Microbiology.
2. Philip, L. Carpenter : Microbiology.
3. Powar : General Microbiology.
4. Salle,A.J: Fundamental Principles of Bacteriology.
5. Alexander, M : Introduction to Soil Microbiology.
6. Frazier,A.C. & Westhoff,D.C: Food Microbiology.
7. Burrows : Text Book of Microbiology.
8. Lakshmanan,M : Laboratory manual in Microbiology.
9. Moat & Foster : Microbial Physiology.
10. Rangaswami,G : Diseases of crop plants in India.
11. Patel,A.H.:Industrial Microbiology (MC . Millan India).

BIO STATISTICS, COMPUTER APPLICATIONS AND BIOINFORMATICS

UNIT I

Definition and scope; Data – Types & collection; Sampling methods – Variables – Discrete and continuous; Presentation of Data , Classification and Tabulation ; Parts of table. Diagrams and Graphs: Line diagrams, Bar Diagram, Pie diagrams, Histogram, Frequency polygon, Frequency poly curve. Measures of Central Tendency – Calculation of Mean, Mode and Median (Grouped and Ungrouped Data)

UNIT II

Measures of dispersion: Variance , Range , Standard Deviation and standard Error, Coefficient of variation. Chi – square test – Calculation and application, students't' Test. Correlation: Introduction , Types ,Perfect positive and negative, Linear and Non-Linear methods – Scatter diagram, Karl Pearson's correlation coefficient ; Interpretation of the Correlation coefficient.

UNIT III

Introduction to computer, Generation of computer – Components of computer, Input devices and Output devices – CPU – Primary and Secondary Memory operating system. Introduction to M.S. Office software, covering, word processing, spread sheet and presentation software. MS Word basics : Creating word document – File, edit, Format, Save menus, adding bullets, numbering and symbols – printing. MS Excel – entering and editing cell entries – adjusting row and column height – Pie-bar-line chart preparation. Uses of Internet – Email, Internet Browsing, World Wide Web(WWW), M.S Power point.

UNIT IV

Bioinformatics : Introduction – Definition of Bioinformatics – History – Importance of Bioinformatics – Scope and application of Bioinformatics – Components of Bioinformatics - Bioinformatics in life science. Biological sequence analysis – Sequence alignment – Pair wise sequence comparison – multiple sequence alignment.

UNIT V

Major Data bases in Bioinformatics – Nucleic acid sequence databases – EMBL – Genbank – Protein sequence database – SWISS – PROT . Databases similarity search Tools: BLAST FASTA – Application of bioinformatics tools. Database Retrieval Tools: ENTREZ – Locus link – Pub Med (Publishers on Medicine) SRS . Protein structure visualizing tools – RasMol, Swiss PDB viewer.

PRACTICALS:

1. Find out Mean, Median, Mode, Standard deviation, Standard error and co-efficient of variance using Neem leaf.
2. Calculation of correlation.
3. Bar diagram, Histogram, Pie diagram and frequency curve.
4. Models, Chart and Photos: Computer Mouse, CPU, Keyboard, Monitor.
5. Visit to a Computer centre to learn internet browsing and email sending – Compulsory for each student.
6. Take printout from NCBI,EMBL and PubMed and keep it for spotters.
7. Write some of the file commands and keep for spotters.

REFERENCE BOOKS:

BIO STATISTICS

1. Arora and Mathan. Bio Statistics (5th Edition). Himalaya Publishing House, Ramdoot, Dr.Bhalerao Marg,Girgaon,Mumbai – 400 004.
2. Daha, T.K. Biostatitics in Theory and Practics. EMKAY Publications, Post Box No.9410, B-19, East Akrishna Nagar, Swami Dayanand Marg, Delhi-110 051.
3. Gurumani. N, An Introduction to Biostatistics (computer Application included) 2nd Edition M.J.P. Publishers, Tamilnadu Book House, 47 Nallathambi street, Triplicane-600 005.
4. Jasra, P.K. and Gurdeef Raj. Biostatistics, Krishna Prakashan Media(P) Limited, 11, Shivahi Road, Meerut – 250 001
5. Parihar and Parihar. Biostatistics and biometry, Student Edition, Agrobios (India) Behind Nasrani Cinema,Chopasani Road,Hodhpur-342 002.
6. Pranab Kumar Banergee. Introduction to Biostatistics (2nd Edition). S. chand & Company Limited, 7361, Ram nager,New Delhi-110 055
7. Prasad, S. Elementa of Biostatistics. Rastogi Publications, Gangotri, Shivaji Road, Meerut 250 002.
8. Satguru Prasad – Fundamentals of Biostatistics (Biometry). EMKAY Publication, Post Box No.9410 B-19, East Akrishna Nagar, Swami Dayanand Marg, Delhi-110 051.

9. Pagano, M. and K. Gauvreau. Principles of Biostatistics. Thomas Learning, Alps Building,1st floor,56,Janpath,New Delhi.
10. Satgurau Prasad, Elements of Biostatistics, Rastogi Publications Gangotri, Shivaji Road, Meerut 250 002.

COMPUTER APPLICATIONS:

1. Krishnamoorthy, R. Computer Programming and applications.
2. Rajaram, V.Fundamentals of computers.

BIOINFORMATICS:

1. Bal, H.P. Bioinformatics principles and Applications, Tata Mc Graw Hill Publishing company Limited, No. 444/1 Sri Ekambara Naicker Industrial Estate,Alkapakkam, Porur, Chennai – 600 116
2. Dan, E.Krane and Michael L.Raymer.Fundamental concepts of Bioinformatics.Pearson Education (Singapore) PTE Limited, Indian Branch, 482 FIE Patparganj,Delhi-110 092.
3. Ignacimuthu, S.Basic Bioinformatics.Narosa Publishing House Private Limited,35-36 Greams Road,Thousand Lights, Chennai-600 006
4. Ranga, M.M. Bioinformatics,Agrobios (India) Behind Nasrani cinema, Chopasani Road,Hodhpur – 342 002.
5. C.S.V.Murthy Bioinformatics- Himalaya Publishing House.

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MSU/2016-17/UG-Colleges/Part-III (B.Sc. Zoology)
Semester-VI/ppr.-29/ Elective (any one) - 3 (A)

AQUACULTURE

OBJECTIVE : To illustrate Aquacultural potential and practices in India and augment food production from aquatic resources through Aquaculture.

UNIT I

Definition, scope of aquaculture, cultural techniques, Aquaculture in India – Freshwater,Coastal and marine aquaculture – Culturable oraganisms – Fin fishes, Shell fishes and their qualities.

UNIT II

Preparation of pond for fish culture.
Types of fish ponds – Nursery pond, rearing pond and culture pond. Fin fish culture – Culture of Indian major carp – Bundh breeding,Induced breeding, Transport of fish seeds. Shell fish culture – culture of marine prawn – Induced breeding – Types of prawn culture in India.
Edible Oyster culture and Pearl Oyster culture.

UNIT III

Types of cultures – Extensive, Semi-intensive and Intensive culture, Monoculture,Monosex culture, Polyculture, Cage culture,Pen culture. Integrated fish farming – Paddy cum fish culture. Animal husbandary cum fish culture,Sewage fed fish culture.

UNIT IV

Fish feed – Artificial feed – feed formulation,need,ingredients,pellets.Live feeds and their culture – Artemia, Diatoms, Rotifers, Micro AlgaeDiseases of aquaculture organisms – Ectoparasites and Endoparasites.Bacterial, Viral and Fungal diseases – Nutritional deficiency diseases.

UNIT V

Government participation in aquaculture. CMFRI,CIFRI,MPEDA,FFDA.Post harvest technology in fishes – Rigor mortis, fish spoilage, fish preservation techniques – freezing,canning,drying. Fish marketing; Co-operative marketing in fisheries.Craft and gears.Water quality management.

PRACTICALS:

1. Determination of pH in two water samples using pH meter.
2. Estimation of Salinity, Dissolved oxygen and Alkalinity in two water samples.
3. Mountings;Placoid, Cycloid and Ctenoid scales.

4. Museum specimens,slides,models and charts**:** Catla,Rogu,Mrigal,Channa,Penaeus,Crossostrea,Raft culture,Pinctada,Argulus,Lernaea.

REFERENCE BOOKS:

1. Beavan, R. Handbook of Freshwater Fisherries on India. Narendra Publishing House,1417, Kishan Dutt street, Maliwara, Delhi – 110 006.
2. Biswas, K.P. Prevention and control of fish and prawn diseases, Narendra Publishing House,1417, Kishan Dutt street, Maliwara, Delhi – 110 006.
3. Dash, M.C. and P.N. Patnik, Brackish Water Prawn Culture, Palani Paramount Publications,69-D.,Anna Nager, Palani – 624602.
4. Dick Mills, Tropical Aquarium Fishes, Chencellor Press, Michelin House,81,Fulham Road, London SW3 6RB.
5. Jhingran, V.G. Fish and Fisheries of India, Hindustan Publishing Corporation (India), Delhi.
6. Khanna, S.S. Introduction of fishes, Central Book dept, Allahabad.
7. Latha Shenoy, Course Manual in Fishing Technology Central Institute of Fisheries Education (Indian Council of Agricultural Research), Versova, Bombay – 400061`.
8. Mary Chandy, Fishes. National Book trust.A-5,Green Park, New Delhi – 110 016.
9. Pandian, T.J., Sustainable India Fisheries. National Academy of Agricultural Sciences. ICAR, Ministry of Agriculture, New Delhi.
10. Parihar R.P. A Text Book of Fish Biology and Indian Fisheries. Central Publishing House, Allahabad.
11. Rath. R. K. Freshwater Aquaculture. Scientific Publishers.5A.New Pali Road Jodhpur,342001.
12. Santhanakumar, G and A.M. Selvaraj. Concepts of Aquaculture. Meenam Publications. Nagercoil Lekshmi Papers, Thirumal Complex, Opp. Chakkaravarthi theatre. Chettikulam Jn., Nagercoil – 629 002.
13. Sebastian. CD. A Manual on seed production and Farming of gaint Freshwater prawn Macrobrachium Rosenbergii. The Marine Product Export Development Authority MPEDA House, Panampilly Avenue, Kochi – 682 036.
14. Srivastava, C.B.L. A Text Book of Fishery Science and Indian Fisheries. Kitab Mahal Distributors,28,Netaji Subash Marg, New Delhi – 110 002.
15. Sundararaj, V. and B. Srikrishnadhas, Cultivable Aquatic Organisms, Narendra Publishing House,1417, Kishan Dutt street, Maliwara, Delhi – 110 006.

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Zoology)
Semester-VI/ Elective (any one) - 3(B)

MEDICAL LABORATORY TECHNOLOGY

Objective : To learn the utility and the applications of the instruments so as to study the etiology of various diseases affecting human beings.

UNIT I

Medical Laboratory Personnel – Code of conduct, Laboratory requirements, Sterilization, Dry heat (Hot air oven),Moist heat (Autoclave, Pressure cooker),Laboratory equipments – Spectrophotometer, Incubator Refrigerator, Auto analyzer, Micro centrifuge, Automatic pipettes.

UNIT II

Collection of blood samples, Packed cell volume (PVC), Erythrocyte sedimentation Rate (ESR),RBC Count, WBC Count, Reticulocyte count, Total count, Differential Count, Pulse rate, Use of blood pressure Apparatus, Electrocardiogram, Echocardiogram, Estimation of Haemoglobin, Artificial pacemaker.

UNIT III

Blood cross matching – Hepatitis test – Haemolytic jaundice, ELISA, Estimation of blood glucose fasting two hour post prandial – Diabetes mellitus, Estimation of blood Cholesterol, Blood Urea, Blood Uric Acid.

UNIT IV

Analysis of urine – Physical examination, Blood cells, Urine glucose, Urine albumin, Bile salts, Ketone bodies, Urine culture – Antibiotic susceptibility test.
Pregnancy Test (Detection of HCG).
Analysis of faeces – Components of faeces their characteristics, factors affecting faeces composition.
Analysis of sputum – Pathological conditions that can be detected in sputum – their causes – Detection of Group A – Streptococcus.

UNIT V

Cerebrospinal fluid – Formation, Composition function, Conditions altering its composition – their causes. Seminal fluid – Composition of seminal fluid, Sperm count, Abnormal sperms, Common pathological conditions detected in semen – their causes.

Aminotic fluid – Sex determination, Diagnosis of pathological conditions of developing foetus through analysis of amniotic fluid.

PRACTICALS:

1. Blood – Packed cell volume (PVC),erythrocyte sedimentation Rate (ESR), Reticulocyte Count, Total Count, Differential Count, Estimation of haemoglobin.
2. Urine – Albumin, Sugar, Ketone bodies, Bile salts, Bile pigments, Pregnancy test – Sputum – Microscopic structures seen in sputum – Semen – Sperm count.
3. Specimens, Slides, Models and Charts:- Haemocytometer, Haemoglobinometer, ESR tubes, Autoclave, Automatic pipette, Reticulocyte.

REFERENCE BOOKS:

1. Biswajit Mohanty and Sharbari Basu – Fundamentals of Practical Clinical Biochemistry, B.I. Publications PVT., LTD.,54, Janpath, New Delhi – 110001.
2. Estridge B.H. Raynold A.P and Walters N.J. Basic Medical Laboratory Techniques,4th edition, Thomson Delmar Learning, Eastern press (Bangalore)Pvt., Ltd., Boommasandra Industrial Area, Hosur Road, Bangalore – 562158.
3. Kannai, L. Mukherjee, Medical Laboratory Technology Vol - I, Vol - II and Vol - III. Tata MC Graw Hill Publishing Company Limited,No:444/1,Sri Ekambara Naicker Industrial Estate, Alapakkam, Porur, Chennai – 600116.
4. Ramnik Sood, Medical Laboratory Technology, Methods and Interpretations. Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
5. Venkadesan, O. Essential of Medical Laboratory technology, Bicobas P.G and Research Department of Zoology, Loyola College, Madras – 600034.

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Zoology)
Semester-VI/ Elective (any one) - 3(C)

MARINE BIOLOGY

UNIT I

Classification of Marine environment – Horizontal and Vertical – Names and Extent of different oceans. Physiological oceanography – Physical properties of water,Specific gravity,Solubility and their influence on marine organisms.

UNIT II

Origin of waves and tides – Major water currents and their impact on animal and plantpopulations and productivity

UNIT III

Chemical Oceanography – Major and Minor constituents of SeawaterSalinity and Chemical composition and their influence on productivity. Energy cycle in marine environment, Carbon, Nitrogen, Phosphorus cycles in marine environment.

UNIT IV

Biological Oceanography – Study of Phyto and Zooplankton – Adaptations of phytoplankton to float.A Survey of economically important fish,prawn and molluscan populations in the nearby coastal region – their life history, food and feeding habits – their natural enemies.

UNIT V

Marine Geology – Study of marine sediments and their economic importance – Oil resources – Pollutants and their effect.Coral reefs in the world.

PRACTICALS

1. Qualitative and Quantitative analysis of Planktons.
2. Estimation of Salinity.
3. Estimation of Nitrates, Silicates and Phosphates.
4. Gut content analysis of local marine fish fauna at two different seasons.
5. Collection of Crabs & tackles used in fisheries (photographs and charts)
6. Study of the biology of any one marine organism available in the local area by each student

REFERENCE BOOKS:

1. M.C. Connaghey – Introduction to Marine Biology (Toppan Co.)
2. Sir Frederick S.Russel and Sir Maurice Yonge- Advances in Marine Biology (Academic Press) 1971 Edition.
3. M.V.Moore-Marine Ecology (John Wiley Sons)

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI
PG - COURSES – AFFILIATED COLLEGES
Course Structure for M.A. (Economics)
(Choice Based Credit System)
(With effect from the academic year 2017-2018 onwards)

Sem. (1)	Sub. No. (2)	Subject Status (3)	Subject Title (4)	Contact Hrs./ Week (5)	Credits (6)
I	1	Core - 1	Advanced Micro Economics Theory - I	5	4
	2	Core - 2	Macro Economic Theory and Analysis I	5	4
	3	Core - 3	Statistical Methods for Economics I	6	4
	4	Core - 4	Monetary Economics	5	4
	5	Elective - 1	International Economics	5	3
	6	Elective - 2	History of Economic Thought	4	3
II	7	Core - 5	Advanced Micro Economics Theory - II	6	4
	8	Core - 6	Macro Economic Theory and Analysis II	5	4
	9	Core - 7	Statistical Methods for Economics II	6	4
	10	Core - 8	Environmental Economics	5	4
	11	Elective - 3	Indian Economy	4	3
	12	Elective - 4	Computer Applications in Economics	4	3
III	13	Core - 9	Mathematical Methods I	6	4
	14	Core - 10	Development Economics	5	4
	15	Core - 11	Public Finance/ Financial Economics	6	4
	16	Core - 12	Research Methodology	5	4
	17	Elective - 5	Micro Finance	4	3
	18	Elective - 6	Industrial Economics/Econometrics	4	3
IV	19	Core - 13	Mathematical Methods II	5	4
	20	Core - 14	Planning and Growth	5	4
	21	Core - 15	Public Economics	5	4
	22	Core - 16	Health Economics	5	4
	23	Core - 17	Project	10	8

For the Project, **f**lexible credits are b/w 5 - 8 & Hours per week are b/w 10 - 16.

Total number of credits ≥ 90 : 90
Total number of Core Courses : 17 (16 T + 1 Project.)
Total number of Elective Courses : 6
Total hours : 120

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ADVANCED MICRO ECONOMICS THEORY – 1

UNIT: I Theory of Consumer Demand:

Basic Economic problem – Economic theories- validity of Economic Theories for policy making – pragmatic approach to Demand Analysis – Constant Elasticity of demand model – Distributed lag models – Linear expenditure system – Dual properties and propositions- Roys Identity – Shepherds Lemma – Slutsky theorem.

UNIT: II Theory of Production:

Production function – continuous aggregate production function – Cobb Douglas production function – constant Elasticity of Substitution (CES) – Translog production function – Technical progress – Embodied and Disembodied neutral labour saving and capital saving technical progress – Derivation Cost function from production function.

UNIT: III Market Structure and Pricing:

Perfect Competition – Short run and long run of the firm and industry – price and output determination – Monopoly – price determination Monopoly control – Price discrimination – Monopolistic competition – general and Chamberlin approaches to equilibrium – Equilibrium of product differentiation and selling costs – excess capacity – criticisms of monopolistic competition – monopsony – bilateral monopoly.

UNIT: IV Duopoly and Oligopoly:

Oligopoly and duopoly models – collusive and non-collusive models- Cournot, Bertrand, Chamberlin, Sweezy, Stackelberg models, Cartels – price leadership – Non-price competition in oligopoly.

UNIT: V Theories of Firm:

Bain's limit pricing theory – Silos-Labini model of limit pricing – Franco Modiglianis contributions to limit price – profit maximization theory – theory of full cost or average cost pricing – the Andrew's version; The marginalist controversy.

Books for Reference:

1. Koutsoyiannis, A. Modern Micro Economics, ELBS Macmillan,1994.

2. Baumol, W.J. Economic Theory and Operations Analysis: Prentice Hall of India, New Delhi.

3. Stonier,A.W. and Haque D.C. – A Text Book of Economic Theory

4. Halvarian, Micro Economics (Advanced) Affiliated East West Press.

5. Jhingan,M.L. Advanced Economic Theory: Brinda Publications, New Delhi.

6. Ahuja, H.L. Advanced Economic Theory: S.Chand & Company Ltd. New Delhi.

7. Herderson, J.M. and Quandt.Micro Economics: Mc Graw Hill Publications.

8. David F. Heith and Soren Wibe: Cost and Production Function: Macmillan Publications.

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MACROECONOMIC THEORY AND ANALYSIS - I

Unit – I : Introduction

Some Basic Macroeconomic Concepts : Macroeconomic Variables – Relationship between Variables – Time Series and Cross-Section Analysis – Ex-ante and Ex-post Variables – Need of an Aggregate Approach – Limitations.

Unit – II : National Income and Circular Flow of Income

Concepts of National Income – Keyne's Concept of National Income – National Income Accounting – Social Accounting : Input-Output Accounting, Flow of Funds Accounting - Problems in the Measurement of National Income – National Income and Social Welfare – Circular Flow of Income.

Unit – III : Consumption Function

Keyne's Psychological Law and its Implications – Determinants of Consumption – Absolute Income Hypothesis – Relative Income Hypothesis - Life Cycle Hypothesis – Permanent Income Hypothesis – Pigou's Real Balance Effect - Long Term Consumption Function.

Unit – IV : Investment Function

Concepts and Types of Investment – Determinants of Investment – Marginal Efficiency of Capital – Marginal Efficiency of Investment – Acceleration Theory and Investment –

Unit – V : Macroeconomic Issues

Inflation – Meaning and Types – Keynesian Theory of Inflation – Modern Theory of Inflation – Philips Curve.

Business Cycle – Meaning and its Nature – Theories of Business Cycle : Samuelson's Model, Kaldor's Model, Hicks Model of Business Cycle.

References :

1. Dernberg, T.F., Macroeconomics: Concepts, Theories and Policy, Mc Grow Hill 1985.
2. Friedman and Heller., Monetary VS Fiscal Policy, New York University Press, 1969.
3. Branson. W., Macroeconomics Theory and policy, Harper & Row, 1989.
4. Roberts, P. G., The supply side Revolution, Harvard University Press, 1983.

5. Baumol. W. J and Blinder, Alan. S., Economics, Principles and Policy, Harcourt Bruce, London 1988.
6. Shapiro. E., Macroeconomic Analysis, Harcourt Bruce Inc, 1994.
7. Eisner. R and Robert H. Strotz., Determinants of Business Investment, Impact of Monetary Policy, Prentice Hall -0 1993.
8. Branson.W., Macroeconomic Theory and Policy, Harper & Row 1984.
9. Gordon, R. J. Macroeconomics, Little Brown 1981.
10. Ghosh B.N. Modern Macroeconomics: Theory and Policy, Ane Books, New Delhi, 2012.
11. Gupta G.S., Macroeconomics Theory and Application, Mc Grow- Hill, New Delhi, 2008.
12. Jhingan. M.L. Macroeconomics Theory- Rinda Publication New Delhi 2012.
13. Hamberg. D., Business Cycle, Mac Milan, New York, 1951.

MSU / 2017-18 / PG –Colleges / M.A. Economics / Semester –I / Ppr.no.3 / Core -3

STATISTICAL METHODS FOR ECONOMICS - I

Unit – I: Correlation

Simple Correlation – Meaning – Types – Assumptions and Limitations - Karl Pearson's Correlation co-efficient and Spearman's Rank Correlation co-efficient and their properties.

Unit – II: Regression

Simple Regression – Types of regression – Methods of Estimation of Linear Equations using Ordinary Least Square Method – Standard Error of Regression co-efficient - Partial and Multiple Regression.

Unit – III: Time Series Analysis

Time Series Analysis – Concept and Components – Utility of Time Series - Determination of Regular Trend and Seasonal Indices.

Unit – IV: Index Numbers

Index Numbers – Concept, Price Relative, Quantitative Relative, Value Relative – Methods of Constructing Index Numbers – Unweighted Index Numbers – Weighted Index Numbers – Problems in the Construction of Index Numbers - Tests of Adequacy of Index Numbers - Consumer Price Index Numbers.

Unit – V: Vital Statistics

Definition – Uses of Vital Statistics – Methods of Obtaining Vital Statistics – Measurement of Fertility – Reproduction Rates – Measurement of Mortality – Life Tables and its Uses.

References:

1. *Sancheti D.C.* and Kapoor V.K. – Statistics, Theory, Methods and Applications.
2. *SC. Gupta* and V.K. Kapoor, Fundamentals of Mathematical Statistics.
3. S.P. Gupta – Statistical Methods.

MSU / 2017-18 / PG –Colleges / M.A. Economics / Semester –I / Ppr.no.4 / Core -4

MONETARY ECONOMICS

Unit I:

Concepts of Money: Traditional and Modern view – Concept of liquidity – Radcliffe Committee – Gurley and Shaw hypothesis

Unit II:

Demand for money: Meaning – Classical Approach – Keynesian Approach – Post-Keynesian Approach – Real Balance Effect – Friedman's Theory of Demand for Money – Tobin's Portfolio Selection Model.

Unit II:

Money Supply concepts: - RBI – Money supply and Price level – Components of Money supply – Determinants of money supply – Hi-powered money and money multiplier – Control of money supply – Theories of Inflation – Control of inflation.

Unit IV: -

Financial System: - Structure of Financial system – Financial market – Market and its composition – Capital Market – Government and Industrial Securities Market – Regulation of Financial Market – SEBI.

Unit V: -

Monetary Policy: - Meaning – Objectives – Instruments – Role of Monetary Policy in developing countries – Expansionary and Restrictive Monetary Policy – Limitations of monetary policy with special reference to India.

Books for Reference:

1. Mishra SS, Money, Inflation and Economic Growth, Oxford and IBH Publishing company, New Delhi, 1981.

2. Gupta L.C., India's Financial Markets and Institutions, Society for Capital Research and Development, New Delhi, 1999.

3. Jhingan M.L., Monetary Economics, Vrindha Publications, New Delhi.

4. Inflation Theory and Policy, Haggen, A.J., 1977, London, The Macmillan Press Ltd.

5. Macro Economics, Income and Monetary Theory Aschhein Joseph and Ching Yao Hseih, 1969, Charles E Merrill Publiching Co., Columus Ohio.

MSU / 2017-18 / PG –Colleges / M.A. Economics / Semester –I / Ppr.no.5 / Elective -1

INTERNATIONAL ECONOMICS

Unit I: Theories of International Trade: -

Importance of International Economics – Basic Concepts: Production Possibility Curve – Opportunity Cost –Offer Curve .The Modern theory of Factor Endowments - The Heckscher–Ohlin Theory - Samuelson's factor – Price Equalization Theory. Factor intensity reversals – Single - Multiple - Stopler–Samuelson Theorem –Rybczynski Theorm - Leontief Paradox

Unit II: Economic growth and International trade: -

Gains from Trade - Effects of Growth on Trade, on terms of trade and on production - Trade welfare and terms of trade of a small country and large country - Immisersing growth.

Unit III: Balance of Payments and Foreign Exchange: -

Structure and Components – Adjustment Mechanism of BOP – Types and Effects of Tariffs – Types of Non-Tariff Barriers – Foreign Exchange Rate and its policy – Control of Foreign Exchange.

Unit IV: Economic Integration and Co-operation: -

Regional Trade Blocks – Bi-lateral and Multi-lateral International Negotiations, Preferential Trade Areas (PTAs) and Free-Trade Areas (FTAs) – Objectives, Functions – Structure and Working of IMF, World Bank and Asian Development Bank.

Unit V: World Trade Organization: -

WTO – Origin – Objectives _- Structure – Functions – Working of WTO – WTO Agreements – Multilateral Agreements on Trade in Goods – Agreement on Agriculture – Agreement on Textiles and clothing – Anti-Dumping – GATS, TRIPS, TRIMS, south-South Co-operation and SAARC.

Books for reference:

1. International Economics, Francis Cherunilam, TATA McGraw-Hill Publishing Company Ltd.
2. International Economics, Vaish M.C., Sudama Singh Oxford and IBH Publishing Co.Pvt Ltd.,.
3. International Economics, Jhingan M. L., Vrindha Publications Pvt. :td/. Delhi-91.
4. International Economics, Sankaran S, Morgham Publication, Chennai- 17.
5. International Economics, Mithani D M., Himalaya Publishing Housing.
6. International Economics, Desai S S M and Nirmal Bhalerao.

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HISTORY OF ECONOMIC THOUGHT

Unit – I : Pre-Classical Period and Classical School

Importance of history of economic thought – Mercantilism – main characteristics - Physiocrates: Quenay's tableau economique concept of surplus growth.

Classical School: Adam Smith: The invisible hand doctrine – wealth of nation – laissez faire – labour profit and wages – critiques of Adam Smith. David Ricardo: Theory of value – theory of rent – comparative advantage theory of trade. Malthus: theory of population – critique of say's law.

Unit – II : The Neo Classical School

The Marginalist revolution: Value (Marginal utility theory) and distribution (Marginal productive theory of wages) – General equilibrium: Walras and Pareto – Marshall's Contributions: role of time in price determination – ideas on consumers' surplus – elasticities – prime and supplementary costs. Pigou: Welfare Economics – Schumpeter role of entrepreneur and innovations – Criticism of neo classical school.

Unit – III : Socialism and Marxian Thought

Evolution of socialist thought – Utopian. Socialism – Saint Simon Oweri Blance – Fourier – Proudhon – Scientific Socialist.

Karl Marx – Efforts at scientific socialism – Organic composition of capital – Breakdown of capitalism – Reserve army of labour – critiques of Marx – Modern revival of Marxian economics.

Unit – IV : The Keynesian Revolution and Monetarism

Keynes's criticism of classical theory – Keynesian theory of employment – Keynes and economic policy – Monetarism: Milton Friedman's new quantity theory – friedman's concept of natural rate of unemployment.

Unit – V : Modern Developments

Amartya Sen's Capability theory of welfare – Twenteith century economic thought – main features - the rise of Keynesianism – critical valuation of the development of economic thought.

References :

1. Eric Roll, "A History of Economic Thought", Faber & Faber Publishing House, London, UK – 2002 New and Revised Edition.

2. Gride Charles and Charles Rist, "A History of Economic Doctrines' D.C. Health and Company, Massachusetts, USA.

3. Hajela TN, "History of Economic Thought", ANE Books Pvt. Ltd., New Delhi.

4. Lewis H. Haney, "History of Economic Thought: A Critical Account of the Origin and Development of the Economic Theory", Forgotten Books Publisher, United States – 2017 Revised Edition.

5. Lionel Robbins, "A History of Economic Thought – The LSE Lectures", Princeton University Press, New Jersey, USA - 2000 Revised Edition.

6. Lokanathan, "History of Economic Thought", S. Chand Publishing House, New Delhi.

7. Robert B. Ekelund Jr. and Robert F. Hebert, "A Hisotry of Econmic Theory and Method", Waveland Press, USA - 6th Edition 2013.

8. Wiebke Kuklys, "Amartya Sen's Capablitity Approach: Theoretical Insights and Empirical Applications", Springer Publishing, New York, USA.

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Advanced Micro Economic Theory – II

UNIT –I Alternative Theories of Firm:

Recent Developments in the theory of pricing – Baumol's theory of sales revenue maximization – Cyert and March model – Maximum rate of growth hypothesis by Marris – Williamson's model of Managerial discretion – Behavioural theory of firm – Game theory.

UNIT –II Distribution:

Neo-classical approach – Marginal productivity theory – Euler's theorem- the adding up problem – Modern theories of rent, wage, interest and profit – liquidity preference theory of interest – Shackle's theory of profit – Macro theories of distribution – Ricardian, Marxian, Kalecki and Kaldor.

UNIT –III Welfare Economics:

Pigovian Welfare Economics and Externalities – the compensation criteria – Kaldor, Hicks criteria – Scitovsky criterion – Problems of existence, stability and uniqueness of general equilibrium – Maximisation of Social Welfare – marginal conditions of paretian optimum – pareto optimality and competitive equilibrium.

UNIT –IV General Equilibrium Analysis:

Walrasian General Equilibrium Analysis – 2x2x2 model – pareto optimality – tatonnement and non- tatonnement process – Social Welfare function – Arrow's impossibility theorem – second best theory.

UNIT –V Theories of Risk and Uncertainty:

Choice under certainity - formalization of uncertainity – choice under uncertainity – contingent consumption – properties of utility function and probabilities – criticisms of the expected utility theory – Risk aversion – The demand for insurance – diversification of risk – Risk spreading – Role of stock market effect of taxation on investment in risky assets.

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Books for Reference:

1. Jhingan,M.L. Advanced Economic Theory: Brinda Publications, New Delhi.

2. Koutsoyiannis, A. Modern Micro Economics: Macmillan Press, London.

3. Baumol, W.J. Economic Theory and Operations Analysis: Prentice Hall of India, New Delhi

4. Cullis and Jones; 1988, Public Economics and Public Choice: Oxford University Press.

5. Gravelle and Rees;1988, Micro Economics: Longman House.

6. Halvarian, Micro Economics (Advanced) Affiliated East West Press

7. Thirlwall, A.P.; 1994, Growth Economics, ELBS.

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MACROECONOMIC THEORY AND ANALYSIS - II

Unit – I : Neo-Classical and Keynesian System

Classical, Neo-Classical and Keynesian View on Interest – The IS-LM Model – IS-LM Model with Government Sector – IS-LM Model with Labour Market and Flexible Prices.

Unit – II : Income Theory of Prices

Quantity of Money and Price Level – Development of Income Theory - Keyne's Contribution Saving and Investment Approach – Major Propositions of Income Theory – Limitations – Its Superiority over Quantity Theory – Supplementary to Quantity Theory.

Unit – III : Post Keynesian Developments in Macro Economics

The Rational Expectation Hypothesis – Supply-Side Economics.

Unit – IV : Theory of Income and Employment

Classical and Keynesian Theory of Income and Employment – Say's Law of Market - Classical Models – Critical Appraisal – Keynesian Theory of Income Employment and Output – Keynesian Economics and Less Development Countries.

Unit – V : Macroeconomic Policies

Need to Control Inflation and Business Cycle – Goal of Macroeconomic Policies - Monetary and Fiscal Policy – Fixed Target Approach – Optimizing Approach - Cost Benefit Approach – Effectiveness of Monetary Policy and Fiscal Policy in IS-LM Framework – Income Policy.

References :

1. Ackley. G., Macroeconomic Theory and Policy, Mac Millan New York, 1976.
2. Rana. K.C. and Verma K.N., Macroeconomics Analysis, Vishal, 1999.
3. Beckerman.W., An Introduction to National Income and Social Accounting, University of Lardy, 1967.
4. Dernburg. T., Macroeconomics concept, Theories and policies, Mc Grow Hill, New York 1985.
5. Roa. V.K.R.V., Investment, Income and multiplier in underdeveloped Economy, Indian Economic Review – 1952.
6. Shapiro. E., Macroeconomic Analysis, Harcourt Bruce Inc, 1994.
7. Eisner. R and Robert H. Strotz., Determinants of Business Investment, Impact of Monetary Policy, Prentice Hall -0 1993.
8. Branson.W., Macroeconomic Theory and Policy, Harper & Row 1984.

9. Gordon, R. J. Macro economics, Little Brown 1981.
10. Ghosh B.N. Modern Macroeconomics: Theory and Policy, Ane Books, New Delhi, 2012.
11. Gupta G.S., Macroeconomics Theory and Application, Mc Grow- Hill, New Delhi, 2008.
12. Jhingan. M.L. Macroeconomics Theory- Rinda Publication New Delhi 2012.
13. Hamberg. D., Business Cycle, Mac Milan, New York, 1951.

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STATISTICAL METHODS FOR ECONOMICS - II

Unit – I: Probability Theory and Distributions

Probability – Definition (Classical and Empirical) – Theorems of Probability – Conditional Probability – Bayes' Theorem – Random Variables (Discrete and Continuous) – Special Probability Distributions – Binomial, Poisson and Normal (Properties, Uses, Illustrations).

Unit – II: Sampling Theory

Sampling – Basic Concepts and Laws of Sampling – (Law of Statistical Regularity and Law of Inertia of Large Numbers) –Sampling Errors – Sampling Distributions – Sampling Distribution of means Sampling Distribution of Proportions – Standard Error and its uses.

Unit – III: Estimator

Estimator and Estimate – Point Estimate and Interval Estimate – Properties of a good Estimator – Method and Estimation – Least Square Method – Problems related to Estimator.

Unit – IV: Testing of Hypothesis

Null and Alternative Hypothesis – Simple and Composite Hypothesis – Type I and Type II Errors – Critical Region – Level of Significance – One Sided and Two Sided Tests – **Unit – V: Sampling Distributions**

Sample Distributions – "Z", "t", "F", "X^{2}" Distributions and Applications – Testing of Means and Analysis of Variance (ANOVA) – Goodness of Fit.

References:

1. *Sancheti D.C.* and Kapoor V.K. – Statistics, Theory, Methods and Applications.
2. *SC. Gupta* and V.K. Kapoor, Fundamentals of Mathematical Statistics.
3. S.P. Gupta – Statistical Methods.
4. M. Des Raj, Sampling Theory.
5. G.W. Cochran, Sampling Techniques.

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ENVIRONMENTAL ECONOMICS

Unit I: Introduction to

Environmental Economics

Introduction to resources and Environment in Economic Theory-Classification of resources - Emergence of Resource and Environment Economic Theory - Material Balance Principle

Unit II: Efficiency and Market Failure

Environmental resources - Scarcity and choice - Economic efficiency; Efficient allocation; Efficiency in consumption production and product run efficiency; Social Welfare Function and Optimality; Inter – temporal efficiency; Optimal allocation and a market Economy - Market Failure and Public Policy - Externality and Public Goods - Externality and Economic Efficiency

Unit III: Harvesting renewable and non-renewable resources: -

Simple optimum resource depletion model - Resource extraction in perfect competition and monopolistic market - Dynamics of resource harvesting - Socially optimal resource harvesting -Economics of Forestry – Conservation of resources.

Unit IV: Pollution and depletion of quality and quantity of environmental resources: -

Classification of forms of pollution - Nature of emissions-Damage relationship-Zone of influence –Degree of atmosphere mining-Mobility of emission sources-Efficient level of pollution -Pollution abatement - Issues in economics of pollution – Technological progress, Minimum Standard of Conservation

Unit V: Environment and Economic Policy: -

Coase theorem - Economically efficient and cost effective pollution abatement programs - Forms of direct regulation (tax, subsidies, and permits) Economic growth and natural environment Population Growth, Economic; International and Global Environmental Population Problems – Sustainable Economic Development.

Books for reference

1. Roger Pearman&Yuema - Natural Resource and Environmental Economics - 1995Longman
2. Nick Hanley, Jason F Shogren, Ben White, 1999; Environment Economics in Theory andPractice – Mac Millan
3. Partha Das Gupta and Karl – Goral Maler – 1997; The Environment and emerging Development Issues – Vol 1

4. Allan Randal-Property Rights. Efficiency and the distribution of Income – Resource EconomicsSecond Edition - John Wiley and Son
5. Climate change in Asia and Pacific, Venkatachalam Anbumozhi, Sage Publications
6. Prasad Modak and Asit. K. Biswas, 1999 - Environmental Impact Assessment for DevelopingCountries - Oxford University Press.
7. Environmental Valuation in South Asia,Haque,Cambridge University Press (ISBN-9781107007147)
8. World Bank — World Development Reports.

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INDIAN ECONOMY

Unit I: Economic Development and its Determinants:

Features of Indian Economy – Indicators of Development – Human Development Index (HDI), Gender Development Index (GDI).

Unit II: Planning in Inda:

Meaning – Types and Models – Mahalanobis. Input-Output Multi sectoral Model – Planning Commission – Overview of Indian Five Year Plans – Eleventh Five Year Plan – Evaluation and Appraisal of Eleventh Five Year Plan – Twelfth Five Year Plan – Objectives.

Unit III: Agriculture: -

Implications of Land Reform – Technological changes in Agariculture – Pricing of Agricultural Products – Recent Trends in Agaricultural Marketing – Second Green Revolution – Organic Farming Practices.

Unit IV: Industrial Growth in India

Performance of Textiles, Petro chemical and Information Technology Industry – MSME - Output and Employment of MSMEs - Policies and Programmes to remove disabilities of MSM Es– Liberalization, Privatisation – Globalisation.

Unit V: Infrastructure and Economic Development

Importance - Energy –Sources – Availability of Primary Energy in India –Energy Crisis – Measures Taken-Renewable Energy Potential –Power – Sources of Electric Power -Targets and Achievements –Rural Electrification - Education –Progress of Education in India -School – Higher Education- Technical Education – Vocational Education.

Books for references:

1 .Indian Economy, DhingraI.C ,S.Chand and Sons Indian Economy, 2.Dutt and Sundharam, S.Chand and Sons, Planning Commission

3.EPW, Southern Economist

4.Economic Reform in India,Hope, Cambridge University Press (ISBN-9781107046047)
Strategies for Achieving Sustained High Economic Growth, The case of Indian States, Kaliappa Kalirajan, Richard T.Shand, Shashanka Bhide, Sage Publications(ISBN9788132104483
5.India Working:Essays on Society and Economy, White, Cambridge University Press(ISBN-9788175962309)

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COMPUTER APPLICATIONS IN ECONOMICS

Unit I: MS Office and SPSS:

Overview – windows and Menus, Toolbars – Dialog Boxes – File Interface – Get File – Save out file – Export File – Import File – Data Processing using Excel.

Unit II: Data Entry: -

Basic Structure of an SPSS data file – Using data edition – Reading spread sheet data – Reading a database – Reading Text data.

Unit III: Data Definition: -

Preparation of Code Book, Data List, Begin Data, End Data, Defining Variable Type, Variable Tables, Value Labels, Missing Labels.

Unit IV: Data Transformation and Analysis: -

Statistical Techniques for Data Analysis. Frequency, Cross Tabulation, Correlation, Regression, Chi-Square, 't' test, ANOVA.

Unit V: Out put Display: -

Interpretation of output – Transfer of data display formats – creating and Edition Graphs – Tables and Diagrams, Bar, Line, Pie, Scatter, Histogram.

Books for Reference:

Basic Readings List:

1. Gujarati, D N., (2012), Basic Econometrics (2nd Edition), McGraw Hill, New Delhi.

2. Krishnamurthy E V and Sen S K (1976), Computer Based Numerical Algorithms, Affiliated East – West Press, New Delhi.

3. Lipschultz, M and S Lipschultz (1981), Theory and Problems of Data processing, Schum's Outline Series, McGraw Hill, New York.

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI – 12

M.A. ENGLISH (CBCS) (FOR AFFILIATED COLLEGES)

FIRST YEAR SYLLABUS

(With effect from the academic year 2017 – 2018)

1. **Objectives**

The P.G. Course in English Literature and Language aims to

- equip the students with an in depth knowledge of a wide spectrum of genres and writers
- help them acquire communicative skills and a global perspective of English Language
- enable them to understand the multicultural context of English Language and Literature

2. **Conditions for Admission**

A candidate who has passed B.A. Degree Examination of M.S. University or any other university recognized by the UGC with Branch XII English as the Main subject of study shall be permitted to appear and qualify M.A. Degree in English.

3. **Eligibility for the award of the Degree**

A candidate shall be eligible for the award of the degree only if he/she has undergone the prescribed course of study for a period of not less than two academic years and passed the examinations of all the four semesters prescribed, earning 90 credits.

4. **Duration of the Course**

The duration of the course is for two academic years consisting of four semesters, each semester consisting of 90 working days.

The course of study shall comprise instruction in the following subjects according to the syllabus and books prescribed from time to time.

I Semester

Core Subjects:	Hrs	L	T	Credits
Modern Literature I	6	2	4	4
Modern Literature II	6	2	4	4
Romantic Period	6	2	4	4
Indian Writing in English	4	4	-	4
Literature and Gender (Elective I)	4	2	2	3
African Literature (Elective II)	4	2	2	3
Total (6 Courses)	**30**			**22**

II Semester

Core Subjects:	Hrs	L	T	Credits
Victorian Age and the Age of Hardy	6	2	4	4
Literary Theory and Criticism I	6	2	4	4
Indian Writing in English Translation	6	2	4	4
American Literature	4	4	-	4
Communicative English (Elective III)	4	2	2	3
Northeast Indian English Literature (Elective IV)	4	2	2	3
Total (6 Courses)	**30**			**22**

5. **Examinations:**

   The examinations shall be of 3 hours duration for each paper at the end of each semester. The candidates failing in any subject will be permitted to appear for each failed subject in the subsequent examinations.

6. **Scheme of Examinations:**

Each paper contains an internal component. There is a pass minimum of 50% for external and overall components. External Examination is for 75 marks and the Internal Assessment carries 25 marks. The Examination paper consists of three sections- the first consisting of 10 questions 1 mark each; the second 5 questions of 5 marks each and the third 5 questions of 8 marks each with a total of 75 marks.

Section A 10 x 1 = 10

Section B 5 x 5 = 25

Section C 5 x 8 = 40

Each question offers an internal choice, set in an 'either or pattern'. The questions will cover all 5 units of each paper.

Internal assessment:

Regarding the Internal assessment, the 25 marks is allocated in the following manner.

	PG
The Average of the best two tests from three compulsory tests	15 Marks
Assignment	04 Marks
Seminar	06 Marks
Total	25 Marks

Note: Each test is of one hour duration.

M.A. English Syllabus

I Semester

Modern Literature I – Core I	**Hrs**	**Credits**
(Chaucer to the Jacobean Age)	**6**	**4**

Unit – I

Geoffrey Chaucer	-	The Prologue to the Canterbury Tales
		In the beginning
		The Knight
		The Prioress
		The Clerk
		The Cook
		The Wife of Bath
Edmund Spenser	-	Prothalamion

Unit – II

Sir Thomas Wyatt	-	I Find No Peace
Henry Howard, Earl of Surrey	-	London, Hast thou Accursed Me

Unit – III

Lord Francis Bacon	-	Of Truth
		Of Adversity
		Of Friendship
The Bible	-	The Book of Esther

Unit – IV

Christopher Marlowe - Dr. Faustus

Thomas Kyd - The Spanish Tragedy

Unit – V

Ben Jonson - The Alchemist

Thomas Dekker - The Shoe Maker's Holiday

Modern Literature II – Core II **Hrs** **Credits**

(Metaphysical and Restoration Age) **6** **4**

Unit – I Poetry

John Donne - Canonisation and The Extasie

John Milton - Paradise Lost Book IX

Unit – II Prose

Dr. Johnson - Life of Milton

Addison and Steele - Sir Rogers Family

The Picture Gallery

Unit – III Poetry

Alexander Pope - "The Rape of the Lock"

Thomas Gray - "An Ode on a Distant Prospect of Eton College"

Unit – IV Drama

William Congreve - The Way of the World

Richard Brinsley Sheridan - The School for Scandal

Unit – V Fiction

Henry Fielding	-	Tom Jones
Oliver Goldsmith	-	The Vicar of Wakefield

Romantic Period – Core III

Hrs	Credits
6	4

Unit – I Poetry

William Collins	-	Ode to Evening
William Blake	-	The Chimney Sweeper
William Cowper	-	On the Receipt of my Mother's Picture
Robert Burns	-	Highland Mary

Unit – Poetry

William Wordsworth	-	Resolution and Independence
John Keats	-	Ode to Autumn
P.B. Shelley	-	Ode to the West Wind
S.T. Coleridge	-	Kubla Khan

Unit – III Prose

Charles Lamb	-	Christ's Hospital

		The Southern Sea House
William Hazlitt	-	The Fight

Unit – IV Fiction

Jane Austen	-	Emma
Emily Bronte	-	Wuthering Heights

Unit – V Fiction

Sir Walter Scott	-	Kenilworth
Maria Edgeworth	-	Belinda

Indian Writing in English – Core IV **Hrs** **Credits**

4 **4**

Unit – I Poetry

Rabindranath Tagore	-	Gitanjali (1,2,3,12 and 24)
A.K. Ramanujam	-	River
Agha Shahid Ali	-	Post Card from Kashmir
Dilip Chitra	-	My Father Returns Home
Jeyant Mahapatra	-	A Rain of Rites

Unit – II Prose

Rabindranath Tagore	-	Nationalism
Ananda Coomaraswamy	-	That Beauty is a State
B.R. Ambedkar	-	Extracts, 4 and 5 from Annihilation of Caste

Unit – III Drama

Mahesh Dattani - Final Solutions

Mahashweta Devi - Rudali

Unit – IV Fiction

R.K. Narayan - *Painter of Signs*

Mulk Raj Anand - *Coolie*

Unit – V Fiction

Chetan Bhagat - *One Night @ the Call Centre*

Anita Nair - *Lessons in Forgetting*

Literature and Gender (Elective – I)

Hrs	Credits
4	3

Unit I Poetry

Sylvia Plath - Daddy
The Arrival of the Bee Box
Edge.

Imtiaz Dharker - Blessing
Purdah 1
Battle-Line.

Unit II Drama

Ama Ata Aidoo – The Dilemma of a Ghost

Manjula Padmanabhan – Harvest

Unit III Fiction

Toni Morrison	-	The Beloved
Doris Lessing	-	The Grass is Singing

Unit IV Non-Fiction

Virginia Woolf	-	A Room of One's Own (Chapter IV).
Simon de Beauvoir	-	The Second Sex (Book I, "Facts and Myths").

Unit V Fiction

Anita Brookner	–	Hotel Du Lac
Shobhaa De	–	Socialite Evenings

<u>African Literature – Elective II</u>

	Hrs	Credits
	4	**3**

Unit I - Poetry

Julia Lithebe	-	"The Sunshine"
Neo Mvubu	-	"Mighty Eyes"

Unit II - Poetry

Ben Okri	-	"A New Dream of Politics"
Christopher Okigbo	-	"Hurrah For Thunder"

Unit III – Drama

Ama Ata Aidoo	-	<u>Anowa</u>

Unit IV - Fiction

Nadine Gordimer - *July's People*

Unit V - Fiction

Nuruddin Farah - *Sardines*

II Semester

<u>Victorian Age and the Age of Hardy -Core I</u>

	Hrs	**Credits**
	6	**4**

Unit – I Poetry

Alfred Lord Tennyson - Lotus Eaters

Robert Browning - Rabbi Ben Ezra

Mathew Arnold - Dover Beach

D.G. Rossetti - The Blessed Damozel

Unit – II Prose

Thomas Carlyle	-	Heroes and Hero Worship (Lecture II – The Hero as Prophet)
John Ruskin	-	Unto this Last

Unit – III

John Galsworthy	-	The Silver Box
J.M. Barrie	-	The Admirable Crinchton

Unit – IV

Charles Dickens	-	David Copperfield
Charlotte Bronte	-	Jane Eyre

Unit – V

George Eliot	-	Silas Marner
Thomas Hardy	-	Mayor of Casterbridge

<u>American Literature</u> Core - II

Hrs	**Credits**
6	**4**

Unit – I Poetry

Walt Whitman	-	When Lilacs Last in the Dooryard Bloomed
Emily Dickinson	-	Because I Could not stop for Death
Robert Frost	-	The Death of the Hired Man
Hart Crane	-	To Brooklyn Bridge

Langston Hughes - I, Too

Unit – II Prose

Ralph Waldo Emerson - The American Scholar

Henry David Thoreau - Civil Disobedience

Unit – III Short Story

Edgar Allan Poe - The Fall of the House of Usher

O. Henry - The Cop and the Anthem

One Dollar's Worth

Eudora Welty - A Visit of Charity

Unit – IV Drama

Arthur Miller - Death of a Salesman

Edward Albee - Who's Afraid of Virginia Woolf

Unit – V Novel

John Steinbeck - Grapes of Wrath

Saul Bellow - Seize the Day

Reference:

An Anthology: American Literature 1890 – 1965. Esbert S. Oliver

American Literature of the Nineteenth Century. An Anthology, William J. Fisher

<u>Literary Theory and Criticism – I</u> Core – III

Hrs	**Credits**
6	**4**

Unit -I

Lionel Trilling's "The Sense of the Past"

Northrop Frye – "Criticism, Visible and Invisible"

Unit -II

Marxist Criticism: Christopher Caudwell – The Development of Modern Poetry

Terry Eagleton - Capitalism, modernism and postmodernism

Unit -III

I.A. Richards – The Four Kinds of Meaning

F.R. Leavis – Literary Criticism and Philosophy

Unit - IV

Julia Kristeva - The ethics of linguistics 207

Luce Irigaray - The bodily encounter with the mother 414

Unit – V

Elaine Showalter: Feminist Criticism in the Wilderness

John Hillis Miller: The Critic as Host

Reference:

J.S. Rohan Savarimuthu. *Literary Theory and Criticism – Since 1830*

Harry Blamires. *A History of Literary Criticism*

V.S. Sethuraman ed. *Contemporary Literary Criticism: An Anthology*

The Critical Tradition: An Anthology of English Criticism II Volume Ed. by S.Ramasamy and V.S.Sethuraman, Macmillan, 1978

Modern Criticism and Theory Ed.by David Lodge

<u>Indian Writings in English Translation</u> Core -IV

Hrs	**Credits**
4	**4**

Unit – I Poetry

Subramania Bharathi - Panchali's Pledge Part I Canto I

Kumaran Asan - Uprightness, Psalm

Salma	-	On Borders

Unit – II Drama

K.A. Gunasekaran	-	Touch
Mahasweta Devi	-	Bayen

Unit – III Prose

P. Sivakami	-	Land: Woman's Breath and Speech
Rettamalai Srinivasan	-	A Brief History of My Life

Unit – IV Fiction

U.R. Ananthamurthy	-	Bharathipura
Prathibha Ray	-	Yajasenei: The Story of Draupadi

Unit – V Short Story

Cho. Dharuman	-	Wetness
Rabindranath Tagore	-	Grandfather

Text Books:

The Oxford India Anthology of Tamil Dalit Writing edited by Ravikumar and R. Azhagarasan, Oxford University Press, New Delhi, 2012

Bharathipura by U.R. Ananthamurthy, Translated from Kannada by Susheela Punitha, Oxford University Press, New Delhi 2010.

Yajnasenei The Story of Draupadi by Prathibha Ray, Translated from Odiya by Pradip Bhattacharya, Rupa Publications India Pvt. Ltd

Panchali's Pledge by Subramania Bharati. Translated by Usha Rajagopalan, Hachette India Publications.

Five Plays by Mahasweta Devi. Translated by Samik Bandyopadhyay, Seagull Publications, Calcutta, 1997.

Grandfather by Rabindranath Tagore. Selections from *Galpaguchha 2 Manikara and Other Stories*. Translated by Ratan K. Chattopadhyay. Orient Blackswan Private Limited, New Delhi, 2010.

http://cpstudent.blogspot.in/011/04/55-english-translation-of-kumaran-asans.html

http://www.caravanmagazine.in/fiction-poetry/four-poems

Communicative English – Elective III

Hrs	Credits
4	3

Unit – I

Successful Communication

1) Communication: Significance and Importance
2) Effective Communication: Procedure and activity

Unit – II

Group Discussion - Definition and Characteristics of group discussion

Interview Skills - Introduction and Preparation

Unit – III

E-Skills

1) Comprehension of e-communication
2) Online Career Skills
   (a) Curriculum Vitae
   (b) Video Conferencing
   (c) e-advertising
   (d) e-marketing

Unit – IV

Speech

1) Purpose and Strategies of a Speech
2) Body Language

Unit – V

Critical Skill

Evaluating arguments / Expressions / Feedback / Analysis

Reference:

S.K. Mandal. *Effective Communication and Public Speaking*

K.R. Lakshminarayanan. *Advanced English Communication Skills Lab*

P. Kiranmani Dutt, Geetha Rajeevan, C.L.N. Prakash. *A Course in Communication Skills*

Northeast Indian English Literature – Elective IV

	Hrs	Credits
	4	3

Unit – I Poetry

Thangjam Ibopishak – "Volcano You Cannot Erupt"

Desmond L. Kharmawphlang – "Last Night I Dreamed"

Unit – II Poetry

Saratchand Thiyam – "Sister"

Temsula Ao – "Stone-People from Lungterok"

Ilabanta Yumnam- "Barak River You Are Beautiful"

Unit – III Short Stories

Arnab Jan Deka – 1. "Three Village Girls"

2. "An American Mother"

3. "Himalayan Mystic Meeting"

Unit – IV Fiction

Mitra Phukan - *The Collector's Wife*

Unit – V

Easterine Kire - *Mari*

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI
PG - COURSES – AFFILIATED COLLEGES
Course Structure for M.A. (History)
(Choice Based Credit System)
(With effect from the academic year 2017-2018 onwards)

Sem. (1)	Sub. No. (2)	Subject Status (3)	Subject Title (4)	Contact Hrs./ Week (5)	Credits (6)
I	1	Core	History of Tamil Nadu upto 1565 AD	6	4
	2	Core-2	History of India upto 712AD	6	4
	3	Core-3	History of Europe from 476 to 1453AD	6	4
	4	Core-4	History of world civilization upto 1453AD	4	4
	5	Elective-1	Principles and Methods of Archaeology	4	3
	6	Elective-2	Indian Public Administration since 1947	4	3
			Subtotal	**30**	**22**
II	7	Core-5	History of Tamil Nadu from 1565 to 1987AD	6	4
	8	Core-6	History of India from 712 to 1765 AD	6	4
	9	Core-7	History of Europe from 1453 to 1789AD	6	4
	10	Core-8	History of England upto 1688 A.D	4	4
	11& 12	Elective-3 & 4 (select any two)	History of Russia from 1689 to 1964AD	4	3
			History of Japan upto 1965	4	3
			History of the Arabs from 570 to 1258AD	4	3
			Subtotal	**30**	**22**

MSU / 2017-18 / PG –Colleges / M.A. (History) / Semester –I / Ppr.no.1 / Core -1

HISTORY OF TAMIL NADU UPTO 1565AD

Objectives: To acquaint the students about the ancient Tamil Kings who ruled over this land with the unique culture and language.

Unit: I

Geographical features and the Sangam Age:

Geographical features of Tamil Nadu- Sources : Literary , Archaeological- Race, Language and Religion- the Sangam Age:- Main sources- Sangam works- The Age of the Sangam – Political history – Kadal Pirakkottiya Senguttuvan - KarikalaChola- TalayalanganattuNedumseliyan- Subordinate chieftains. Sangam culture- Administration- Economy- Cultural life.

(11L)

Unit: II

The Kalabhras and ThePandyas:

The Kalabhras: Origin of theKalabhras- Effects of Kalabhra rule on the Tamil country- The first empire of the Pandyas: Sources- Political achievements: Kadungon to ViraPandya- Pandya contribution to government, Art and Architecture- Cave architecture.

(12L)

Unit: III

The Pallavas and The Cholas:

Origin of thePallavas- Imperial Pallavas- Mahendravarman I- Narasimhavarman I-Other rulers-The PandyaPallava conflict–Contribution of Pallavas to Art and Architecture,Culture-Administration, Socio-economic life-Religious condition- The Cholas:TheVijayalaya Line of Cholas:Parantaka I- Rajaraja I - Rajendra I - Chalukya Cholas: Kulottunga I-KulottungaIII-The Chola administration- Contribution to Literature- Art and Architecture-Socio-economic life – Culture-Internal and external trade- Religious condition.

(15L)

Unit: IV

Pandyas and the Muslim invasions:

Pandyas of the second empire – Political History-Administration and Social life-Contribution to Art and Architecture– Revenue Policy of the later Pandyas-Muslim Invasion of South India- Invasion of Malik Kafur-Rise of Madurai Sultanate- Impact of Muslim Rule.

(10L)

Unit: V

Foundation of Vijayanagar Empire:

Rise of the Vijayanagar kingdom- Origin-Kumara Kampanna's Southern Expedition- Tamil Country under Vijayanagar Empire-Krishna Devaraya-Battle of Talikotta -Impact of the Vijayanagar Rule - Administration – Social and Economic conditions- Contribution to Art and Literature.

(12L)

(Total: 60L)

Text Books:

1. Krishna MurtiV.M- "History of Tamil Nadu", Vijyalakshmi Publications.
2. NilakantaSastri K.A- "A History of South India", Swathi Publications, 11-A Sriramanagar North st, Madras 18.
3. Subramanian-"History of Tamil Nadu", Kudal Publishers 217-A, South Masist, Madurai-I.

Books for Reference;

1. Mahalingam T.V - Reading in South Indian History
2. NeelakandaSastri K.A -The Cholas
3. NeelakandaSastri K.A -The Pandya Kingdom
4. Pillai.K.K-Social History of the Tamils
5. Rajayyan.K-History of Tamil Nadu p.t. 1
6. SrinivasaAiyangar P.T-The History of the Tamils
7. Subramanian N- The SangamPolity , Madurai.

MSU / 2017-18 / PG –Colleges / M.A. (History) / Semester –I / Ppr.no.2 / Core -2

HISTORY OF INDIA UPTO 712 A.D

Objective: To create awareness and understanding of the rich Indian culture and heritage.

Unit: 1

Pre-Historic Period:

Physical features of India – Sources of Ancient Indian History – Literary Sources–Indigenous and Foreign Accounts – Archaeological sources, Life of people in the Pre-historic Times: Paleolithic Age – Neolithic Age – The Age of Metals.

(7L)

Unit: II

From Harappan Culture to Aryanisation:

Harappan culture: Indus Valley Civilization – Centers of Civilization – Date - Town planning – Art and Architecture – Indus script – Social and Economic Life of the people – Religion. Fall of the Harappan culture. Vedic culture: Origin of Aryans – Early settlements and expansion – Rig Vedic society, polity and religion, Vedic literature. Later Vedic Age : Social, Economic and Religious life.

(11L)

Unit: III

North India from 600-325 BC:

Mahajanapadas - Rise of kingdoms and Republics– Rise of Magatha and Nandas. Life of the people - Four Ashrams - Factors for the rise of new religions - Buddhism – Buddha's Teachings – The four Buddhist Councils – Schism in Buddhism: Mahayanism and Hinayanism – Spread of Buddhism – Legacy of Buddhism. Jainism: Life of Mahavira - Teachings of Jainism – 24 JainaThirthankaras – Jain Councils – Spread of Jainism - Schism in Jainism - Legacy of Jainism. Persian and Greek Invasions.

(12L)

Unit: IV

Rise of Empires - I Phase:

Rise of Mauryan Empire: Sources – Chandragupta Maurya– Megasthenes - Ashoka – Kalinga war - Asoka's Dharma – Ashokaand Buddhism – Ashoka's Edicts – Fine Arts, Education, Literature under the Mauryas - Mauryan Administration. The Kushan Empire: Kanishka, His conquests and religion – Contact with outside world - Coinage – Architecture - The Gandhara School of Art, and Mathura School of Art.

(15L)

Unit: V

Rise of Empires- II Phase:

The Guptas: Sources – Chandra Gupta I - Samudra Gupta – Fa-hien and his Account of India - Chandra Gupta II – conquests – Gupta administration – Economic condition – Coinage of Guptas – Golden Age of the Guptas – Guptas in the field of Literature, Art and Architecture – Science - Ajanta Paintings – Education and Educational Institutions - HarshaVardhana: Hiuen Tsang's account of India. India on the eve of Muslim invasion – Arab conquest of Sindh and its effects.

(15L)

(Total: 60L)

Text Books:

1. Hans Raj :"History of Ancient India", Surjeet Publications, the Kholapur road, Kamla Nagar , Delhi -7.
2. Kundra D.N –History of India- Navdeep Publications.-3623,Chauri Bazaar ,Delhi
3. Khurana - History of India from the Earlies Times to 1206 A.D

Books for reference:

1. Agraval. D.P. and ChakrabartsD.K - Essays in Indian Proto History
2. Atlekar A.S - State and Government in Ancient India.
3. Basham A.L - The Wonder that was India.
4. Beni Prasad - Theory of Government in Ancient India.

5. Chopra.P.N.(Ed) - India Pre-historic and Protohistoric

6. Majundar, R.C. (Ed) - The History and culture of Indian People. Vol.I(Vedic age) Vol. II (The Age of Imperial unit)Vol.III (Classical age)

7. NilakantaSastri, K.A - History of India Vols. I & II
8. Ray chaudhri, Hem Chandra, Political History of Ancient India.
9. RomilaThapar - History of India Vol. I.
10. Sankalia H.D - Pre and Proto History in India and Pakistan.
11. Sathianathaier, R -A Political and cultural History of India.
12. ShereenRatnagar -Understanding Harrappan civilization in the Greater Indus valley.

MSU / 2017-18 / PG –Colleges / M.A. (History) / Semester –I / Ppr.no.3 / Core -3

HISTORY OF EUROPE (476 -1453 A.D)

Objective: To appraise the Historical significance of pre-modern Non Western culture.

Unit: I

Brief Survey of Europe after 476 A.D:

Fall of Western Roman Empire-Occupation of Western Europe by Barbarians- The Ostrogoths- The Visigoths – The Vandals- The Franks- The Anglo- Saxons- The Burgundians- The Lombards. The Byzantine Empire: ConstantineI (324-337)- Theodosius I(379-395)-Justinian I (527- 565)-Contribution-Byzantine Culture- Rise and spread of Christianity- Rise and spread of Islam.

(10L)

Unit: II

The Frankish Kingdomto the Capetian Kings of France:

Clovis I(481-511)-Charles Martel(719-741)- Charlemagne(768-1814)- The state after Charlemagne- Carolingian Renaissance-Decline. Feudalism: Rise and Development – Features –Decline- Manorial System. The Capetian Kings of France- Hugh Capet(987-996)- Philip II Agustus- Louis IX- The later Capetian Kings.

(15L)

Unit: III

The Church and the State:

The Papacy- Monasticism- The Cluniac movement- The Holy Roman Empire-Henry the Fowler-Otto the Great- Struggle between the Empire and Papacy(1049-1250)-Investiture Conflict-Gregory VII and Henry IV-Frederick Barbarosa – Frederick II-Their Relations with the Pope-Frederick II's place in Medieval History-Innocent III-Religious Policy –Relations with European Kings.

(15L)

Unit: IV

Holy and Political Wars:

The Crusades (1095-1271) – Causes for the failure- Results- The Hundred Years War(1337-1453)- Causes - Course – Causes for the Success of the French-Results.

(10L)

MSU / 2017-18 / PG –Colleges / M.A. (History) / Semester –I / Ppr.no.3 / Core -3

Unit: V

Life and Society in the Middle Ages:

Church Life- Medieval Economy- Growth of Commerce- Growth of Towns and Trade Guilds. Intellectual development and the Rise of Universities- Art and Architecture in the Middle Ages- Society at the end of the MiddleAges. Capture of Constantinople in 1453.

(10L)

(Total: 60L)

Text Books:

1. George Holmes (Ed) – The Oxford illustration History of Medieval Europe, Oxford University press.
2. Robert S. Hoy and Stanley Chodorow- Europe in the Middle Ages.
3. NilakantaSastri- Essentials of world history.

Books for reference:

1. Baynes.N.H and Moss.L.B- Byzantium an introduction to East Roman civilization.
2. Fisher H.A.L - A history of Europe from the beginning to18th C. Vol.I and II.
3. Joseph R. Strayer and Dana c Munro - 'The Middle Ages , 295-1500AD"
4. Martin Scott - Medieval Europe.
5. Michael Frassetto - Early Medieval World from the Fall of Rome to the times of Charlemagne.
6. Swain.J.E - A History of World Civilization.
7. Wallace K Ferguson and GeofreyBrun- Survey of European Civilization.K.CChowdray, New Central Book Agency, Calcutta.

MSU / 2017-18 / PG –Colleges / M.A. (History) / Semester –I / Ppr.no.4 / Core -4

HISTORY OF WORLD CIVILISATION UPTO 1453

(EXCLUDING INDIA)

Objective: To acquaint the students about the contribution made by the World civilizations to the total heritage of mankind.

Unit: I

Life in Pre Historic Times:

The Origin of Life – Factors that favoured the origin and development of civilization. Pre Historic Man – Palaeolithic Age – Neolithic Age – Bronze Age – Iron Age – Human Races and their Movement.

(8L)

Unit:II

Bronze Age Civilization:

Mesopotamia: Sumerian Civilization – Important cities. Royal cemetery – Sargon the Great of Akkad – Social and Economic Life – Sumerian Law and Religion – Babylon and its Empire's : Hammurabi the Great –The code of Hammurabi – Nebuchadnezzar II – Architecture – Religion – Literature and Learning. Assyrian Rise to Power : Expansion –wars – Chaldeans. Egyptian civilization: The first king or pharaohs – Contribution to religion, art, architecture, Maths and Medicine – Chinese civilization – The land and the People – Political Institutions – Economic and Social Developments – Arts – Religion and Philosophy – Literature and Learning.

(15L)

Unit:III

Early Iron Age civilization:

The Iranian Civilization: Cyrus the Great – Darius the Great – Social – Economic and Religious condition – Art and Architecture. The Greek Civilization: City States – War between Athens and Sparta –Contribution to World Civilization – The Roman Civilization:

Monarchy – Early Republic – Rise of Dictatorship – Julius Caesar – The Golden Age of Augustus – Contribution of the Romans.

(15L)

Unit: IV

Medieval Period:

Byzantine – Government – Art – Religion and Philosophy – Literature – Justinian code – St.Sophia – Importance of Byzatine civilization – Christianity – Role of the Church – Services of the Church– Monasteries – Papacy – Contribution of Papacy to World Civilization. (10L)

Unit:V

Rise of Towns and Cities:

Factors favourable to the growth of Towns – Medieval Guilds – Contribution of Towns – Constantinople the bulwark of Eastern Europe –Fall of Constantinople – Genesis of Renaissance – Genesis of Reformation.

(12L)

(Total : 60L)

Text Books:

1. J.E Swain-"A History of World Civilization"-Eurasia Publishing House pvt,Ramnagar,New Delhi.
2. Majundar R.K –"History of World Civilization"

Books for reference:

1. Arnold J.Toynbee - A Study of History Western
2. Burns. E.M - World Civilization
3. Davies. H.A - An outline of the History of the world.
4. Harrison F - Byzantine History in the Early Middle age.
5. Shunghal. D.P - India and World Civilization
6. Sri Vastva. A.N,Mujumdar. K.K. - History of World Civilization
7. Starr.C.G - A History of the Ancient World.
8. Wildurand - History of Civilization

PRINCIPLES AND METHODS OF ARCHAEOLOGY

Objective: The study enable the students to know the Human activity through the recovery and analysis of material culture.

Unit: I
,An introduction of Archaeology:

Definition - History and Archaeology - Pre - historic and Historic Archaeology - Kinds of Archaeology - Environmental Archaeology, Ethno Archaeology and Historical Archaeology - Value of Archaeology as a primary and Supplementary evidence.

(12L)

Unit: II

History of Archaeology in the world:

Classical Archaeology - Antiquarianism. Rosetta Inscription - Henri Schliemann - Thomas Jefferson. Thompson -Development of New Archaeology - Processual and Post Processual Theory - Flinders Petrie -Pitt Rivers - Gordon Childe - History of Archaeology in India - Asiatic Society - Sir William Jones - Alexander Cunningham - Archaeological Survey of India. Sir John Marshall - Sir -Mortimer wheeler - Exploration : Folk traditions - Field survey - Magnetometer - Comparative study - Ariel Photography.

(12L)

Unit: III

Excavation Methods:

Site survey - Geophysical Survey Excavation : Methods of Excavation, Horizontal Excavation, Burial Excavation.

(12L)

Unit: IV
Archaeological Recording:

Land Survey - Topographical Survey - Stratigraphy and its importance - Three Dimensional Recording - Drawing Photography - Cataloguing -Conservation methods, Metal Bone - Archaeology and other sciences.

(12L)

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Unit: V

Dating Methods in Archaeology:

Relative Dating.Absolute Dating - Radio Carbon Dating (C14Dating) -Dendrochronology - Archaeomagnetism - Potassium Argon Method - Fluorine Test - Nitrogen Test - Pollen Test.

(12L)

(Total: 60L)

Text Books:

1. Clive, Gamble - Archaeology: The Basics
2. Raman, K.V - Principles and Methods of Archaeology.

Books for reference:

1. Barkar, Philip - Techniques of Archaeological Excavation.
2. Colin Renfrew - Archaeology: theories, Methods and Practices
   a. ,,,
3. Harris, Edward C - Principles of Archaeological Stratigraphy
4. Hester R. Thomas ,Shafer - Field method in archaeology
5. Robert J Sheer - Fundamentals of archaeology
6. Sankalia .H.D - New Archaeology – The Scope and application in India

MSU / 2017-18 / PG –Colleges / M.A. (History) / Semester –I / Ppr.no.6 / Elective -2

INDIAN PUBLIC ADMINISTRATION

SINCE- 1947

Objective: To Promote well informed and intelligent citizens, to have the ability to participate in the affairs of the Nation effectively.

Unit: I

Constitutional Frame work:

The Indian Constitution – Preamble – Salient Features – Fundamental Rights – Directive Principles – Union Government: President – Prime Minister–Parliament – Judicial Organization – State Government: Chief Minister Governor – State Assembly – Centre -State Relations – Union Territories and Administration.

(12L)

Unit: II

Administrative Framework:

Cabinet Secretariat – Duties and Responsibilities – Cabinet Committees – Function – Prime Minister's Office – Role and Function. Central Secretariat – Functions – Executive Agencies – Growth and development of Departments in India - Ministry of Finance – Ministry of Home Affairs – Ministry of Personal – Ministry of External Affairs – Attorney General of India – Comptroller and Auditor General of India. (12L)

Unit: III

Administrative Relations:

Bureaucratic Administration – Public Service and Civil Service – All India Services – Central Services – UPSC – Recruitment and Training – Grant-in-Aid – Inter State Council – Planning Commission – NITI Aayog–National Development Council – Zonal Council – Administrative Reforms: Important – Commissions and Committees – Election Commission.

(12L)

Unit: IV

State Administration:

Structure – State Secretariat – Chief Secretary – State Public Service – TNPSC – State Service – Regional Divisional Commissioners – District Administration - District Collector – Various Departments of the District – Law and Order – National Police Commission (1977).

(12L)

Unit: V

Decentralized Administration:

Corporations: Major Municipal Corporations – Powers and Functions, Municipalities - Powers and Responsibilities – Elections – District Development Council – Panchayat Raj Administration – Structure – Gram Sabha – Gram Panchayat – PanchayatSamiti-ZilaParishad.

(12L)

(Total: 60L)

Text Books:

1. ShriramMaheswari - Indian Administration (New Delhi: Orient Longman, 1993
2. Venkatesan - Public Administration., V.C. Publications, Rajapalayam.

Books for reference:

1. Biju M.R.(ed) - Financial Management of Panchayat Raj Sysytem
2. BhaktapadaSinha Raj - Panchayat Raj Institutions and rural Development
3. Chaturvedi T.N -Organizationof Government of India (New Delhi1985).
4. Garg H.P. - Indian Government and Politics
5. Gupta D.C. - Indian Government and politics, Vikas publishing House.
6. Inamdar - Development Administration in India
7. Maheswari S.R - The Administrative Reforms Commission (New Delhi: Atmaram, 1982).
8. Rakesh Prasad - Panchayatraj in Action.
9. Singh.D.P. - Problems of Public Administration inIndia (Delhi: Chand & Co.,1980).
10. Srivastva L.N - Constitutional History of India and National Movement.

MSU / 2017-18 / PG –Colleges / M.A. (History) / Semester –II / Ppr.no.7 / Core - 5

HISTORY OF TAMIL NADU -1565-1987

Objective:To enable the students to grow as a responsible citizen in a democratic society

Unit: I

Tamil Nadu under the Nayaksand Sethupathis:

Sources for theNayak History-Rise of the Nayaks – Senji – KrishnappaNayak,Madurai – ThirumalaNayak, Thanjavur – RagunathaNayak - Decline of the Nayaks-society, religion, art and architecture.TheSethupathis:ThirumalaSetupati – KilavanSethupathi – MuthuramalingaSethupathi.

(12L)

Unit:II

Tamil Nadu under the Marathas and Nawabs:

Maratha conquest on Tamilaham – Venkoji – Shivaji – Shaji – Serfoji – Tukkoji–Socio-Religious – Cultural-and Education conditions under the Marathas.Nawabs of Arcort – Chanda Sahib, Mohammad Ali, Maphuz Khan, Khan Sahib-Administration and society under the Nawabs.

(12L)

Unit: III

Tamil Nadu under the British:

The Europeans on the Coromandel –Anglo French confict in the Carnatic –Carnatic Wars-Administrative Reforms of the English-Revenue Administration-Judicial Administration-Dyarchy- Administration of the Justice party-Growth of Education-Role of Christian Missionaries-Wood's Despatch-Hunter Commision-Macalay's Minutes..

(12L)**Unit: IV**

Freedom movement in Tamil Nadu:

Earlier Attempts-PuliThevar- VirapandyaKattabomman- Poligar Rebellion- South Indian Rebellion-Vellore Mutiny- Swadesi Movement-Non Co-operation movement-Civil Disobedience Movement -March to Vedharanyam- Quit India Movement- V.O. Chidambaram Pillai-V.V.S Iyer – Vanchinathan-SubramaniaBharathi-Rajaji and Sathyamurthi-E.V.R-Self Respect Movement.

(12L)

MSU / 2017-18 / PG –Colleges / M.A. (History) / Semester –II / Ppr.no.7 / Core - 5

Unit: V

Tamil Nadu in free India:

Congress Administration-Kamaraj- Anti-Hindi Agitation of 1965-Rise of DMK - DMK in power-C.N Annadurai- M.Karunanidhi- Rise of AIADMK- AIADMK in power – M.G Ramachandran and Administrative reforms-Death of M.G.R.

(12L)

(Total: 60L)

Text Books:

1. N.Subrahmanian- - "History of Tamil Nadu A.D 1565-1956", Koodal publishers
2. Rajayyan K –"History of Tamil Nadu (1565-1982)",Raj publishers- Madurai 21.

Books for reference:

1. Bakker C.J. -The Politics of South India
2. Krishna Pillai A. -Tamil Nadu under Vijayanagar.
3. MurasoliMaran- Dravidian Movement
4. Rajayyan K - South Indian Rebellion
5. –do- - Rise and fall of the Poligars of Tamil Nadu
6. –do- - Real History of Tamil Nadu upto 2004.
7. Thandavan.R - The Dravidian Movement
8. Thirunavukkarasu -DravidaIyakkaVerkal
9. Visswanathan E.S -The Political Career of E.V. RamasamiNaickar
10. YesudhasonV.IssacJeyadhas -History of Tamil Society and Culture Since 1336

MSU / 2017-18 / PG –Colleges / M.A. (History) / Semester –II / Ppr.no.8 / Core - 6

HISTORY OF INDIA

A.D. 712– 1765

Objective:To imbibe in the minds of the students a deep and intense feeling of Nationalism and Love for the Country.

Unit: I

Sources and Turkish Invasions:

Sources: Archaeology – Monuments, Inscriptions, Coins – Literature – Court Historians – Foreigners - The Turkish conquest of India: Political Social Economic background Sabuktigin, Mohammad of Ghazni –Indian expeditions – Muhammad Ghori's invasion on India –Battle of Tarains – effects.

(7L)

Unit: II

Delhi Sultanate:

Slave dynasty: (1206-1290) - Qutb-ud-din Aibak – Iltumish – Razia Begum – Balban – Khilji dynasty: (1290 – 1320) - Ala-ud-din khilji.Tughlaq dynasty: (1320-1412) –Ghiyas-ud-din Tughlaq Mohammad- Bin-Tughlaq– FerozTughlaq - Invasion of Timur - – Decline of Tughlaq Dynasty – Sayyid Dynasty (1414-1451) - Lodi dynasty(1451-1526) – Bahlol Lodi - Sikandar Lodi – Ibrahim Lodi –Administration-Art and Architecture-Education, Literature and Society- Decline of Delhi Sultanate.

(15L)

Unit: III

Mughal Empire:

Sources– Babur – Humayun – Shersha – Akbar – Jehangir – Nurjahan – Shahjahan-Aurangazeb– Mughal Administration- Social and economic conditions-Art and Architecture-, Deccan Policy- Frontier Policy -Decline and disintegration of Mughal Empire. (15L)

Unit: IV

Rise and fall of the Marathas:

Shivaji and his successors- Maratha Mughal relations- Maratha Expansion under Peshwas-Rise of the Peshwas- BalajiVishwanath – BajiRao I- BalajiBajiRao. Defeat of the Marathas.Invasion of Nadir Shah and Ahmad Shah Abdali.Third battle of Panipat.

(12L)

Unit:V

Establishment of British rule in India:

Advent of the Europeans-Trading Centres of European companies in India -Competition and Rivalry-Carnatic Wars –British Supremacy in Bengal-The Battle of Plassy and Buxar-The Treaty of Alahabad(1765).

(11L)

(Total: 60L)

Text Books:

1. Iswari Prasad – History of Medieval India.
2. NilakantaSastri. – Advanced History of India

Books for Reference:

1. Bongard Levin, et. al – History of India, Vol.II.
2. Edwards and Garret – Muslim Rule in India
3. Habibullah, N.M.S. – Foundation of Muslim Rule in India.
4. IrfanHabib – Medival India.
5. Majumdar, R.C., ed – History and Culture of Indian People,
6. Mohammad Habibed – Comprehensive History of Delhi Sultanate.
7. Ranade ,M.G - Rise of the Maratha Power.
8. SanghMittra – Medieval Indian History
9. Sathiyanathaier, R. – Political, Cultural History of India Vols. I and II
10. Sewell, R. – Forgotten Empire of India.
11. Sherwani – The Bahmanis of Decan
12. Smith, V.A. – The Oxford History of India.
13. Sharma S.R - Mughal Empire in India
14. Tripathi,R., - Rise and Fall of the Mughal Empire

HISTORY OF EUROPE(1453-1789)

Objective: To understand the Legacy of the Middle Ages in Europe and to appreciate the beginnings of Modern Europe.

Unit: I

Europe in the 15th and 16th centuries:

Geographical Explosion of Spain,Portugal,England and France-Effects-Renaissance in Europe- Factors aiding the flowering of Renaissance-Renaissance in Italy-,Germany,Spain,England- Renaissance in art, architecture, sculpture,paintings,drawings and science. (12L)

Unit: II

Reformation:

Religious reformation- Decline of the Catholic Church and Pepacy- The Rise of Humanist movement- Spread of secular attitude – Rise of Nationalism- Lutheranismin Germany-Protestanism in Switzerland-Anglicanism- Results of the Reformation- Counter Reformation

(12L)

Unit: III

Emergence of Nation States and National Monarchs:

Causes for the rise of Nation States-Royal absolutism- England:Henry VII, Henry VIII,Edward VI, Elizabeth I- Spain: Ferdinand, Charles V,PhilipII - France: Louis XI,Charles VIII, Francis I,Henry IV.

(12L)

Unit: IV

The Last Religious and the First Politocal War:

The Importance of religious , dynastic, and economic issues of Thirty years war- Different Periods of the Thirty years War-Peace of Westphalia – France under Richelieu and Mazatin-Rise of Sweden- GustavusAdolphus.

(12L)

MSU / 2017-18 / PG –Colleges / M.A. (History) / Semester –II / Ppr.no.9 / Core - 7

Unit: V

Age of Enlightenment:

Louis XIV of France- Peter the Great and Catherine II of Russsia, Frederick William and Frederick William the Great of Prussia, Maria Therasa and Joseph II of Austria, Europe on the eve of French Resolution.

(12L)

(Total: 60L)

Text Books:

1. Mukharjee L – A study of European History(1453-1815),M.L Mukharjee Publications, Kolkata.
2. Kurana K.L- Modern Europe(1453-1789)

Books for reference:

1. BaintonRolend H -The age of Reformation
2. Elliot J.H - Europe Divided 1559-1598
3. Gindeley, A .- History of the Thirty years Wars.
4. Grant A.J - History of Europe 1495-1610
5. Grimm , Herold - The Reformation Era
6. Hughes Philip - A Popular History of the Reformation
7. Thomson, S. Harrison - Europe in Renaissance and Reformation.
8. RadheyShyam - World History.
9. Rao.B.V - History of Europe 1450 to 1815AD.

MSU / 2017-18 / PG –Colleges / M.A. (History) / Semester –II / Ppr.no.10 / Core - 8

HISTORY OF ENGLAND UPTO 1688 A.D

Objective:It enable the students to know about the true nature of the past history of England and how it overcame its obstacles that impede its progress.

Unit: I

The Pre- Norman period:

Roman Conquest of Britain- Effects – Legacy of Rome in Britain-The Teutonic tribes-Spread of Christianity – Effects.Alfred the Great. Golden Age of the Saxons .The English life on the eve of the Norman Conquest.

(10L)

Unit: II

The Normans and the Plantagents:

Norman Conquest of England by William I the Conqueror- Political , Social, Economic and Religious changes after the Conquest – William II- Henry I-Stephen. Plantagents: Henry II – Richard I – John-The Magna Carta- Henry III and the Mad Parliament – Edward I's Reforms and the Model Parliament- Hundred years War-Edward III's Reforms and development of Parliament- Richard II.

(15L)

Unit: III

The Lancastrian Kings and the Tudors:

Henry IV to Henry VI- The wars of the Roses- Lancastrian experiment of Parlimentary government.The Yorkist Kings- Origin and development of Parliament from 13th to15^{th} centuries.Henry VII- Henry VIII- His church policy and fall. Edward VI- Mary Tudor – Elizabeth, Relations of the Tudors with Parliament.

(15L)

Unit: 1V

Stuart Period:

James I- Struggle between James I and his Parliments- Charles I –His First Three Parliaments- The Long Parliament – The Great Civil War- The Common wealth and the Protectorate.

(10L)

Unit: V

The Restoration and the Glorious Revolution:

Charles II and Restoration –Convention Parliament- Cavalier Parliament – Different Ministries of Charles II.Growth of Privy Council during Charles II. James II- Glorious Revolution – Circumstances – Significance.

(10L)
(Total:60L)

Text Books:

1. Srivatsva L.N – Constitutional History of England.
2. Woodward E.L- "A History of England",B.IPublications,Madras.

Books for reference:

1. Edward and Goratte - History of England.
2. Joug - History of England
3. King's Publications -History of England(1485-1945).
4. Lloyd.T.O -The British Empire 1558 to 1983
5. Ransay Muir -History of England.
6. Rao B.V - History of Europe(1450-1815)
7. VidyaDharMahajan -England since 1485

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HISTORY OF RUSSIA-1689A.D-1964

Objective: To enable the students to know about the importance of Russia to the World.

Unit: I

The Ascendancy of Russia:

Ivan IV the terrible- Romanov dynasty-Peter the great(1689-1725)- Peter's Reforms- St.Petersburg- Russia's foreign policy, Catherine the great- Domestic reforms- Administrative reorganization- Economic Policies- Foreign policy-Paul 1796-1801 Society and culture in the 18th century.

(10L)

Unit: II

Russia from 1801 to 1881:

Alexander I (1801-1825)- Nicholas I (1825-1855)- Alexander II (1855-1881) -abolition of Serfdom- Judicial reforms – Zemstvos- Polish revolt- Foreign policy.

(5L)

Unit: III

Russia and the world:

Alexander III (1881-1894)- Nicholas II(1894-1917) Nihilism in Russia- the Russo- Japanese war (1904-1905)- Treaty of Portsmouth- Impact- Revolution of 1905-. The Russian Duma (1906-1914).

(13L)

Unit: IV

Russia between the First and Second World Wars:

Role of Russia in the First World War- February Revolution of 1917- Bolshevik Revolution of October 1917 -Impact of the Russian Revolution and the success of Socialism- Russia under Lenin and Stalin- USSR in World War II- The Aftermath of the War.

(17L)

Unit: V

The Khrushchev Era (1953-1964):

Domestic policies- Agriculture- The Soviet Economy- Foreign policy of Soviet union- Soviet union and Eastern Europe Sino- Soviet Relation- Soviet Relation with western powers- Cold war and military alliances- Effects of the cold war soviet Impact on the war : Political Impact- Ideological Impact- Impact on International Relations.

(15L)

(Total: 60L)

Text Books:

1. ManoharR.Wadhwani- ‘’Rise of Soviet to world power’’, S.Chand and Company Ltd. Ram Nagar, New Delhi.
2. N.Subramanian- ‘’History of Russia. As Ennes Publications,96, NGO colony, Madurai.
3. Majumdar.R.K and Srivastva.A.N-History of Russia

Books for reference:

1. Basil Dmytryshyn -A History of Russia
2. Carr.E.H -The Russian Revolution from Lenin to Stalin.
3. Chaurasia R.S - World History
4. King’s Publishers - History of Russia and USSR.
5. Kristine Bushnell -History of the USSR vol. I and II.
6. Rao.B.V - History of Europe 1450-1815. Sterling Publishers pvt Ltd.
7. VidyaDharMahajan -“History of Modern Europe since 1789
8. Vinay Kumar Malhotra-Gorbachevian Revolution in the Soviet union.

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HISTORY OF THE ARABS

A.D. 570 TO 1258

Objective: It enables the students to familiarise with the various aspects of Islam and the history of the rise and establishment of Islamic Civilization.

Unit: I

Pre- Islamic Arabia and Muhammad Prophet:

Arabia – The cradle of the Semitic race – Mecca, Kaaba, the Quraysh – The Abyssinian – Geographical condition – The age of Ignorance (Jahiliya period) – Arab Kingdoms – Prophet Muhammad's Life and Teachings – Kuran – The book of Allah – Islamic doctrines and beliefs – Five pillars of Islam

(12L)

Unit: II

Early Caliphs and the expansion of Islamdom:

The Orthodox Caliphate – Pious Caliphs, Abu Bakar, Umar, Uthman and Ali – Expansion and colonization – Administration under the orthodox Caliphs – Struggle between Ali and Muawiah and the fallout.

(12L)

Unit: III

Umayyads:

Umayyad Caliphate (661-750) – The Umayyad Caliphs – Golden Zenith of the Umayyads – Umayyad Administration – Socio cultural condition under Umayyads – Decline and fall of Umayyads.

(12L)

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Unit: IV

Abbasids:

Abbasid Caliphate, Abbasid Caliphs (750-1258) – The Abbasid State and Society – Scientific and Literary Progress under Abbasids – Golden prime of the Abbasids – Fall of Abbasid dynasty.

(12L)

Unit: V

Arabs in Spain and Egypt:

Islam in Spain – Cultural Progress in Islamic Spain – the Fatimids of Egypt – Administration, society and culture under Fatimids.

(12L)

(Total:60L)

Text Books:

1.Philip K Hitti-"The History of the Arabs"

2. S. Selvin Kumar-"The Medieval Arabs"

Books for reference:

1. Ali K. – A Study of Islamic History
2. Ameer Ali – History of Saracens
3. Arnold T.N. – Caliphate
4. AtharHussian – The Glorious Caliphate
5. KhudaBaksh – History of the Islamic Civilization
6. Muir W. – The Caliphate: Its Rise, Decline and Fall
7. Zaiden J. – Omayyads and Abbasids

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First Year : II Semester

Elective paper

History of Japan upto 1965

Objective : to inculcate that hard work of the people of Japan made them to recover from the disaster of the second world war and to become the most prosperous modern state in Asia.

UNIT : I

Early History of Japan:

Geographical Features -Historical background-Origin of the people. Early Society, Shintoism-The rule of the Shoguns. Political , Social and Economic conditions. The opening of Japan: Coming of The Europeans-Perry Expeditions. Treaties-Fall of Shogunate.

UNIT : II

The Meiji Restoration and Modernisation:

Meiji Restoration-Causes –Changes brought about by Meiji restoration –Progress in Industry and Agriculture. Socio, economic and Political structure . Impact of West: Religious reforms-Education- Intellectual Awakening-Cultural life.

UNIT : III

Beginning of Militarism and Imperialism :

Japan's Interest in Korea-Hostile attitude of U.S.A-Sino-Japanese war of 1894-95- Anglo – Japanese Alliance.Russo-Japanese war-Japan becomes an imperial nation-Stages in Territorial expansion-Korea ,Manchuria . American involvement in Manchria-Japan's relation with China . Japan and the first world war(1914-1919)- Japan's 21 demands. Japan and international conferences.

UNIT : 1V

Japan upto 1945

The Washington Conference of (1921-22) -Second Sino-Japanese war-Japan's relation with Germany, Russia and America . Rome- Berlin-Tokyo Axis-Japan and The second world war.

UNIT : V

Japan since 1945

Consequences of Japan's defeat- Economic rebuilding- Causes of economic success – Industrial growth-Major industries, Transport-Trade and Economic cooperation-Labour Movement- Welfare measures-Developement of science and technology.

TEXT BOOKS:

M.D .David - Rise and Growth of Modern Japan , Himalaya Publishing House, Bombay

R.S.Chaurasia – Historry of Modern Japan. Forward Book Depot-Delhi

BOOKS FOR REFERENCES:

1. Beasley, W.G. – The Modern History of Japan, London, 1971
2. Chakravarthi N.R - Hundred Years of Japan and India, Calcutta 1978.
3. Majumdar R.K and Srivastva A.N - History of Japan
4. Shivkumar , S. Jain - History of Modern Japan.
5. Vinacke ,H.M -A History of the Far East in Modern Times, London 1967

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI
PG - COURSES – AFFILIATED COLLEGES
Course Structure for M. Com.
(Choice Based Credit System)
(With effect from the academic year 2017-2018 onwards)

Sem. (1)	Sub. No. (2)	Subject status (4)	Subject Title (4)	Contact Hrs./ Week (5)	Credits (6)
I	1	Core-1	Management Accounting	6	4
	2	Core-2	Advanced Business Statistics	6	4
	3	Core-3	Management Concepts and Organizational Behaviour	6	4
	4	Core-4	Office Automation	6	4
	5	Core-5	Modern Marketing Management	6	4
II	6	Core-6	Financial Management	6	4
	7	Core-7	Quantitative Techniques for Decision Making	6	4
	8	Core-8	Legal Frame work of business	5	4
	9	Core-9	Business Environment	5	4
	10	Core-10	Retail Management	4	4
	11	Elective - 1	Entrepreneurship Development	4	3

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MANAGEMENT ACCOUNTING

L	T	P	C
6	0	0	4

Objective:

The objective of the course is familarising the management accounting practices used by management for effective administration.

Unit I

Introduction and Financial statement Analysis

Management Accounting: Definition, Scope, Objectives, Functions, Advantages and Limitations - Management Accounting Vs. Financial Accounting - Management Accounting Vs. Cost Accounting - Tools of Management Accounting - Installation of Management Accounting system - Organisation for Management Accounting

Unit II

Funds Flow analysis and Cash Flow analysis

Funds Flow Analysis: Concept of fund - Procedure for preparation of Fund Flow Statement – Cash Flow Analysis: Procedure for preparation of Cash Flow Statement as per AS3 – Differences between Fund Flow Statement and Cash Flow Statement.

Unit III

Marginal Costing and Break Even Analysis

Marginal Costing - Important concepts – Marginal costing and Absorption costing – Break Even Analysis – Cost Volume Profit Analysis – Managerial Applications of Marginal costing.

Unit IV

Standard costing and Variance Analysis

Standard cost and Standard costing – Analysis of variances: Direct Material, Direct Labour, Overhead and Sales variances

Unit V

Budgetary Control

Budget – Budgeting – Budgetary Control - Functional budgets: Sales, production, production cost, purchases, purchase cost and cash budget – Fixed and Flexible Budget – Master budget - Zero Base Budgeting.

References

1. Management Accounting, S.N.Maheshwari, Sultan Chand & Sons, New Delhi.
2. Management Accounting, Dalston L Cecil and Jenitra L Merwin, LearnTech Press, Trichy.
3. Management Accounting, ShashiK.Gupta and R.K.Sharma, Kalyani Publishers, New Delhi.

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ADVANCED BUSINESS STATISTICS

L	T	P	C
6	0	0	4

Objective:

The objective of the course is to acquaint students with important statistical techniques for managerial decision making .The emphasis will be on their applications to business and economic situations

Unit I

Probability Distribution: Theoretical Distribution - Binomial, Poisson, and Normal Distributions and their applications to business.

Unit II

Statistical Inference: Test of Hypotheses: – Standard error and sampling Distribution - procedure for testing of Hypothesis- Two tailed and one tailed Test of Hypothesis – Assumptions of the Parametric data- Z test-One sample T Test-Independent Sample T test– Paired sample T Test - Analysis of Variance (ANOVA)

Unit III

Non Parametric Tests: Chi-square tests-Sign tests-Kruskal-Wallis test- Mann Whitney U test.

Unit IV

Statistical Decision Theory: Decision making Environments – Criteria for making decision under condition of risk and uncertainty- Expected value approach.

Unit V

Statistical Quality Control: Control charts for variables and attributes-Acceptance sampling.

Books for Refeence:

1.Statistical methods - S.P.Gupta

2.Fundamentals of Statistics- Gupta, S.C.,

3. Levin, R.I. and D.S. Rubin, *Statistics for Management*, Prentice-Hall of India.

4. Spiegel, M.R. *Theory and Problems of Statistics,* Schaum Publishing Company.

5. Aczel, Amir D., *Complete Business Statistics,* McGraw Hill, 1999.

6. Kazmeir Leonard J., Norval F. Pohl, *Basic Statistics for Business and Economics,* McGraw Hill International (2nd ed.)

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MANAGEMENT CONCEPTS AND ORGANISATIONAL BEHAVIOUR

L	T	P	C
6	0	0	4

Objective

The objective of this course is to help students understand the conceptual frame work of management and organizational behavior.

Unit-I

Management- Definition- Functions of manager- Management function – Planning, organizing, Authority responsibility, Powers of delegation, Decentralization, Staffing directing, Co-ordinating, Control- nature, process and techniques.

Unit-II

Organizational behaviour- evolution, Development, relationship between organization behavior and management, Attitudes, Perception, Learning, Personality, Transaction analysis Motivation- Meaning, concepts, Theories of motivation, Motivation and Morale

Unit III

Group dynamics- Definition, importance, Types of groups, Group formation and development, Composition, Performance, Leadership- Styles, theories.

Unit IV

Organizational change and development –Planned change- resistance to change and managing change. Organizational development (OD) meaning, objectives, models and OD interventionism

Unit-V

Quality of working life (QWL)- Evolution and development of constituents of Quality of work life QWL in Indian context International organizational behavior- cultural differences and similarities, individual behaviour in International organization- Group behaviour- Organisation characteristics- organization change and managerial career.

Books for Reference:

Principles of Management- L.M Prasad
Organizational Behavior- S.S.Khanka S.Chand& Company Ltd-2005
Organizational Behavior- Stephen P.Robbins- Pearson Education SinaporeP.Ltd.,

Reference books

Stephens P.Robbins- OrganisationalBehaviour, Prentice Hall 1997.
Organizational Behavior- Aswathappa- Himalaya Publishing House.
Organizational Behavior- John W.Navstrom and Keith Davis.Tata McGraw Hill.
Understanding Organizational Behavior- UdaiPareek- Oxford University Press
Organisational Behaviour Text and cases, Avinash.K.Chitale,et.al.,PHI Learning Private Limited

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OFFICE AUTOMATION

L	T	P	C
6	0	0	4

Objective:

The objective of the course is to make the students to learn modern methods of office automation through computer

UNIT-I

MS-Word 10

Page formatting-working with columns-constructing high quality tables-working with complex documents-mail merge-publishing online forms.

UNIT-II

MS-Excel

Creating Excel worksheets-entering and editing cell entries, working with numbers, changing worksheet layout, other formatting options-printing in Excel-using functions and reference- naming ranges-creating charts- using custom and special effects-using financial and statistical functions.

UNIT-III

MS-Access

Objectives of Access Database-parts of Access window-starting Microsoft Access-creating a new database-creating a database through table wizard-creating table through Design window-Query-forms-Report.

UNIT-IV

MS-Power point

Creating power point presentation: creating a basic presentation-building presentation-modifying visual elements-formatting and checking text-adding objects-applying transitions-animation effects-preparing handout-taking the show on the road.

UNIT-V

Business Engineering and ERP

Business engineering-introduction-significance-principles-Enterprise Resource Planning (ERP)-introduction-evolution-integrated system approach-business benefits-ERP in business processes.

Text Books:

1. **Stephen L. Nelson**, "Office 2010,Computer Reference", Tata McGraw Hill Publishing company Ltd.
2. **Sumner Mary**- "Enterprise Resource Planning", Pearson Education, inc. I Edition 2012.

Reference Books:

1. **Gini Courter &AnnettelMaraquis**, "MS-Office 2010",BPB Publishing.
2. **Alexis Leon**, "Enterprise Resource Planning", II Edition,Tata McGraw Hill Publishing company Ltd.2007.
3. **GargVinodkumar, Venkitakrishnan.N.K**., "Enterprise Resource Planning- Concept and Practice", II Edition, PHI Learning2009.

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MODERN MARKETING MANAGEMENT

L	T	P	C
6	0	0	4

Objective:

The course intends to impart students with modern marketing management practices

UNIT I:

Introduction: Concept, nature, scope and importance of marketing; Marketing concept and its evolution; Marketing mix; Strategic marketing planning – an overview. Issue and Developments in marketing: Social, ethical and legal aspects of marketing; Marketing of Services; International marketing; Green marketing; Cyber marketing;MLM-Relationship marketing and other developments in marketing.

UNIT II:

Product Decisions: Concept of a product; Classification of products; major product decisions; product line and product mix; Branding; Packaging and labeling; Product life – cycle – strategic implications; New product development and consumer adoption process.

UNIT III:

Marketing Research – Marketing Environment – Marketing Information System – Difference between Marketing Research and Marketing Information System .Pricing Decisions: Factors affecting price determination; Pricing policies and strategies; Discounts and rebates.

UNIT IV:

Distribution Channels and Physical Distribution Decisions; Nature, functions, and types of distribution channels; Distribution channel intermediaries; Channel management decisions; Retailing and wholesaling.

UNIT V:

Promotion Decisions: communication process; Promotion mix – advertising, personal selling, sales promotion publicity and public relations; Determining advertising budget; Copy designing and its testing; Media selection; Advertising effectiveness; Sales Promotion – tools and techniques.

Reference :

1. Kotler, Philip: Marketing Management – Analysis, planning, implementation and control, Prentice Hall New Delhi.(latest edition).
2. Marketing: A Managerial Introduction: J.C. Gandhi, McGraw Hill Publications, latest edition.
3. Majumdar, Rananuj; Product Management in India, Prentice hall, New Delhi. \
4. MC Carthym E. jenone and William D perreaultJr;Basic Marketing; Managerial approach, Richard D.irwn, Homewood , llliois. Reprint.
5. Ramaswamy, V.S and Namakumari,S; Marketing management, Macmillan India, New Delhi.
6. Srinivasan, R;Case studies in marketing; the Indian context, Prentice Hall, New Delhi.
7. Stanton, William J. and chariesfutrell; fundamentals of marketing; McGraw hill publishing co., New York.
8. Still.RichardR,EdwardW.Cundiff and Norman A.P Govoni Sales Management: Decisions, Strategies and cases, Prentice Hall, New Delhi.
9. Chandra Bose, Modern Marketing – Principles & Practice, Prentice Hall, New Delhi.
10. Chandrasekar,K.S,Marketing Management-Text Cases, Vijay Nicole Imprints Private Limited,Chennai

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FINANCIAL MANAGEMENT

L	T	P	C
6	0	0	4

Objective:

The objective of the course is to make the students acquainted with modern principles of financial management.

UNIT- I

Financial Management – Meaning – Nature and scope of finance – Objectives – Profit Vs Wealth maximization – Finance functions – Functions and role of Finance Manager – Time value of money.

UNIT –II

Capital Budgeting – Investment decisions – NPV, IRR., ARR - Payback period – Profitability Index – NPV and IRR comparison- Capital rationing – Risk analysis – Time Value of money - Techniques.

UNIT –III

Cost of Capital – Significance, Importance and concepts – Cost of Debt – Preference capital – Equity capital – Retained earnings – Combined cost of capital (Weighted) - Cost of equity – CAPM.

UNIT – IV

Capital structure theories – Traditional and MM hypothesis – Determining capital structure in practice – Operating, financial and combined leverage – Measurement of Leverages – Effects of operating and financial leverage on profits – Significance of leverage.

UNIT-V

Working capital Management – Meaning – Significance – Types of working capital – Estimation of Working capital requirements – Management of cash – Dividend policies – Issues in dividend decisions – Walter model – Gordon's model – M.M hypothesis forms of dividend.

Books for reference:

1. Khan MY, Jain Pk, Financial Management; Tata McGraw Hill, New Delhi
2. Chandra, Prasanna, Financial Management, Tata McGraw Hill, Delhi
3. Pandy, I.M., Financial Management, Vikas Publishing house, Delhi
4. Maheswari S.N. Financial Management: Principles and Practice, Sultan Chand and sons, New Delhi, 2013
5. Tulsian.PC, Bharat Tulsian, Financial Management, S. Chand New Delhi 2010
6. P.Periasamy, Financial Management, Vijaay Nicole Imprints Pvt. Ltd.,2015

QUANTITATIVE TECHNIQUES FOR DECISION MAKING

L	T	P	C
6	0	0	4

Objective:

The objective of the course is to acquaint the students with the use of quantitative models in decision making.

UNIT I

INTRODUCTION AND LINEAR PROGRAMMING:

Operations Research-Quantitative Approach to Decision Making - Nature and Significance of OR in Decision Making-Models in Operations Research- Application Areas of Operation Research- Linear Programming-General Concepts -Definitions - Assumptions in Linear Programming - Limitations in Linear Programming - Applications of Linear Programming - Formulation of LP Problems - Solution Methods : Graphical method (maximization and minimization)- Simplex method (maximization and minimization(Big M Method)).

UNIT II

TRANSPORTATION

Concepts- Formulation of Transportation Problem- Balanced and Unbalanced Problems-Minimization and Maximization Problems, Finding IBFS - Northwest Corner Rule(NWCR) , Least Cost Rule (LCR) and Vogel's Approximation Method(VAM) - Optimality Tests - Modified Distribution method (MODI).

UNIT III

ASSIGNMENT PROBLEMS

Concepts - Mathematical Formulation of an Assignment Problem - The Assignment Algorithm (Hungarian Assignment method) - Balanced and Unbalanced Assignment Problems-Minimization and Maximization Problems-Restricted and Reserved routes / choice - Travelling Salesman Problem as an Assignment Problem.

UNIT IV

PROJECT MANAGEMENT AND QUEUING MODELS

Introduction- Types of Networks - CPM : Critical Path Method and PERT: Programme Evaluation Review Technique – Basic differences between CPM and PERT - Drawing a network - Obtaining of Critical Path- Time estimates for activities.-Probability of completion of project- Determination of floats (total, free, independent)-Queuing Models-Introduction, Concepts, Terminology - General structure of queuing system - Operating Characteristics of Queuing system - Poisson-exponential single server model(finite population).

UNIT V

REPLACEMENT ANALYSISAND SIMULATION

Replacement of capital assets – discrete cases when time value of money is not considered and when time value of money is considered.-Replacement of items that fail suddenly -Monte-Carlo method of simulation.

Books for reference:

1. Operations Research - J.K. Sharma, Macmillan India Ltd.
2. Operations Research – V.K.Kapoor ,Sultan & Sons
3. Operational Research - An Introduction, Taha, H.A - Macmillan
4. Operations Research – Kanti Swarup, P.K. Gupta, Man Mohan, S. Chand
5. Operations Research-S.Gurusamy, Vijay Nicole Imprints Private Limited
6. Operations Research-R.Panneerselvam, Vijay Nicole Imprints Private Limited

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LEGAL FRAME WORK OF BUSINESS

L	T	P	C
5	0	0	4

Objective:

To create the knowledge of Legal perspective and its practices to improve the business.

UNIT I

Payment of Wages Act – Payment of Bonus Act – Industrial Disputes Act, Sale of Goods Act 1930.

UNIT II

Provisions of Companies Act 2013 relating to Company Administration – Board of Directors – Manager – Managing Director – Provisions relating to various types of meetings and their related items – powers, duties and liabilities of Directors – Corporate Governance.

UNIT III

Foreign Exchange Management Regulation Act1999, Objective and definitions under FEMA – Dealings in foreign exchange – holding of foreign exchange etc. current account transactions, capital account transactions – export of goods and service realization and repatriation of foreign exchange – Exemptions authorized person – penalties and enforcement – Compounding of offences – Directorate of enforcement – Appellate Tribunal etc.

UNIT IV

Environmental Legislation Legal and regulatory frame work – procedures for obtaining various environment clearances – role and function of Environments of Environment Tribunal / Authority – Appearance before Environment Tribunal / Authority – Environment Audit.

UNIT V

Consumer Protection Act – Consumer rights, Procedures for Consumer grievances redressal, Types of consumer RedressalMachinaries and Forums – Competition Act 2002 – Cyber crimes, IT Act 2000 and 2002, Cyber Laws, Introduction of IPR – Copy rights, Trade Marks, Patent Act.

TEXT BOOKS

1. N.D. Kapoor, Elements of mercantile Law, Sultan Chand and Company, India, 2006.
2. P.K. Goel, Business Law for Managers, Biztantatara Publishers, India, 2008.
3. AkhileshwarPathack, Legal Aspects of Business, 4th Edition, Tata McGraw Hill, 2009.
4. Kapoor, N.D. "Elements of Mercantile laws", Sultan Chand & Sons New Delhi, 1999 Maheshwari, S.N &Maheshwari, S.K "A Manual of Business Laws", Himalaya Publishing House Bombay, 2003.

REFERENCES

1. P.P.S. Gogna, Mercantile Law, S.Chand& Co. Ltd., India, Fourth Edition, 2008.
2. Dr.Vinod, K.Singhania, Direct Taxes Planning and Management, 2008.
3. Richard Stim, Intellectual Property- Copy Rights, Trade Marks, and Patents, Cengage Learning, 2008.
4. Balanchandran V., Legal Aspects of Business, Tata McGraw Hill, 2012.
5. Daniel Albuquerque, Legal Aspect of Business, Oxford, 2012.
6. Ravinder Kumar – Legal Aspect of Business – Cengage Learning, 2nd Edition – 2011.
7. K.C. Mishra and M.Bakshi, legal and Regulatory Aspects of Insurance, CENGAGE learning, Delhi, 2005.
8. Kenneth A.Abraham, Kenneth S. Abraham Insurance laws Regulation : Cases and Material, Foundation Press, 2005.
9. Corporate Laws – Taxman Publication.

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BUSINESS ENVIRONMENT

L	T	P	C
5	0	0	4

Objective:

The objective of the course is to make the students to understand the changing environment around the business.

Unit I

Business environment – Meaning – Types of environment – Internal and external environment. Environment analysis and forecasting – Techniques for environmental analysis – Approaches to environmental analysis – Types of forecasting – Techniques for environmental forecasting – Benefits of environmental analysis – Limitation of environmental forecasting.

Unit II

Business and society – Business ethics and values – Culture and business. Corporate governance – Need and importance of corporate governance – Principles of good corporate governance – Corporate transparency – Corporate accountability – Recommendations of Birla committee. Industrial policy – Industries (Development and Regulation Act) – Industrial Licensing.

Unit III

Public sector – growth and performance – the new public sector policy – Organisation of public enterprises – government control over public enterprises. Pricing policy of public enterprises – private sector – joint sector – co-operative sector. Privatisation and disinvestment – Arguments against privatisation – Rengarajan committee on disinvestment – Privatisation in India.

Unit IV

Globalisation of business – Stages of globalisation – Essential conditions of globalisation – Pros and cons of globalisation – WTO and India International investments – Types of foreign investments – Regulation of foreign investments – Foreign investments by Indian companies – Multinational corporations.

Unit V

Social responsibility of business – Social orientation of business – Responsibilities of business to different sections – Arguments for and against social movement – Social Audit.

Reference Books

1. Dr. C.B. Gupta, "Business Environment" Sultan Chand and Sons, New Delhi, 2011.
2. Francis Cherunilam, "Business Environment Text and cases" Himalaya Publishing House, Mumbai, 2011.
3. H.L.Ahuja, 'Economic Environment of Business', S.Chand, New Delhi, 2009.

MSU / 2017-18 / PG –Colleges / M.Com / Semester –II / Ppr.no.10 / Core - 10

RETAIL MANAGEMENT

L	T	P	C
4	0	0	4

Unit – I

Introduction: – Meaning – Concepts – Formats of Retailing – Functions – Importance – Retail trends in India.

Unit – II

Retail Merchandising: - Basics of Retail Merchandising – Process –Methods – Retail Merchandise Mix – Merchandise buying – Analysing – Merchandise Performance.

Unit – III

Retail location strategy: - Importance of location decisions – Retail Franchising – Types of Retail location and site locations – Determining Factors – Retail location theories – Strategic Retail Planning Process.

Unit – IV

Retail Market Segmentation: - Market segmentation – Benefits of market segmentation – Segmenting, targeting and positioning – Criteria for effective market segmentation – Dimensions of segmentation.

Unit – V

Retail store Operation: - Elements of Retail store – Operations – Management of Retail outlet – Role of centralized retailers – Operations master schedule (OMS) – Store Maintenance.

Reference Books

1. Dr.Harjit Singh, "Retail management" A Global Perpective Text and Cases , "Sultan Chand Publications.
2."Chetan Bajaj", Rajnish Tuli and Nidhi V Srivastva. "Retail Management" Oxford University Press.
3. Gibson.G.Vedamani, "Retail Management – Functional and Practices, "Jaico Publishing house.
4. Suja Nair, "Retail Management" – Himalaya Publishing house.
5. David Gilbert "Retail Marketing management- Pearson Education low price Edition, New Delhi 2008.

MSU / 2017-18 / PG –Colleges / M.Com / Semester –II / Ppr.no.11 / Elective - 1

ENTREPRENEURSHIP DEVELOPMENT

L	T	P	C
4	0	0	3

Unit – I

Entrepreneur – Meaning - Types of Entrepreneurs – Characteristics – Factors affecting Entrepreneurial growth – Knowledge and skills of Entrepreneur's – Functions of Entrepreneurs.

Unit – II

Entrepreneurial motivation – Need – Objective – Achievement of motivation training – Self Rating – Stress Management – Entrepreneurship development programme.

Unit – III

Micro, small and medium Enterprises – Definition – Characteristics – Objectives – Advantages and disadvantages – Importance – Problems of Micro, small and medium (MSM) enterprises – Steps involved in starting up a business.

Unit – IV

Finance and Accounting – Need – Source of Finance, Term loans – Capital structure – Financial Institutions – Taxation.

Unit – V

Women Entrepreneur – Concept – Reasons for the slow growth in India – Problems of women Entrepreneurs – Measures for the development of women Entrepreneurs in India – Sickness of small business – Concept - Consequence - Connective measures.

Reference Books

1. S.S.Kanka: Entrepreneurial Development, Sultan Chand.
2. C.B. Gupta & N.P.Sreenivasan : Entrepreneurial Development, Sultan Chand.
3. Prasanna Chandra: Project Planning, Analysis, Selection, Implementation and Review, Tata McGraw Hill.
4. Nirmal K. Gupta: Small industry – Challenges and Perpectives, Anmol Publications.
5. Vasantha Desai: Small Scale Industries and Entrepreneurship, Himalaya.

Table - **3**: Common Course Structure for **P.G. Degree Programme in Science – M.Sc. (General)**[#](with effect from the academic year 2017-2018 onwards) M.Sc. BOTANY

Sem. (1)	Sub No. (2)	Subject Status (3)	Subject Title (4)	Contact Hrs./ Week (5)	Credits (6)
I	1	Core-1	**Algology and Bryology.**	6	4
	2	Core-2	**Mycology, Lichenology and Molecular Pathology.**	6	4
	3	Core-3	**Microbiology and Immunology.**	5	4
	4	Core-4	**Phytochemistry.**	5	4
	5	Core-5 **Practical - 1**	**Algology, Bryology,Mycology and Lichenology.**	4	2
	6	Core-6 **Practical – 2**	**Molecular Pathology Microbiology, Immunology and Phytochemistry.**	4	2
			Subtotal	**30**	**20**
II	7	Core-7	**Pteridophytes, Gymnosperms and Paleobotany**	5	4
	8	Core-8	**Genetics, Cell & Molecular Biology**	5	4
	9	Core-9	**Anatomy. Embryology and Morphogenesis**	4	4
	10	Core-10	**Entrepreneurship Botany**	4	4
	11	Core - 11	Field Work	4+	3
	12	Core-12 **Practical - 3**	**Pteridophytes, Gymnosperms,Paleobotany and Anatomy.**	4	2
	13	Core-13 **Practical - 4**	**Genetics, Cell & Molecular Biology, Embryology, Morphogenesis and Entrepreneurship Botany.**	4	2
			Subtotal	**30**	**23**

Sem. (1)	Sub. No. (2)	Subject Status (3)	Subject Title (4)	Contact Hrs./ Week (5)	Credits (6)
III	14	Core-14	**Taxonomy of Angiosperms and Economic Botany**	6	4
	15	Core-15	**Biochemistry and Biophysics**	6	4
	16	Core-16	**Computer Application and Bioinformatics**	5	4
	17	Core-17	**Research Methodology**	5	4
	18	Core-18 **Practical - 5**	**Taxonomy of Angiosperms, Economic Botany and Research Methodology**	4	2
	19	Core-19 **Practical - 6**	**Biochemistry, Biophysics, Computer Application and Bioinformatics**	4	2
			Subtotal	**30**	**20**
IV	20	Core-20	**Plant Physiology**	4	4
	21	Core-21	**Plant Ecology and Conservation Biology**	4	4
	22	Core-22	**Applied Biotechnology**	4	4
	23	Core-23 **Practical - 7**	**Plant Physiology and Applied Biotechnology**	4	2
	24	Core-24 **Practical - 8**	**Plant Ecology and Conservation Biology**	4	2
	25	**Elective - 1**	**ELECTIVE – Medicinal Botany and Dietetics**	3+	3
	26	**Core-25**	**Project**	7+	8
			Subtotal	**30**	**27**
			Total	**120**	**90**

+ Extra hours for the Project

For the Project, **f**lexible credits are b/w 5 – 8 &Hours per week are b/w 10 - 16.

Total number of credits ≥ 90 : 90

Total number of Core Courses : 25 (15 T + 8 P + 1 Prj. + 1 FW.)

Total number of Elective Courses / F.W. / S.T. : 1

Total hours : 120

CORE PAPER 1

PLANT DIVERSITY I - ALGOLOGY AND BRYOPHYTES

UNIT - I

General characters and interrelationships of Algae with other thallophytes. Classification of algae (Fritsch, 1935). A comparative study of the major groups – with special reference to their occurrence, thallus structure and life-history of: Chlorophyceae, Charophyceae, Bacillariophyceae, Phaeophyceae and Rhodophyceae and Cyanophyceae.

UNIT- II

Comparative account of pigments, cell wall components, reserve food, flagella, chromatophores, pyrenoids, eyespot and nucleus. Range of thalli diversity- Life-cycle patterns and alternation of generations.

UNIT- III

Economic importance of algae with special reference to food, industrial products and medicine. Role of algae in soil fertility. Algal blooms and Fossil algae.

UNIT - IV

General characters of Bryophytes and interrelationships. Classification of Bryophytes by Rothmaler (1951). General characters of major orders – Marchantiales, Jungermanniales, Anthocerotales, Sphagnales, Funariales and Polytrichales.

UNIT - V

Life cycle pattern and alternation of generations in Bryophytes. Origin of Bryophytes – Reproduction in Bryophytes. Fossil bryophytes with special reference to *Naiadita*. Ecological adaptations and economic importance of Bryophytes.

Practicals

Algae

Caulerpa, Ulva, Chara / Nitella, Padina, Dictyota, Turbinaria, Gracillaria, Oscillatoria and *Scytonema, and Anabaena.*

Bryophytes

Riccia, *Plagiochasma, Anthoceros, Funaria*

Record

To maintain a record note book for evaluation.

Field Trip

Algal collection trip and submission of 5 Herbarium Sheets.

Reference Books

1. The Algae-Chapman., V.J. & Chapman, D.J. Elbs and Macmillian, London, 1960.
2. Structure and Reproduction of the Algae. Vol. I & II., Fritsh, F.E. Camb. Univ. Press, 1965.
3. The Biology of the Algae., Round, F.W. Edward Arnold Publishers, London, 1973.
4. Text Book of Algae., Sharma, O.P. Tata McGraw Hill Publishing Co., New Delhi, 1986.
5. Introductory Phycology., Kumar, H.D. Affiliated East Press, NewDelhi.
6. The Algae – A review – Prescott, G.W. Bishen Singh & Mahendra Pal Singh, Dehra Dun and Otto Koelta Science Publishers, West Germany, 1969.
7. Text book of Algae – Sharma, O.P. Tata McGraw Hill Publishing Co., New Delhi, 1986.
8. Text Book of Botany, Algae (Revised edition), Pandey B.P., S. Chand & Co., New Delhi, 2000.
9. Text Book of Algae, Sharma, O.P., Tata McGraw Hill Publ. Co.Ltd., New Delhi, 1992.
10. Introduction to Phycology, South, G.R. & Whittick, A. Blackwell Scientific Publ., Oxford.
11. Botany for Degree students, Algae 9th revised edition, Vashista Sinha B.R., Singh, V.P., 2002, S. Chand & Co. Ltd., New Delhi.
12. . British Mosses and Liverworts – Watson, E.V. Cambridge, 1980.
13. Biology of Bryophytes-Chopra, R.N. and Kumar, P.K.Wiley Eastern Ltd., New Delhi, 1988.
14. Bryophytes – Prem Puri. Atma Ram & Sons, Delhi, 1981.
15. An introduction to Embryophyta Vol. II, Parihar, N.S., Central Book depot, Allahabad, 1967.
16. The Interrelationships of t
17. he Bryophyta – Cavers, F. Indian report S.N. Technico (Book House), Patna, 1981.

CORE PAPER 2

PLANT DIVERSITY – II MYCOLOGY, LICHENOLOGY AND MOLECULAR PLANT PATHOLOGY

UNIT - I

Classification of fungi proposed by Alexopoulous and Mims (1979). Morphology, structure, reproduction, and life history. General characters of fungi of the following: Mastigomycotina - Zygomycotina - Ascomycotina - Basidiomycotina and Deuteromycotina.

UNIT – II

Mode of nutrition - Reproduction and life cycle patterns. Homothallism and Heterothallism in fungi. Homokaryon and Heterokaryon. Parasexuality and heterokaryosis. Economic importance of fungi - food, medicine and biocontrol agents. Mycorrhizae - Structure and Symbiotic association. Types - Ectotrophic - endotrophic - application of mycorrhizae in agriculture.

UNIT – III

General account of Lichens. Classification of lichens by Miller (1984). Structure, nutrition and reproduction of the three major groups. Economic importance. Lichens as pollution indicators. Microchemical tests for lichens.

UNIT – IV

Concept of plant diseases - causes of plant diseases - role of environment and host nutrition, enzymes, toxins and growth regulators on pathogenesis. Symptoms and identification. Host-parasite interactions. Disease control methods - Cultural, Physical, Chemical and Biological methods.

Defense strategies - Morphological and Biochemical. Molecular basis of gene-for-gene hypothesis: R-gene expression and transcription profiling, cloning of resistance genes and marker-aided selection, pyramiding of R genes.

UNIT- V

Common plant diseases: Diseases of Cereal crops - wheat and rice; Pulse Crops - mung bean and pigeon pea; Oilseed crops - sunflower and groundnut and Cash crops like cotton and sugarcane.

Practicals

Fungi

Mucor / Pilobolus, *Agaricus, Xylaria, Polyporus, Puccinia.*

Lichens

Micropreparations of vegetative and reproductive parts of any foliose / fruticose lichens.

Mycorrhizae

Permanent microslides / photographs.

Molecular plant pathology

Etiology of diseases on wheat / rice, groundnut, sugarcane.

Any photographs / slides / phytochemicals relevant to molecular pathology (host - pathogen interactions).

To maintain a record note book for evaluation.

Reference Books

1. Introduction to Fungi. Webster, J. Cambridge University Press London, 1970.
2. Fungi., Srivastava, S., Pradeep Publications, Jalandhar, 1999.
3. The Biology of Lichens., Hale, M.E., Edward Arnold, Mayland. 1983.
4. Botany for Degree Students – Fungi, Vashista, B.R., S.C hand & Co., New Delhi, 1982.
5. College Botany Vol. I Fungi & Pathology, Pandey B.P., 1997.
6. A Text book of Plant Pathology, Bilgrami, K.S. & Dube, H.C., Vikas, New Delhi.
7. Plant diseases. Singh, R.S., Oxford & IBH, New Delhi.
8. A textbook of Fungi, Bacteria and Virus.1978. Dube, H., Vikas Publ.,
9. Mills Dallice *et al*., 1996. Molecular Aspects of Pathogenicity and Resistance: Requirement for Signal Transduction. APS, St Paul, Minnesota.
10. Parker, J. 2008. Molecular Aspects of plant Diseases Resistance. Blackwell Publ.
11. Gnanamanickam, SS (Eds). 2002. Biological Control of Crop Diseases. CRC Press, Florida.

CORE PAPER 3

MICROBIOLOGY AND IMMUNOLOGY

UNIT - I

Bacteriology: General characteristics - Classification (Bergey`s), Ultra structure of bacterial cell : Gram positive & Gram negative, Endospore, Staining methods-, Reproduction - Fission and sporulation. Isolation and cultivation of bacteria, Nutritional types. Bacterial growth- continuous & synchronous culture. Kinetics of growth. Determination of bacterial growth – Direct method: Haemocytometer - Viable plate count - Indirect method: Turbidity.

UNIT - II

Mycoplasma and Virology: Mycoplasma - structure and classification. Viruses - General characters, Classification, Structure, Multiplication. Viruses of Eukaryotes - Plant viruses. Viroids and prions. Bacteriophages- classification, - Lytic and lysogenic cycle

UNIT III

Food and Industrial Microbiology: The role of microorganisms in foods - Spoilage of fruits, vegetables, meats, poultry, eggs, bakery products, dairy products and canned foods - Food preservation - Introduction to industrial microbiology-- Microbiology of fermented milk products (Cheese, Yoghurt), beverages, wine and vinegar industry. Production of 1) organic acid- Acetic acid; 2) Enzyme- Amylase.

UNIT - IV

Environment and Agricultural Microbiology: Microorganisms in soil environments: Surface, subsurface and deep soil conditions. Microorganisms in various aquatic environments: Freshwater, Brackish-water, Marine - Microbes in the extreme environments and their adaptations. Indicator organisms. Microbial inoculants in agriculture: *Rhizobium*, *Pseudomonas*, BGA, - Microbial Herbicides- B*t* toxins.

UNIT- V

Immunology: Cells of the Immune System - Innate and Adaptive immunity - Antigens - Antigenicity and immunogenicity - B and T cell epitopes - Immunoglobulin: Structure, Function and Immunoglobulin classes. Antigen-Antibody reaction - Immune response during bacterial (Tuberculosis), parasitic (Malaria) and viral (HIV) infections, congenital and acquired immune-deficiencies.

Practicals

1. Preparation of culture media agar slant - agar plate.
2. Isolation of microbes by streak and pour plate method.
3. Isolation of soil microbes by serial dilution techniques.
4. Isolation and identification of Bacteria and Fungi from spoiled food.
5. Isolation of microbes from soil and water.
6. Gram staining of Bacteria.
7. Demonstration of bacterial mobility (Hanging drop method).

Reference books

1. Pelczar J.M., Chan E.C.S. and Kreig. R.N. 2008. Microbiology. 13th Reprint, Tata Mc Graw Hill Publishing Company Ltd, New Delhi.
2. G. Tortora, B. Funke and C. Case. 1995. Microbiology: An Introduction. 5th ed. Menlo Park, CA: Benjamin/Cummings.
3. J. Ingrahamand C. Ingraham. 1995. Introduction to Microbiology. Belmont, CA: Wadsworth.
4. Mathews, R.E.F., 1957. Plant Virology. Cambridge University Press. London.
5. Atlas, R.M. 2000. Microbiology - Principles of Microbiology. Mosby Year Book Inc, Missouri.
6. Black, J. 2007. Microbiology - Principles and Explorations. 7th Edition, Prentice Hall International, Inc, New York.
7. Brock, T.D. 2000. Biology of Microorganisms. 9th edition, Southern Illinois University, Carbondale.
8. Prescott, L.M., Harley, J.P. and Klein, D.A. 1996. Microbiology.3rd Edition, W.M.C. Brown Publishers, Chicago.
9. Salle, A.J. 1997. Fundamental Principles of Bacteriology. 7th Edition, Tata Mc Graw Hill Publishing Company Ltd, New Delhi.
10. Vijaya Ramesh, K. Food Microbiology, MJP, Chennai Immunology.
11. Kannan,T. Immunology, MJP, Chennai.
12. Mark Wheelis, 2010. Principles of Modern Microbiology, Jones and Bartlett, Cannada.
13. Richard, A., Godsby., Thomas, J., Kundf. Barbare A and Osborne, 2000. Kuby - Immunology W.H. Freemen and Company.
14. Rao C.V. A Text Book of Immunology, 2011. Narosa Publication House, NewDelhi.

CORE PAPER 4

PHYTOCHEMISTRY

UNIT- I

Phytochemistry - Scope of Phytochemistry. Importance in pharmaceuticals industry. Preparation of plant extracts - maceration, infusion, digestion, decoction, percolation, sonication, hot continuous extraction, aqueous alcoholic extraction, superficial fluid extraction and counter-current extraction. Parameters for selecting appropriate extraction method.

UNIT - II

Secondary metabolites - definition, classification, preliminary phytochemical screening by chemical test. Methods for separation and isolation of constituents. Synergy and polyvalent action of phytomedicines.

UNIT- III

Flavonoids: Definition, properties, classification, natural sources and therapeutic applications of flavonoids: Flavones, Flavanones Flavonols, anthocyanins. Alkaloids-Ephedrine, Serpentine and Morphine. Carotenoids-α and β-carotenes

UNIT - IV

Glycosides: Definition, properties, classification, natural sources, pharmacological and toxicological effects of glycosides. Terpenoids- β-Sitosterol, Glycyrrhizin. Phenolics - Coumarins and Tannins.

UNIT - V

Volatile oils - source, constituents, properties, extraction and utilization of Sandal wood oil, Lemon grass oil, Vetiver oil, Clove oil and Eucalyptus oil. Medicinal uses of resins.

Reference Books

1. Gurdeep Chatwal, 1983. *Organic Chemistry of Natural Products*, Himalaya Publishing House, Mumbai.
2. Jean Bruneton, 1999. *Pharmacognosy,* Second Edition, Lavoisier Publishers, Inc. USA.
3. Kokate, C.K., Purohit, A. P and Gokhale, S.R. 2004. *Pharmacognosy*, Nirali Prakashan Publications, Pune.
4. Nitin Suri, 2010. *Phytochemical Techniques*, Oxford Book Company.

5. Roseline, A. 2011. *Pharmacognosy*, MJP Publishers, Chennai.
6. Rumit M Shah and Rupesh T Nayak, 2012. *Pharmacognosy*, Global Academic Publishers, New Delhi. (Part I and Part II).
7. Wallis, T.E. 1985. *Text Book of Pharmacognosy*, CSB Publishers, New Delhi.
8. William Charles Evans, 2002. *Pharmacognosy*, Fifteenth edition, Harcourt Brace & Company, Asia Pvt. Ltd.

Practicals

1.Quantification of Antioxidants in the given samples:

A. Estimation of flavonoids, B. Estimation of Ascorbic acid, C. Estimation of β-Carotene

2.Preliminary Phytochemical Test:

A. Alkaloids, B. Tannins, C. Phenols, D. Glycosides and E. Saponins

3.Spotters- Photographs/images of oil extraction, structure of : Ephedrine, coumarins, β-Sitosterol, Glycyrrhizin

II SEMESTER

CORE PAPER 7

PLANT DIVERSITY – III. PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY

UNIT - I

General features and origin of Pteridophytes. Classification of Pteridophytes (Reimer, 1954).

Range of morphology, structure, reproduction and evolution of gametophytes and sporophytes of the following: *Rhynia, Lepidodendron, Sphenophyllum, Calamites*.

UNIT-II

Range of morphology, structure, reproduction and evolution of gametophytes and sporophytes of the following**:** *Angiopteris, Lygodium, Isoetes, Equisetum, Ophioglossum, Pteris, Polypodium, Salvinia, Marselia* and *Azolla*.

UNIT - III

Stelar evolution in Pteridophytes. Heterospory and origin of seed habit. Structure, development and evolution of sori and Telome theory. Economic importance of Pteridophytes.

UNIT - IV

A general account of the characteristic features of Gymnosperms. Origin of Gymnosperms. Classification of Gymnosperms (Sporne, 1965). General account of *Williamsonia*.

General account on the distribution, morphology, anatomy, reproduction and phylogeny of *Cycas, Araucaria, Ginkgo, Taxus, Ephedra, Gnetum.* Economic importance of Gymnosperms.

UNIT - V

Concepts of Palaeobotany, A general account on Geological Time Scale. Techniques for palaeobotanical study. Fossil types: Compressions, incrustation, casts, molds, petrifactions, coalballs and compactions.. Systematic and Nomenclature of fossil plants. Palaeoclimates and fossil plants. Role of fossil in oil exploration and coal excavation.

Practicals

Pteridophytes

Selaginella, Isoetes, Pteris, Adiantum, Salvinia and *Azolla*.

Fossil slides: *Rhynia, Lepidodendron, Sphenophyllum, Calamites*.

Gymnosperms

Cycas, Araucaria, Ginkgo, Taxus, Ephedra.

Fossil slides: *Lyginopteris, Heterangium, Cordaites* and *Medullosa*.

Prepration of double stained permanent slides each one from Pteridophytes and Gymnosperms

Reference Books

1. Parihar, N. S. 1985. The Biology and Morphology of Pteridophytes. Central Book Depot, Allahabad.
2. Rashid, A. 1986. An Introduction to Pteridophyta. Vani Educational Books, New Delhi.
3. Sharma, O. P. 1990. Text Book of Pteridophyta. Macmillan India Ltd., India.
4. Smith, G. M. 1971. Cryptogamic Botany. Vol. II. Bryophytes and Pteridophytes. Tata McGraw Hill, New Delhi.
5. Sporne, K.R. 1972. The Morphology of Pteridophytes. B.I. Publications, Madras.
7. Sundararajan, S. 2007. Introduction to Pteridophyta. New Age International Publishers, New Delhi.
8. Vashishta, P. C. *et al*., 2008. Botany for Degree Students: Pteridophyta. S. Chand and Co. Ltd., New Delhi.
9. Chamberlain, C.J. 1957. Gymnosperms Structure and Evolution. University Chicago Press, New York.
10. Sporne, K.R. 1974. The Morphology of Gymnosperms. B.I. Publications, New Delhi.
11. Vasishta, P.C. *et al*., 2006 Botany for Degree Students: Gymnosperms. S. Chand and Co. Ltd., New Delhi.
12. Arnold, C.A. 1947. An introduction to Paleobotany. McGraw Hill Book Co.
13. Nikias, K.J. 1981 Palaeobotany, Palaeoecology and Evolution. Praeger Publishers, USA.
14. Seward, A.C. 1919. Fossil Plants. Vol. I, II, III and IV. Cambridge University Press, London.

CORE PAPER 8

GENETICS, CELL AND MOLECULAR BIOLOGY

UNIT - I

Structure and functions of nucleus, nuclear envelope and nucleolus. Chromosomes. Cell cycle, Cell divisions: Mitosis-mitotic apparatus and its physiochemical characteristics and biochemical composition. Meiosis.

Sex determination in plants - theories of sex determination. Sex linked characters-primary, secondary and permanent. Sex- influenced and sex limited characters. Molecular basis of mutation- physical and chemical mutagens and their mode of action. Gene mutation.

UNIT - II

DNA- types (A, B, C & Z), Watson and Crick model of DNA, viral DNA, bacterial DNA, Mitochondrial and Chloroplast DNA. Dissociation and re-association kinetics of DNA, cot value, rot value and its significance. DNA synthesis and replication (prokaryote and eukaryote)-Enzymes involved, origin of replication, priming, DNA polymerases. Methylation of DNA.

UNIT - III

Damage and DNA repair mechanism – photo reactivation – excision repair - mismatch repair. Genetic recombination- generalised - site specific. Molecular mechanism-Holliday model. Lysogenic and lytic cycle - Bacterial Transformation - Transduction and Conjugation.

UNIT - IV

RNA-synthesis- types. RNA polymerases-role. Transcription-(Prokaryote, Eukaryotes), Initiation, elongation, termination, post transcriptional changes in RNA. Genetic code, Wobble hypothesis. Translation - ribosome assembly, formation of initiation complex, initiation factors, elongation and termination, translational inhibitors.

UNIT - V

One gene one enzyme hypothesis. Modern concept of genes. Fine structure of the gene - pseudoalleles. IS Element-transposons. Operon concept, *trp o*peron, *gal* operon. Positive and negative control - Catabolite Repression, Gene Regulation in Eukaryotes. Gene silencing.

Practicals

Solving problems involving:

1. Simple Molecular biology problems based on the theory syllabus.
2. Interactions of genes.
3. Chromosome mapping from test cross data.
6. Sex determination, Sex linked inheritance.
7. Identification of different stages of meiosis from suitable plant material.
8. Interpretation of micrographs.
9. Study of mitotic index from suitable plant material

Molecular Biology (demo)

1. Isolation of plant genomic DNA and its quantification by UV- spectrophotometric method.
2. Isolation of RNA and its quantification by UV - spectrophotometric method.

Spotters

Cot curve, DNA melting curve, Karyotype and idiographic analysis.

Reference Books

1. Benjamin Lewin, 2004. Genes VIII. Pearson Prentice Hall.
2. Channarayappa, 2006. Molecular Biology. Principles and Practices. Universities Press (India), Pvt. Ltd., Hyderabad.
3. David Freifelder, 2006. Molecular Biology. Narosa Publishing House, Madras, New Delhi.
4. Gupta, R.K. 2006. Genetics. Rastogi Publications.
5. Nicholl, DST, 2001. An Introduction to Genetic Engineering. Cambridge University Press.
6. Old, R.N. and Primrose, S.B. 2004. Principle of Gene Manipulation. Blackwell Scientific Publication, USA.
7. Power, C.B. 2007. Genetics Vols I & II. Himalaya Publishing House. Kundanlal Chandak. Industrial Estate. Ghat Road. Nagpur.
8. Satyanarayana, U. 2006. Biotechnology. Books and Allied (p). Ltd. Kolkatha.
9. Russel, P.J. 2010. iGenetics. Benjamin Cummings, Sanfransisco Boston NewYork.
10. Turner, P., A. McLennan, A. Bates, M.White, 2005. Instant notes Molecular Biology, Third Edition, Taylor & Francis.
11. Avinash Upadhyay and Kakoli Upadhyay, 2005. Fundamentals of Molecular Biology. First edition, Himalaya Publishing House.

CORE PAPER 9

ANATOMY, EMBRYOLOGY AND MORPHOGENESIS

UNIT - I

Meristem - Classification of meristems - apical meristem. Organization of shoot apical meristem (SAM) and root apical meristem (RAM). Cell to cell communication. Programmed Cell Death (PCD) - Vascular cambium - origin, structure, seasonal activity.

UNIT - II

Xylem, Phloem and their elements - primary and secondary structures. Secondary growth - periderm - structure development of lenticels. Anomalous secondary growth.

UNIT - III

Wood anatomy - physical, chemical and mechanical properties. Defects in wood - natural defects, knots and defects due to diseases. Reaction wood - Tension and Compression wood - Durability of wood. Ontogeny of dicot and monocot leaves. Kranz anatomy. Development of stomata, trichome development and Dendrochronology.

UNIT - IV

Microsporogenesis - Pollen wall, Pollen development Pollen storage, Pollen allergy, Megasporogenesis. Fertilization - barriers of fertilization. Endosperm - Types and haustoria. Organogenesis of dicot and monocot embryo. Apomixis and Polyembryony.

UNIT - V

Plant Morphogenesis - Definition – Polarity - as expressed in external and internal structures and in isolated cells. Symmetry - types. Differentiation as expressed in structure - effect of environment on differentiation - Factors controlling morphogenesis.

Practicals

Anomalous activity of cambium in *Boerhaavia, Bougainvillea, Achyranthes* and *Dracaena.*

Wood anatomy –any 4 common timbers (T.S, T.L.S and R.L.S)

Leaf anatomy - C_3 (rice) & C_4 – (*Cynodon*, *Zea mays*).

Dissection of globular / Cordate stage of embryos and endosperm haustorium from suitable seed.

Reference Books

1. Brown *et al.*, 1981. Text book of wood Technology Mc Graw Hill.

2. Clowers, F.A.L. 1961. Apical Meristems. Blackwell scientific Publication, oxford.
3. Cutter, E.G. 1978.Plant Anatomy, Edward Arnold Publishers Ltd; London.
4. Easu, K. 1953. Plant Anatomy. John Wiley& sons Inc; New York.
5. Fahn, A.1989. Plant Anatomy. Maxwell Pvt. Ltd., Singapore.
6. Metcalfe and Chalk. 1950. Anatomy of the Dicotyledons and Monocotyledons. Vol. I and II. Clarendon Press, oxford, U.K.
7. Singh, V., Pande, P.C and Jain, D.K.1987. Anatomy of seed plants. Rastogi Publications, Meerut.
8. Agarwal, S.B. 1990. Embryology of Angiosperms - a fundamental approach. Sahitya Bhawan, Agra.
9. Bhojwani S.S and Bhatnagar, S.P. 1981. Embryology of Angiosperms. Vikas Publishing House Pvt. Ltd., New Delhi.
10. Dwivedi, J.N.1998. Embryology of Angiosperms. Rastogi Publications, Meerut.
11. Maheswari, P. 1965. An Introduction to Embryology of Angiosperms. International Society of Plant Morphologies, University of Delhi.
12. Bard, J.1990. Morphogenesis. Cambridge University Press, London.
13. Bonner. J.T. 1965. Morphogenesis. Oxford & IBH Publications, Bombay.
14. Bryant, J.A and Francis, D. 1985.The Cell Division cycle in plants. Cambridge University Press, London.

CORE PAPER 10

ENTREPRENEURSHIP BOTANY

UNIT - I

Gardening: History, scope and importance of gardening - Types of Gardening: Water garden (Aqua Garden), Desert and Rock Garden (Xeric Garden), Kitchen Garden, Landscape Garden. Cultivation: Topiary, Bonsai, Nursery practices, Management and Marketing of garden plants.

UNIT - II

Olericulture and Floriculture: Major Vegetables of Tamilnadu- Onion & Brinjal. **Floriculture**: Aromatic flowers. Indoor cultivation of Flowers. Green, Poly and Glass Houses. Outdoor cultivation of Flowering Plants - *Rosa, Chrysanthemum,* and *Jasmine* Flower arrangement, cut flowers, Bouquet Making. Industrial uses of Flowers - Dyes preparation from flowers. Marketing Avenues.

UNIT - III

Organic Farming: Historical Account of Organic Farming - Impact of organic farming in the current scenario. Bio Composting - *Azolla* Cultivation. Vermicomposting - methods - Vermi Marketing.

UNIT – IV

Mushroom Cultivation: Brief History - Scope of Mushroom Cultivation of Paddy straw and Oyster mushroom - Medicinal and Nutritional value of mushrooms. Pathology of Mushrooms. Harvesting and Post harvesting technology - Marketing, Packing, Storage and recipes.

UNIT - V

Entrepreneurship - funding agencies (NABARD), Rural Banking, FAO, TNAU, - STEP (Science & Technology Entrepreneurship Programme) - Govt and NGO's, Yojana Schemes. Entrepreneurship Development Programme (EDP). Need and their significance.

Reference Books

1. Don Ellison, 2002. Garden Plants of the world. New Holland Publishers. V.K.
2. Valerie Bradley, 2006. The complete guide to House Plants. Readers Digest, New York.
3. Geoff Hamilton, 1993. Gardens of World - Practical Gardening Course, BCA London.

4. Reader's Digest Guide to Creative Gardening 1984, London.
5. Collin Levis 1997. Bonsai - A Care Manual. Chancellor Press London.
6. Anna Pavord, 1996. The New Kitchen Garden. Dorling Kindersley London.
7. Peter Mc Hoy., Barbara Segall and Stephanie Donaldson. 1997. Practical Small Gardening.
8. Pratibha Trivedi. 1996. Home Gardening ICAR, New Delhi.
9. Jane Fearnley 1995. Gardening Made Fast, Wedenfeld London.
10. Vijaya Ramesh, K. 2007. Food Microbiology, MJP Publisher, Chennai.
11. Suresh Gopalani, 2011. Fundamentals of Applied Nutrition.
12. Sumathi R. Mudambi, Shalini Roa, M.V. Raja Gopal, 2006. Food Science New Age International (P) Ltd., New Delhi.
13. Mridula Mirajkar and Sreelata Menon Food Science and Processing Technology (Vol. I &II) Kanishka Publishers, New Delhi.
14. Dhinesh kumar, 2009. Food Service and Catering Management Omega Publishers, New Delhi.
15. N.K. Jain 2011. Fundamentals of Food Science Technology Processing and Preservation. Cyber Tech Publications.
16. Ramani, A.V. 2009. Food Chemistry MJP Publishers, Chennai.
17. Hard, H.E. 2013. The Mushroom, MJP Publishers, Chennai.
18. Mukund Joshi, 2012. New Vistas of Organic Farming. Scientific Publishers Bangalore.
19. Singh, J.K. 2012. Mushroom Diseased and its control. Emkay Publishing House, New Delhi.
20. Dey, S.C. 2000. Mushroom Growing, Agrobios, Jodhpur.
21. Singh, 2005. Modern Mushroom cultivation. International Book Distributors Deharadun.
22. Suman 2005. Mushroom Cultivation Processing and Uses. IBH Publishers and Distributors, New Delhi.
23. Pathal, V.K.N. Yadav and Gaur, M. 2000. Mushroom Production and Processing Technology.
24. TNAU, Hand Book on Mushroom Cultivation.

25. Sharma, V.P. 2006. Disease and Pests of Mushrooms, IBH Publishers and Distributors, New Delhi.
26. Geeta Sumbali, 2010. The Fungi, Narosa Publishing House, Chennai.
27. Patel A.V. and Singh R.P. 1968. Teaching Agriculture in India Ram Prasad and Sons, Agra.
28. Rais AHMAD, 2009. WTO and Indian Agriculture - Opportunities and Challenges (1-3 Vols) Mittal Publications, New Delhi.
29. Joshi, S.R. 2006. Biopesticides - A Bio Technological Approach New Age International (P) Ltd. N.D.
30. Subba Rao, N.S. 1988. Bio Fertilizer in Agriculture, Oxford & IBH, New Delhi.
31. C.S.I.R. 1988 - The Wealth of India (Service Pub & Inf. Directorate), New Delhi.
32. ICAR, 1987. Hand Book of Agriculture, New Delhi.
33. Sharma J.S. Principles and Practice of Plant Breeding.
34. Bailey, L.H. 1958. The Standard Cyclopedia of Horticulture, Macmillan London.

Note :

1. Students may be encouraged to visit TNAU / 1CAR Research Stations.
2. Visiting websites.
3. Referring News Letter / Booklets of CSIR, TNAU, DBT.
4. Recommended Readings:- Velan Ulagam / Naveena Velanmai, Pasumai Vikadan, Tholil Nutpu, Thottakkalai, Herbal Bio Tech., and Hindu Survey of Agriculture.

Practical:(spotters)

1.Kitchen garden/water garden/Rockery

2.Green house/Polyhouse/Glass house

3.Organic farming-Azolla cultivation/Vermicompost

4.Mushroom cultivation- Paddy straw/Oyster mushroom

5.Note on Funding agencies – EDP/NABARD

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI
PG - COURSES – AFFILIATED COLLEGES
Course Structure for M.Sc. Chemistry
(Choice Based Credit System)
(with effect from the academic year 2017- 2018 onwards)

Sem. (1)	Sub. No. (2)	Subject Status (3)	Subject Title (4)	Contact Hrs/ week (5)	Credits (6)
I	1	Core - 1	Organic Chemistry – I	4	4
	2	Core - 2	Inorganic Chemistry – I	5	4
	3	Core - 3	Physical Chemistry – I	5	4
	4	Elective - 1	Advanced Topics In Chemistry – I	4	4
	5	Core - 4 Practical - 1	Organic Chemistry Practical – I	4	2
	6	Core - 5 Practical - 2	Inorganic Chemistry Practical – I	4	2
	7	Core - 6 Practical - 3	Physical Chemistry Practical – I	4	2
	Subtotal			**30**	**22**
II	8	Core - 7	Organic Chemistry – II	5	4
	9	Core - 8	Inorganic Chemistry – II	4	4
	10	Core - 9	Physical Chemistry – II	5	4
	11	Elective - 2	Advanced Topics In Chemistry – II	4	4
	12	Core - 10 Practical - 1	Organic Chemistry Practical – II	4	2
	13	Core - 11 Practical - 2	Inorganic Chemistry Practical – II	4	2
	14	Core - 12 Practical - 3	Physical Chemistry Practical – II	4	2
	Subtotal			**30**	**22**

MSU / 2017-18 / PG-Colleges / M.Sc. (Chemistry) / Semester-I / Ppr. No.1 / Core-1

ORGANIC CHEMISTRY – I

UNIT – I: AROMATICITY AND NOVEL RING SYSTEM

Aromaticity: Benzenoid and non–benzenoid compounds – generations and reactions – sextet theory – MO theory – Huckel's rule – Annulenes and hetero annulenes – Anti and homo aromaticity – Fullerenes.

Novel ring system: Nomenclature of bicyclic and tricyclic systems – structure and synthesis of Adamantane – Congressane – Alternant and non – alternant – Azulene – and sydnones.

UNIT – II: ORGANIC REACTION MECHANISM AND METHODS

Reaction mechanism: Energy diagram of simple Organic reactions – Transition state and intermediate. Kinetic and Thermodynamic requirements of reactions –Baldwin rules for ring closure -Hammond Postulate and microscopic reversibility.

Methods: Kinetic and Thermodynamic control of product formation. Kinetic methods of determination: Rate law – Primary and secondary isotope effect. Non-Kinetic methods of determination: Testing and Trapping of intermediates, Isotopic labeling, Cross–over experiment and stereo chemical evidence.

LFER: Hammett equation – Physical significance of σ and ρ – Applications and Limitations – Taft equation.

UNIT – III: STEREOCHEMISTRY

Concept of chirality: – Enantiotopic, diastereotopic hydrogens and prochiral centres – axial and planar chirality – stereochemistry of compounds containing two dissimilar asymmetric carbons, ansa compounds and para cyclophanes.

R/S notations of Spiranes, allenes and Biphenyl ortho derivatives – E/Z notation of compounds containing one and two double bonds.

Stereospecific and stereoselective synthesis – Methods of Asymmetric synthesis including enzymatic and catalytic process – Cram's rule and Prelog's rule – Cram chelation model and Felkin – Aln model.

UNIT – IV: REARRANGEMENT REACTIONS

Types of rearrangements: Nucleophilic, electrophilic and Free radical and protrophic reactions.

Mechanism: Nature of migration – migrating aptitude and memory effects, ring enlargement and ring contraction rearrangements.

Reactions: Carbon to carbon migration: Wagner – Meerwein, Pinacol – Pinacolone, Benzil – Benzilic acid, Arndt – Eistert synthesis, Demjanov and dienone-phenol rearrangements.

Carbon to oxygen migration – Baeyer–Villiger, Hydro peroxide and Dakin rearrangements.

Carbon to Nitrogen migration – Lossen, Neber and curtius rearrangements. **Miscellaneous:** Von – Richter rearrangement and Fischer - Indole synthesis.

UNIT – V: REAGENTS IN ORGANIC SYNTHESIS

Gilman's reagent – LDA – DCC – 1,3 – dithane (umpolung synthesis) – Selenium dioxide. Fetizon's reagent – Lemieux – Von Rudloff reagent – Lemieux–Johnson reagent – Woodward and prevost hydroxylation. Merrifield resin – Vaskas catalyst – Wilkinson's catalyst

REFERENCES

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2. S.M. Mukherji and S.P. singh, ' Reaction mechanism in Organic Chemistry ', Macmillan India Ltd, 1978.
3. M. Mukerji, S.P. Singh, and R.P. Kapoor, "Organic chemistry", Vol . I and II, Wiley Eastern Ltd., 1985.
4. J.March, ' Advanced organic chemistry', Fourth Edition, John Wiley and Sons, Newyork, 2006.
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11. P.S. Kalsi, ' Stereo chemistry – Conformation and mechanism – New Age international (p) Ltd., 2000.
12. P.Ramesh, 'Basic Principles of organic stereochemistry', Meenu Publications, Madurai, First Edition, 2005.
13. D. Nasipuri, 'Stereochemistry of organic compounds – Principles and applications', Wiley Eastern Ltd., 1991.
14. J.M. Harris and C. Wamser – John, ' Fundamentals of organic reaction mechanism – Wiley and sons
15. F.A Carey,'Organic Chemistry, Tata Mc Graw Hill, fifth reprint, 2005.
16. T.H. Lowry and K.S Richardson,' Mechanism and Theory in Organic Chemistry', Houper and Row Publishers – Newyork, 1987
17. V.M. Potapov, 'Stereochemistry' – Mir Publishers ,1979
18. R.O.C.Norman, 'Principles of Organic Synthesis, Chapman Hall, London, 1993.
19. Raj K. Bansal, 'Reaction mechanism in Organic chemistry, Tata Mc Graw Hill, Third Editon, 10th reprint, 2005.
20. Gurdeep R. Chatwal, 'Reaction mechanism and Reagents in organic chemistry', Himalaya publishing House, Bombay 1992.
21. J.N. Gurtu and R. Kapoor, 'Organic Reactions and Reagents', S.Chand and company Pvt. Ltd.,
22. Gurdeep Chatwal,'Organic Chemistry of Natural Products,' Vol.I and II, Himalaya Publishing House, Bombay 1992.
23. O.P. Agarwal, 'Chemistry of Natural Products,'Vol I and II, Goel publishing House, Meerut, 1984.
24. V.K. Ahluwalia and R.K. Parshar, 'Organic Reaction mechanism,'second Edition , Narosa publishing House,2005.
25. H.O. House, 'Modern synthetic Reaction,'Second Edition , W.A. Benjamin, Inc., London, 1972.
26. R.K. Mackie, M.M. Smith and R.A. Aitken,'Guide Book to Organic Synthesis' Second Edition, Longman Seientific and Technical, Singapore, 1990.
27. K. Nakanishi, 'Natural Product Chemistry,'Blackie Publications, Vols, I, II, III.
28. R.H. Thomson, 'Chemistry of Natural Products – Wiley, Newyork, 1996.
29. R.T. Morrison and R.N. Boyd,'Organic Chemistry' sixth Edition, Prentice Hall, 1994.
30. Michael B. Smith, 'Organic Synthesis,' Mc Graw Hill international Edition , 1994.
31. Bhupinder Mehta, Manju Mehta, Organic Chemistry, PHI Learning, New Delhi, 2011.
32. Organic chemistry by Clayden, Greeves, Warren & Wothers.
33. Organic chemistry by John McMurry.
34. Organic chemistry by L.G. Wade. JR.
35. Named Organic reactions by Thomas laue & Andreas Plagens.

INORGANIC CHEMISTRY – I

Unit – I: CHEMICAL BONDING

Valence Bond theory: Linear combination of A.O's in hybridization - stereochemistry of the hybrid orbitals - Calculation of s and p characters of equivalence and non-equivalence of hybrid orbitals – **VSEPR theory** – Walsh diagrams - Bent's rule.

M.O. theory – symmetry and overlap in M.O's - σ, π, ∂ M.O's- phi and mu bonds (Delta and quadrupole bond formation) – M.O. diagrams of hetero nuclear diatomic molecules (CO, NO) and triatomic molecules (BeH_2, CO_2).

Ionic Bond: Lattice energy – Born-Lande equation, Born Haber cycle and numerical problems involving it for the calculation of electron affinity or lattice energy – Kapustinskii equation.

Unit – II: REDOX POTENTIAL AND NON-AQUEOUS SOLVENTS

Redox potential: Applications of redox potential to inorganic reactions - factors affecting redox potential.

Acid-Base - Concept of acids and bases, Hard Soft Acid Base (HSAB) concept, symbiosis in hardening or softening a centre - levelling effect - acid-base strength verses HSAB principle.

Non-aqueous solvents: Classification of protic and aprotic solvents. Self ionization and leveling effect. Reactions in non-aqueous solvents - acid-base reactions, complex formation solvolysis, solvation - reactions in liquid ammonia and liquid SO_2. Use of ionic liquids in synthesis.

Unit – III: SOLID STATE CHEMISTRY

Description of crystal structures: calcite, zinc blende, wurtzite, rutile, fluorite, antifluorite, CsCl, CdI_2, K_2NiF_4 - spinels and perovskite. Crystal defects in solids - line and plane defects - Point defects - Schottky and Frenkel defects - Non-stoichiometric defects - Colour centres - Solid electrolytes and their applications.

Band theory - optical and electrical properties of semiconductors. Super conductivity - high temperature super conductors, properties and applications - BCS theory - Cooper electrons - Meissener effect and levitation.

Unit – IV: LANTHANIDES AND ACTINIDES

Correlation of electronic structures, occurrence, extraction from ores and separation methods (Ion exchange and solvent extraction method) and properties of the elements - Chemistry of separation of Pu from U and fission products - Common and uncommon oxidation states - Comparison with transition elements - Lanthanide and actinide contractions – magnetic characteristics of lanthanides and actinides - Similarities between actinides and lanthanides - Use of lanthanide complexes as shift reagents.

UNIT –V: NUCLEAR CHEMISTRY

Atomic nuclei : Nuclear shell structure – nuclear reactions : types, Q-value, threshold energy, cross sections and excitation functions. Direct nuclear reactions – transmutation reactions: stripping and pick-up – high energy reactions : neutron evaporation and spallation – heavy ion reactions – photonuclear reactions. Nuclear fusion and stellar energy – nuclear fission : mass and charge distribution of fission products – fission energy – fission neutrons – theory of nuclear fission – spontaneous fission. Waste disposal and atomic power project in India.

Radio isotopes: Preparation - Analytical applications: radio chromatography, neutron activation analysis, neutron absorptiometry and radiometric titrations.

REFERENCES

1. James E. Huheey, Ellen A. Keiter and Richard L. Keiter, *Inorganic chemistry: principles Structure and Reactivity*, 4th Ed., Harper College Publishers, 1993.
2. F. Albert Cotton, Geoffrey Wilkinson, Carlos A. Marilo and Manfred Bochman, *Advanced Inorganic Chemistry*, Wiley Interscience Publication, 6th Ed., 1999.
3. D.F. Shriver, P.W. Atkins and C.H. Langford, *Inorganic Chemistry*, ELBS, Oxford University Press, 1994.
4. N.N. Greenwood and Earnshaw, *Chemistry of the Elements*, Pergamon Press, 2nd Edition, 1997.
5. K.F. Purcell and J.C. Kotz, *Advanced Inorganic Chemistry*, Saunders Golden Publishers.
6. B.E. Douglas, D.H. McDaniel and J.J. Alexander, Concepts and Models of Inorganic Chemistry, John Wiley and Sons Ltd. 2nd Ed., 1983.
7. J.D. Lee, *Concise Inorganic Chemistry*, ELBS, 2006.
8. A. R. West, *Solid State Chemistry and its Application*, John Wiley & Sons, (Asia), 1998.

9. T. Kutty, J. Tareen, *Fundamentals of Crystal Chemistry*, University Press, 1st Ed., 2001.
10. L.V. Azaroff, *Introduction to Solids*, Tata McGraw Hill Publishing Ltd., India, 1989.
11. C. Kittel, *Introduction to Solid State Physics*, Wiley Eastern Ltd., 5th Ed., 1993.
12. H.V. Keer, *Principles of the Solid State*, Wiley Eastern Ltd., 1993.
13. D.K. Chakrabarthy, *Solid State Chemistry*, New Age International.
14. A.F. Wells, *Structural Inorganic Chemistry*, Oxford Science Publication, London, 1979.
15. B. Sahoo, N. C. Nayak, A. Samantaray, P.K. Pujapanda, *Inorganic Chemistry*, PHI Learning, New Delhi, 2012.
16. Samuel Glasstone, *Source Book of Atomic Energy*, East West Pvt.Ltd., 1969.
17. H.J. Arnikar, *Essentials of Nuclear Chemistry*, Wiley Eastern Ltd., 4th Edition ,2000.
18. G. Friedlander, J.W. Kennedy, E.S. Macies and Julian Malcolm, *Nuclear and Radiation Chemistry*, A. Wiley Interscience publication, 1981.

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PHYSICAL CHEMISTRY - I

UNIT-I Thermodynamics

Concepts of partial molar properties – partial molar free energy, chemical potential, partial molar volume and its significance. Gibbs-Duhem equation, Gibbs-DuhemMargulus equation. Determination of partial molar volume: Graphical method, intercept method and apparent molar volume method. Concept of fugacity; Determination of fugacity by graphical method and compressibility factor method. Concept of Activity and activity coefficient. Determination of activity and activity coefficients for non-electrolytes.

UNIT-II Phase Rule

Phase rule and Lever rule-Derivation of phase rule from the concept of chemical potential. Plots for a mixture of three liquids consisting of one, two and three pairs of partially miscible liquids.

Thermodynamics of irreversible processes

Thermodynamics of irreversible processes with simple examples. Entropy production-rate of entropy production, entropy production in chemical reactions. Onsager reciprocal relations- validity and verification. Thermoelectric phenomena- Electro kinetic and thermo mechanical effects. Application of irreversible thermodynamics to biological and non-linear systems.

UNIT-III Quantum Chemistry - I

Inadequacy of classical mechanics – black body radiation – Planck's quantum concept – photoelectric effect – Bohr's theory of hydrogen atom – hydrogen spectra – wave-particle dualism – uncertainty principle – decline of old quantum theory. Schrödinger equation – postulates of quantum mechanics – operator algebra: linear operator, Hermitian operators, eigenfunctions and eigenvalues, angular momentum operator – commutation relations and related theorems – orthogonality and normalization.

UNIT IV Statistical Thermodynamics

Thermodynamic probability – probability theorems – relation between entropy and probability (Boltzmann-Planck equation), ensembles, phase space, Ergodic hypothesis, microstates and macrostates, Maxwell-Boltzmann distribution law – partition functions – translational, rotational, vibrational and electronic partition functions. Relationship between partition functions and thermodynamic properties – calculation of equilibrium constants from partition functions – heat capacities of monatomic crystals – Einstein theory and Debye theory. Quantum statistics – Bose-Einstein (B.E.) and Fermi-Dirac

(F.D.) distribution equations – comparison of B.E. and F.D. statistics with Boltzmann statistics . Concept of negative Kelvin temperature.

UNIT-V MOLECULAR SPECTROSCOPY (Introduction and Rotational Spectroscopy)

Electromagnetic radiation: quantization of energy; rotational, vibrational, and electronic energy levels and transitions in molecules; regions and representation of spectra. Width of spectral lines-collision broadening, Doppler broadening, Heisenberg uncertainty principle. Intensity of spectral lines-selection rules and transition probability, transition moment integral. Diatomic molecules as rigid rotors: rotational energy levels, intensity of spectral lines, selection rules, effect of isotopic substitution. Diatomic molecules as non-rigid rotors: rotational transitions. Rotational spectra of linear and symmetric top polyatomic molecules.

REFERENCES

1. P. W. Atkins Physical Chemistry, 6th Edtion Oxford, 1998.
2. Y. V. C. Rao, An Introduction to Thermodynamics, Wiley Eastern, 1993.
3. Physical Chemistry, R.S.Berry, S.A.Rice and J.Ross, Oxford, 2001.
4. M. Ladd, Introduction to Physical Chemistry, Cambridge, 1998.
5. D. A. McQuarrie and J. D. Simon, Physical Chemistry, A molecular Approach, Viva, 1998.
6. F. W. Sears & G. L. Salinger, Thermodynamics, Kinetic Theory & Statistical Thermodynamics, Narosa, 1986.
7. D.A. McQurrie and J.D. Simon, Physical Chemistry, A Molecular Approach, Viva Books Pvt. Ltd., New Delhi, 1999.
8. S.H. Maron and J.B. Lando, Fundamentals of Physical chemistry, MacMillan Publishers, New York, 1974.
9. I. N. Levine: Quantum Chemistry, Prentice Hall India, 1994.
10. S. N. Datta: Lecture on Chemical bonding and quantum chemistry, 1998.
11. A. K. Chandra, Introductory Quantum Chemistry; 4th Ed., Tata McGraw Hill, Noida, 1994.
12. D. A. Mcquarrie, Quantum Chemistry; University Science Books, Sausalito, 2008.
13. I. N. Levine, Quantum Chemistry; 5th Ed., Prentice Hall, New Jersey, 2000.

14. R. K. Prasad, Quantum Chemistry; 4th Ed., New Age International Publishers, New Delhi, 2014.
15. K. Rajaram and J.C. Kuriacose, Thermodynamics For Students of Chemistry, 2nd Edition, S.L.N. Chand and Co, Jalandhar, 1986.
16. J. Rajaram and J. C. Kuriacose, Thermodynamics for Students of Chemistry - Classical, Statistical and Irreversible; Pearson Education, New Delhi, 2013.
17. I.M. Klotz and R.M. Rosenberg, Chemical thermodynamics, 6th edition, W.A.Benjamin Publishers, California, 1972.
18. M.C. Gupta, Statistical Thermodynamics, New Age International, Pvt., Ltd., New Delhi, 1995.
19. D.A. McQurrie and J.D. Simon, Physical Chemistry , A Molecular Approach, Viva Books Pvt. Ltd., New Delhi, 1999.
20. R.P. Rastogi and R.R. Misra, Classical Thermodynamics, Vikas Publishing, Pvt., Ltd., New Delhi, 1990.
21. Horia Metiu, Physical Chemistry, Thermodynamics; Taylor and Francis, Singapore, 2006.
22. C. N. Banwell, Fundamentals of Molecular Spectroscopy; 4th Ed., McGraw Hill Education, Noida, 1994.
23. G. M. Barrow, Introduction to Molecular Spectroscopy; McGraw Hill, New York, 1964.

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ADVANCED TOPICS IN CHEMISTRY – I

(Semester - I)

Unit – I : Green Chemistry

Need of green Chemistry – Anastas twelve principles of green Chemistry – Concept of atom economy – Green Reactions – Microwave assisted reactions – Superiority of microwave exposure over thermal reactions – Functional groups – Transportation – Condensation reactions – Oxidation and reduction reactions.

Unit – I : Nano Chemistry

Definition and terminology of Nano particles and Nano structural materials – Synthesis of Nano particles by Physical approaches (Laser ablation, evaporation and sputtering) and Chemical approaches (reduction of metal ions by Citrate and borohydride, Polyol synthesis) green synthesis – Optical and electronic properties of Nano materials.

Unit – III : Applied Electro Chemistry

Principles of Corrosion – Definition – Cost of Corrosion – Electro chemical principles of Corrosion – Corrosion monitoring methods - Coupan (weight loss) – electrical resistance – gasometric – Potentiodynamic polarisation – impedance – hydrogen permeation – Corrosion inhibition – definition – Classification of inhibitors based on electrode process – mechanism of inhibitor action in acidic medium.

Unit – IV : Analytical Chemistry

Principle and Techniques of GC – MS, HPLC, Cyclic voltammetry, Coulometry and Amprometry.

Theoretical and practical aspects of Colorimetry analysis - Flame emission and Atomic absorption spectroscopy - Advantages of atomic absorption spectrometry over flame photometry.

Unit – V : Industrial Chemistry

Nuclear fuels for various types of Nuclear reactors – Hydrogen as fuel in the future, Hydrogen storage materials – Solar energy – fuel from Sun light – Splitting of water – Hydrogen from Sun light – Hydrogen economy – Fuel cells – batteries – Photovoltaics – Stealing the Sun.

REFERENCES

1. Green chemistry – Environmentally benign reactions – V.K. Ahluwalia. Ane books india (publisher). (2006)
2. Green chemistry – Designing Chemistry for the environment – edited by Paul T. Anastas & Tracy C. Williamson. Second edition. (1998)
3. Green chemistry – Environment friendly alternatives – edited by rashmi sanghi & M.M. Srivastava, Narora Publishing House, (2003)
4. Kenneth J. Klabunde, Nanoscale materials in chemistry, John Wiley and sons,Inc.Publication, 2001.
5. K.Klabunde and G.Sergeev, Nano chemistry, 2006.
6. Guozhong Cao, *Nanostructures and Nanomaterials: Synthesis, Properties and Applications*, Imperial College Press, 2004.
7. P.M. Ajayan, L.S. Schadler, P.V. Braun, *Nano composite Science and Technology*, Wiley-VCH, 2003.
8. T. Pradeep, *NANO: The Essentials - Understanding Nanoscience and Nanotechnology,* Tata McGraw-Hill Publishing Company Limited, New Delhi, 2007.
9. C. Brechignac, P. Houdy, M. Lahmani, Nanomaterials and Nano chemistry, Springer 2006.
10. An introduction to metallic corrosion and its prevention by Raj Narayanan.
11. Vogel's Textbook of Quantitative chemical Analysis by G.H.Jeffery, J. Bassett, J.Mendham, and R.C. Denney, Longman Scientific & Technical, 5th edition, 1989.
12. Electro analytical chemistry – Basil H. Vassons and Galen W.Ewing, Wiley Interscience publication 1983.
13. Chemistry Experiments for instrumental methods – Donald T. Sawyer, William R. Heineman, Janice M. Beebe, John Wiley & Sons, 1984.
14. D.A. Skoog and D.M.West – fundamentals of Analytical Chemistry
15. D.A. Skoog – Instrumental Methods of Analysis
16. Skoog, West, Holler and Crouch – Analytical Chemistry – An Introduction
17. Energy resources and the environment, V.K. Prabhakar, 2001.
18. Fundamental Concepts of Applied chemistry, Jayashree Ghosh, S.Chand, 2005

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ORGANIC CHEMISTRY – I

A. Separation of Organic mixture:

(i) Separation of two component mixture and determination of their physical Constants.

(ii) Separation and analysis of at least **six** two component mixture. The students are expected to determine the physical constants for both the components as well as their Derivatives.

(iii) Analysis may be performed in micro (or) macro scale depending upon the Conditions of the laboratory

B. For Class Work Only:

(1) Separation of Caffeine from Tea / Coffee.

(2) Separation of green, blue, red inks by TLC method

REFERENCES:

1.F. C. Mann and B. C. Saunders, Practical organic chemistry, Fourth edition, ELBS, 1970.

2. A.I. Vogel, A Text book of Practical organic chemistry.

3. A.I. Vogel, A Text book of Quantitative Organic Analysis, 1989.

4. Raj K. Bansal, Laboratory Manual of Organic Chemistry, Second Edition, Wiley Eastern Ltd., 1990.

5. Moore, Dalrympk and Rodig, Experimental methods in organic chemistry, 3rd edition, Saunders College publishing, The Oxford Press, 1982.

6. Bassett et.al, A Text Book of Quantitative Inorganic Analysis, ELBS, 1986

7. Roberts, Gilbert, Reidwald-Wingrove. An Introduction to Experimental Organic Chemistry, 1969.

INORGANIC CHEMISTRY - I

1. Qualitative analysis of inorganic mixture containing two familiar and two less familiar cations Pb, Cu, Bi, Cd, Sb, Zn, Co, Ni, Mn, Ca, Ba, Sr, W, Tl, Te, Se, Mo, Ce, Th, Zr, V, U, Ti and Li.

REFERENCES:

1. G. Svehla, *Vogel's qualitative inorganic analysis*, 7th Edition, Pearson Education India, 2008.
2. V. Ramanujan, *Inorganic Semi-micro Qualitative Analysis*, 3rd Edition., National Publishing Company, Chennai, 1990.

PHYSICAL CHEMISTRY -I

I. Conductometry

Conductometric Titrations

a. Estimation of HCl and AcOH in a mixture

b. Estimation of NH_4Cl and HCl in a mixture

c. Conductometry- solubility product of sparingly soluble silver salts.

II. Thermometry

a. Determination of Solution enthalpy of

i. oxalic acid-water

ii. ammonium oxalate-water

iii. Potassium dichromate-water

III. Kinetics -Acid hydrolysis of ester –comparison of strength of acids.

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ORGANIC CHEMISTRY – II

Unit – I: ULTRAVIOLET, INFRA – RED SPECTROSCOPY, ORD AND CD

UV: The absorption laws – Types of electronic transitions – effect of solvents and Hydrogen bonding on λ_{max} values. – Woodward – Fieser rules to calculate λ_{max} values of conjugated dienes and α,β - unsaturated ketones.

IR: Characteristic IR absorptions of different functional groups – factors influencing absorption of carbonyl and hydroxyl groups – electronic effect and effect of hydrogen bonding, Fermi resonance and Finger print region.

ORD and CD: Optical rotatory dispersion (ORD): Octant rule – alpha - halo ketone rule and their Applications-Circular Dichroism.

Unit-II : Aromatic nucleophilic substitution Reaction and Addition to carbon-carbon multiple bonds and carbon - oxygen double bond.

Aromatic nucleophilic substitution reaction : Unimolecular, Bimolecular and Benzyne mechanisms - Reactivity, effect of substrate, leaving group and attacking nucleophile-typical reaction as oxygen and sulphur as nucleophile - Bucherer and Rosenmund reaction- Smiles rearrangement.

Catalytic hydrogenation - Birch reduction - Dieckmann condensation - Mannich reaction - Wittig reaction - Sharpless asymmetric epoxidation - addition of hydrogen halides to carbon - carbon double bond - addition of boranes, Michael addition (1,2 and 1,4)

Addition of dialkyl groups to triple bonds. Addition of hydrides – $LiAlH_4$ and $NaBH_4$.

Unit-III : Reactive intermediates and rearrangements

Carbenes: Generation, stability, structure, and reactivity of carbenes-Wolff rearrangement of acyl carbenes and its synthetic applications.

Nitrenes: Generation, stability, reaction of nitrenes- Mechanism of rearranegements through Nitrene intermediate: Schmidt, Hoffmann, Beckmann rearrangements.

Carbanion: Generation, Structure, Stability and reaction of carbanion- Mechanism of rearrangements involving carbanion as intermediate: Steven, Sommelet- Hauser and Favorski rearrangements.

Aryne: Generation, Structure, Stability, reactions and trapping of aryne- cine substitution.

Unit – IV: ALKALOIDS AND ANTIBIOTICS

Alkaloids: Degradation studies – HEM , Emde and Von – Braun – Structural elucidation and synthesis of Quinine, Morphine, Cocaine, Lysergic acid and Atropine. Synthesis of Reserpine and PaPaverine – Biosynthesis of tyrosine, tryptophan.

Antibioties: Structure and synthesis of penicillin, cephalosporin – C, chloramphenicol and Streptomycin.

Unit – V: VITAMINS AND TERPENOIDS

Vitamins: Structural elucidation, synthesis of vitamins – A_1, B_1 and C - synthesis of vitamins B_2, B_6 ,D and E.

Terpenoids: Structural elucidation, synthesis of α-Pinene, Camphor, α-Cadinene, Zingiberene and squalene - synthesis of α-Santonin and Gibberelic acid. Bio synthesis of mono and di terpenoids.

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INORGANIC CHEMISTRY – II

Unit – I: BONDING IN COORDINATION COMPOUNDS

CFT and LFT: Basic features of CFT and LFT. Splitting of the metal *d* - orbitals in T_d, O_h and square planar symmetries - Jahn-Teller distortion in O_h and T_d complexes - Static and dynamic J.T distortions. Application of CFT: Magnetic Properties - Spectral properties - Spectrochemical series - Kinetic properties. **CFSE**: Calculation of CFSE in O_h and T_d complexes - Contribution of CFSC to M-L bond energy, M-L step-wise stability constants, Hydration energies of M^{n+} - Lattice energy - Preferred stereochemistry - Site selection of the cations in spinel and inverse spinel and OSSE.

MOT: □-bonding and □-bonding in O_h complexes - Effect of □-bonding on the value of Δ (10 Dq). MOT for square planar (16 e^-) and T_d (18 e^-) complexes. Application of MOT to explain spectrochemical series.

Unit – II: STABILITY AND REACTIONS OF COORDINATION COMPOUNDS

Stability of complexes - Thermodynamic and kinetic stabilities - stepwise and overall stability constants of the metal complexes - factors affecting stability - chelate and template effects - Determination of stability constants and composition of the complexes: Bjerrum's method, potentiometric determination, spectrophotometric method, ion-exchange method, polarographic method, continuous variation (Job's) method.

Reactions of complexes: Lability – inertness - Ligand substitution reactions of square planar complexes - Trans effect and trans influence - Theories of trans effect - use of trans effect in synthesis of complexes - Substitution reactions in octahedral complexes - acid hydrolysis, base hydrolysis and anation reactions - Electron transfer reactions - Inner sphere and outer sphere processes - complementary and non-complementary reactions.

Unit – III: ELECTRONIC AND INFRARED SPECTROSCOPY

Electronic spectroscopy: Selection rules for electronic transitions - Line width and shape - Hole formalism - LS Coupling and jj coupling schemes and determination of term symbols – Splitting of terms – Orgel and Tanabe Sugano diagrams – Electronic spectra of I^{st} row transition metal complexes - Evaluation of 10 Dq, β and B' for octahedral d^2 and d^8 systems. Charge transfer spectra - types - Effect of tetragonal distortion and spin - orbit coupling on spectra. Electronic spectra of lanthanide and actinide complexes.

Infrared spectroscopy: Selection rules - calculation of force constants of IR vibrations. Changes in the IR spectra accompanying changes in symmetry upon coordination,

differentiation of coordinated water and lattice water. Application in the study of isomerism - linkage and geometrical isomerism.

Unit – IV: MAGNETIC PROPERTIES OF METAL COMPLEXES

Magnetic properties: Types of magnetism – magnetically diluted and concentrated substances - temperature dependence of magnetic susceptibility of different types of magnetic materials. Paramagnetism and thermal energy – quenching of orbital contribution to magnetic moment by CF – orbital contribution from the excited state through spin – orbit coupling. Mixing of the excited terms with the ground state term through second order Zeeman effect. Magnetic properties of Ist row Transition Metal complexes: comparison of the magnetic properties of O_h, T_d and square planar Fe(II), Co(II), Ni(II) and Cu(II) complexes. Magnetic properties of complexes with A, E and T ground states – magnetic properties of II and III Transition Metal complexes. Application of magnetic moment – oxidation state, structure determination.

Unit V: INORGANIC POLYMERS AND METAL CLUSTERS

Inorganic polymers: General characteristics, degree of polymerization, catenation and heterocatenation - silicates - classification and structure - property correlation - Polyacids - structures of isopoly and heteropoly anions - Polymeric sulphur nitride - Borazines - Phosphazenes - Phosphazene polymers - Boranes and carboranes - Structure and bonding in boranes - Molecular frame work of hydrides of boron skeletal electron pair counting and Wade's rule.

Structure and Bonding of Metal clusters: Dinuclear Clusters: Cu(II) carboxylate, Chromium(II) acetate, and $[M_2Cl_8]^{4-}$ (M = Mo and Re) - Trinuclear Clusters: $[M_3(CO)_{12}]$ (M = Fe, Ru, Os) - Teteranuclear Clusters: $[M_4(CO)_{12}]$ (M = Co, Rh, Ir) - Hexanuclear Clusters: $[Nb_6Cl_{12}]^{2+}$, $[Os_6(CO)_{18}]^{2-}$ and $[Mo_6Cl_8]Cl_4$ – Capping rule – poly atomic Zintl ions.

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PHYSICAL CHEMISTRY-II

UNIT-I Quantum Mechanics I

Setting up and solving Schrodinger wave equation and arriving solution for Particle in 1D box, Particle in a ring, 3D Rectangular box, 3D cubical box, the harmonic oscillator, the rigid rotator, and the hydrogen atom. Degeneracy and degenerate wave functions, Quantum mechanical tunnelling. Shapes and nodal properties of orbitals – Space quantisation.

UNIT-II Quantum Mechanics II

Electron spin, Anti symmetry and Pauli's exclusion principle – Slater determinantal wave functions. Approximation methods-The Variation theorem; Linear Variation Principle, Perturbation theory. Applications of Variation Method and Perturbation Theory to the Helium atom. Born-Oppenheimer approximation, VB and MO theory, for H_2^+ molecular ion and H_2 molecule problems, Hartree Fock Self consistent field method for Helium atom. Hückel Molecular Orbital Theory and its application to ethylene, butadiene and benzene.

UNIT - III Electrochemistry - I

Arrhenius theory, Derivation and Validity of Debye-Huckel Theory, Debye-Huckel-Onsager conductance equation, Deviations from Onsager equation. Debye-Falkenhagen effect and Wien effect. Activity of electrolytes, Determination of activity and activity coefficient using Debye-Huckel theory. Debye-Huckel Limiting law, Debye-Huckel-Bronsted equation. Definition and Determination of Transference number. Abnormal transference number. Electrified interfaces-Lipmann equation derivation. Electrical Double Layer, Structure of electrical double layer Helmholtz-Perrin, Guoy-Chapmann and Stern models of electrical double layer- Applications and limitations.Kinetics of electrode reaction-Butler-Volmer equation, Tafel equation.

UNIT – IV Electrochemistry - II

The Poisson-Boltzmann equation and its solutions. Electrocapillary phenomena-Zeta potential and its applications. Electrophoresis and related phenomena- The electro viscous effect, sedimentation Potential, Electrophoresis. Effect of electrical double layer-Electrocapillarity, Double layer capactance Corrosion and passivation of metals – Pourbaix diagram – Evans diagram – fuel cells – primary and secondary fuel cells – electrodeposition – principle and applications. `

Principles and applications of Polarography–Instrumentation, Interpretation of current voltage curves, tests for reversibility, determination of 'n' values (usefulness of Illkovic equation), polarographic maxima, current time curves, Modern developments, Oscillographic polarography, AC polarography – Cyclic Voltammetry, advantages over

polarographic techniques – Test of reversibility of electron transfer reactions – Chronopotentiometry – apparatus used, advantages over polarography – controlled potential coulometry.

UNIT-V Photochemistry and Radiation Chemistry:

Photochemistry: Introduction. Laws of photochemistry, Quantum yield and its determination. Physical properties of electronically excited molecules: excited state dipole moment, acidity constant and redox Potentials. Photophysical processes in electronically excited molecules: Jablonski diagram – Intersystem system crossing internal conversion, fluorescence, phosphorescence and other deactivation processes. Photosensitisation chemiluminescence and bioluminescence - Stern-Volmer equation and its applications – mechanisms of quenching – electron transfer – energy transfer– experimental techniques in photochemistry –chemical actinometers.

Radiation Chemistry

Differences between radiation chemistry and photochemistry – sources of high energy radiation and interaction with matter – radiolysis of water, solvated electrons – Definition of G-value- Dosimetry and dosimeters in radiation chemistry- application of radiation chemistry.

REFERENCES

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ADVANCED TOPICS IN CHEMISTRY - II

UNIT I: Forensic and computer applications in Chemistry

Forensic science: Finger printing, forensic serology, hair and fiber analysis, explosive residue, glass comparisons, drug analysis, bullet and cartridge analysis.

Introduction of computer: molecular modelling simulation and animation. World Wide Web and Chemical Databases on internet, Techniques of information search, Chemsketch and Chemdraw.

UNIT –II: Applications of nanomaterials

Applications of nanomaterials: Applications in catalysis - Organic transformations and fuel cells - Environmental application - Water purification, air purification - Nano particles as sensors - **Nanocomposites** - Polymer-based Nanocomposites - Polyamide/clay Nano composites – Synthesis, characterization and properties of Nylon 6 - clay hybrid - Polystyrene/clay Nanocomposites – syndiotactic polystyrene/clay Nano composites, properties. Poly(butylenes terephthalate) (PBT) based nano composites. Bio-Nanocomposites- properties and applications.

UNIT III : Industrial polymer

Important industrial polymers – synthesis and applications of poly tetra flouro ethylene (TEFLON), ion exchange resins. Synthetic route, structure and applications of engineering plastics - Acrylonitrile butadiene styrene (ABS), Poly amides (PA), Poly ethylene terephthalate (PET), Polyphenylene Oxide (PPO), Poly sulphone (PSU), Poly ether ether ketone (PEEK), Poly amides, Poly phenylene sulphide(PPS).

UNIT IV : Medicinal chemistry

Drug Discovery, Design and development: Identification of diseases and corresponding targets, Bio assays and leads. Streochemistry and solubility issues in drug design.

Structure Activity Relationship (SARS): Changing size and shape- introduction of new substituents. Quantitative structure activity relationships (QSARS), Lipophilicity – electronic and steric effects- Hansch Analysis – Top liss decision tree. Chemical and process development of drugs.

Preclinical trials: Pharmacology, Toxicology, metabolism and stability studies-formulation.

Clinical trials: Phase I- IV Studies- ethical issues. Patent protection.Regulation.

UNIT V: Bio-organic chemistry:

Characteristics of enzymes- mechanism of enzyme action- chymotrypsin- antibodies of enzymes- biological energy- ATP, NADH, NADPH, $FADH_2$ as electron carriers- Co – enzyme A as universal carriers of acyl groups- glycolysis- citric acid cycle- urea cycle – Link between glycolysis and citric acid cycle- lipid metabolism- biological oxidation- bio metic chemistry cyclodextrins- Calixarenes as enzyme model.

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MSU / 2017-18 / PG-Colleges / M.Sc. (Chemistry) / Semester-II / Ppr. No.11 / Practical - 4

ORGANIC CHEMISTRY PRACTICAL – II

A.Estimation

(i) Estimation of phenol

(ii) Estimation of aniline

(iii) Estimation of ascorbic acid

B.List of single stage preparations:

(i) Preparation of 1,2,3,4 –Tetrahydro carbazole from cyclohexanone.
(ii) Preparation of Resacetophenone from Resorcinol.
(iii) Preparation of p-benzoquinone from hydroquinone.
(iv) Preparation of Bis-2-Naphthol.
(v) Preparation of Di Benzylidene acetone.
(vi) Preparation of anthraquinone from anthracene
(vii) Preparation of benzophenone oxime from benzophenone
(viii) Preparation of Nerolin from β-Naphthol
(ix) Preparation of anthranilic acid from Phthalimide
(x) Preparation of Benzilic acid from Benzil

Note : Each student is expected to submit both Crude and recrystallized samples of the preparation during their regular practical for evaluation at the time of practical examinations.

C. For Class Work Only :

1. Download the following spectra from **internet** and give interpretation.

I. Differentiate the following pair by UV- spectra

(a) Trans stilbene and its cis isomer.

(b) Vinyl methyl ketone and acetone.

(c) Vinyl methyl ketone in two solvents such as n-Hexane and alcohol.

II. Differentiate the following pair by IR spectra

(a)para and ortho hydroxy benzoic acid.

(b) p-nitro and p-amino acetophenone.

(c) Maleic acid and fumaric acid.

(2) Separation of Caffeine from Tea / Coffee.

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INORGANIC CHEMISTRY PRACTICAL - II

A. Analysis of Mixture of Cations by Complexometric titrations

1. Estimation of Cu(II) by EDTA titration in the presence of either Pb(II) or Ba(II) (Sepearation of Pb(II) or Ba(II) by precipitation).
2. Estimation of Zn(II) by EDTA titration in the presence of either Pb(II) or Ba(II) (Sepearation of Pb(II) or Ba(II) by precipitation).
3. Estimation of Ca(II) and Pb(II) in a mixture by EDTA titration (Selective titration by control of pH).
4. Estimation of Cr(III) and Fe(III) in a mixture by EDTA titration (Kinetic masking).
5. Estimation of Mg(II) and Mn(II) in a mixture by EDTA titration (Demasking by F^-)
6. Estimation of Pb and Sn in Solder alloy by EDTA titration (Demasking by F^-).
7. Estimation of Ca(II) ion in an antacid or diet supplement pill by EDTA titration (Substitution titration).

B. Photocolorimetric Analysis of Cations (Course work only)

Estimation of Fe, Ni, Cr, Mn, Cu and NH_4^+. (Any four experiments)

REFERENCES:

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PHYSICAL CHEMISTRY PRACTICAL-II

I Conductometric experiments

(i) Estimation of K_2SO_4 using $BaCl_2$

(ii) Estimation of CH_3COOH and $CH_3COOONa$ in a Buffer solution.

(iii) Determination of Dissociation constant of a weak acid

II Distribution law

(i) Distribution of Iodine between two immiscible solvents & Study of the equilibrium constant of the reaction $KI + I_2 \rightarrow KI_3$

(ii) Distribution of benzoic acid between two immiscible solvents

III Thermometry

Determination of Solution enthalpy of

(i) Benzoic acid-water

(ii) Napthalene-Tolune

IV Kinetics – Study of Kinetics of KI - $K_2S_2O_8$ system.

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Table - 5 : Common Course Structure for PG Degree Programme in Science - M.Sc. (Computer Science)

(with effect from the academic year 2017-2018 onwards)

Sem. (1)	Sub. No. (2)	Subject Status (3)	Subject Title (4)	Contact Hrs./ Week (5)	Credits (6)
I	1	Core - 1	Design and Analysis of Algorithms	5	4
	2	Core - 2	Advanced Java Programming	5	4
	3	Core - 3	Mathematical Foundation for Computer Science	4	4
	4	Core - 4	Object Oriented Systems Development	4	4
	5	Core - 5	Distributed Computing	4	4
	6	Core - 6 Practical - 1	Algorithm Lab Using C++	4	2
	7	Core - 7 Practical - 2	Advanced Java Lab	4	2
			Subtotal	30	24
II	8	Core - 8	Web Application Development	5	4
	9	Core - 9	Open Source Technology	5	4
	10	Core - 10	Advanced Data Base Management System	4	4
	11	Core - 11	Security in Computing	4	4
	12	Elective - 1	Data Mining, Multimedia Systems, Cloud Computing	4	3
	13	Core - 12 Practical - 3	Web Application Lab	4	2
	14	Core - 13 Practical - 4	Open Source Lab	4	2
			Subtotal	30	23

Sem. (1)	Sub. No. (2)	Subject Status (3)	Subject Title (4)	Contact Hrs./ Week (5)	Credits (6)
III	15	Core - 14	Digital Image Processing	4	4
	16	Core - 15	Soft Computing	4	4
	17	Core - 16	Software Testing	4	4
	18	Core - 17	Advanced Computer Networks	4	4
	19	Core - 18	Research Methodology	4	4
	20	Elective - 2	Principles of Compiler Design, Big Data Analytics, Mobile Computing	4	3
	21	Core - 19 Practical - 5	Image Processing Using MATLAB	4	2
	22	Core - 20	Mini Project	2+2*	2
			Subtotal	30	27
IV	23	Core - 21	Major Project	30+2*	16
			Subtotal	30	16
			Total	120	90

*** Extra hours for Project**

For the Project, flexible credits are b/w 5 - 8 & Hours per week are b/w 10 - 16.

Total number of credits ≥ 90 : 90

Total number of Core Courses : 21 (14 T + 5 P + 2 Prj.)

Total number of Elective Courses : 2

Total hours : 120

I SEMESTER

Core – 1
DESIGN AND ANALYSIS OF ALGORITHMS

Unit - I

Introduction : Algorithm-Specification-Performance Analysis. Elementary Data Structure : Stacks And Queues- Trees-Dictionaries-Priority Queues.

Unit - II

Divide And Conquer : General Method-Binary Search- Finding the Maximum And Minimum-Quicksort-Strassen's Matrix Multiplication.

Unit - III

The Greedy Method : General Method-Knapsack Problem-Job Sequencing with Deadlines-Minimum Cost Spanning Tree-Single Source Shortest Path.

Dynamic Programming : General Method-Multistage Graph-All Pairs Shortest Path-Binary Search Tree-0/1 Knapsack Travelling Salesperson Problem.

Unit - IV

Basic Traversal And Search Techniques : Techniques for Binary Trees-Graphs-Connected Components and Spanning Trees-Biconnected Components.

Backtracking : General Method-8-Queen. Graph Coloring : Hamiltonian Cycle.

Unit - V

Branch and Bound : Method-0/1 Knapsack Problem.

NP-Hard And NP-Complete Problem-Basic Concepts-Cook's Theorem- Clique Decision Problem-Job Shop Scheduling.

Text Book

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, "Fundamentals of Computer Algorithms", 2nd Edition,Universities Press(India) Private Ltd., 2008

Reference Books

1. Aho, Hoporoft and Ullman, "The Design and Analysis of Computer Algorithm", Pearson Education, Delhi, 2001.

2. Basu S.K., "Design Methods and Analysis of Algorithms", PHI, 2006.

3. M.A.Weiss, "Data Structures and algorithm Analysis in C++", Pearson Education, Asia, 2013.

Core – 2
ADVANCED JAVA PROGRAMMING

Unit - I

Classes and Objects : Introduction-General form-Object creation-Constructor-Finalize()-Static member-Inner and Anonymous Inner classes; Inheritance and Polymorphism:-Introduction-Inheriting the variables in a class-Inheriting the methods in a class-Inheritance and Constructors-Abstract classes-Final classes-Interfaces and package-Exception Handling.

Unit - II

J2EE Multi-Tier Architecture : Distributive system-The Tier-J2EE Multi Tier Architecture-client-Tier Implementation-web tier Implementation-Enterprise Java Bean tier implementation-Enterprise information system tier implementation; J2EE Best practices:-Enterprise Application strategy-The Enterprise Application-Client Session management-Web Tier and Java Server Pages-Enterprise JavaBean Tier.

Unit - III

JDBC Objects : The concept of JDBC-JDBC drivers-JDBC packages-A brief overview of the JDBC process-database connection-Associating JDBC/ODBC bridge with the database statement objects-Result set-Transaction processing-Metadata; JDBC and Embedded SQL:-Tables-Indexing-Inserting into tables- Selecting data from tables-Joining tables-Calculating data-Grouping and ordering data-subqueries.

Unit - IV

Java Servlets : Java Servlets and Common Gateway Interface Programming-A Simple java Servlet-Anatomy of Java Servlet-Reading Data from a Client-Reading Http Request Headers-Sending Data to Client and Writing the Http Response Headers- Working with Cookies-Tracking Sessions; Java Server Pages:-JSP-JSP Tags Tomcat-Request String-User Sessions Cookies-Session objects.

Unit - V

Enterprise Java Bean:-Enterprise Java Beans-Deployment Descriptors-Session Java Bean-Entity Java Bean- Message Driven Bean-The JAR File; Java Interface Definition Language and CORBA:-The Concept of object RequestBrokerage- Java IDL and CORBA- The IDL Interface-The Client Side the Server Side-Running the Code.

Text Book

1. C.Muthu,"Programming with Java",SecondEdition,VNI, 2008.
2. Jim Keogh,"TheComplete Reference J2EE",TMH, 2004 (Reprint)

References

1. Herbert Schildt, "The Complete Reference Java", Seventh Edition, TMH, 2007.
2. Joseph O'Neil, "JavaBeans Programming", TMH, 1998.

Core -3
MATHEMATICAL FOUNDATION FOR COMPUTER SCIENCE

Unit - I

Mathematical Logic: Introduction-Statements and Notation-Connectives-Normal Forms-The Theory of Inference for the Statement calculus-The Predicate Calculus-Inference theory of the Predicate Calculus

Unit - II

Set Theory: Introduction- Basic concepts of Set theory-Relations-Functions.

Unit - III

Matrices: Rank of Matrix, Solving System of Equations, Eigen values and Eigen Vectors-Inverse of matrix- Cayley Hamilton Theorem.

Unit - IV

Graph Theory: Introduction-Graphs-Application of Graphs-Finite and Infinite Graphs-Incidence and Degree-Isolated Vertex, Pendant Vertex and Null Graph

Paths and Circuits: Isomorphism- Subgraphs - Walks, Paths and Circuits-Connected and Disconnected graphs-Components-Euler Graphs-Operation on Graphs-Hamiltonian paths and circuits-Travelling Salesman Problem

Unit - V

Trees and Fundamental Circuits: Properties of Trees-Pendant vertices in trees-Distance and centers in a Tree-Rooted and Binary Tree-Spanning Tree-Fundamental circuits—Spanning Tree in the Weighted Graph.

Matrix Representation of Graphs: Incidence Matrix-Submatrices-Circuit Matrix-Path matrix-Adjacency Matrix

References

1. J.P. Trembley and R.Manokar, "Discrete Mathematical Structures with Applications to Computer Science",Tata McGraw Hill Publications, 2009.

2. Narasingh Deo, "Graph Theory With Applications To Engineering And Computer Science", Prentice-Hall of India Private Limited, 2007.

3. Kenneth H.Rosen, "Discrete Mathematics and its Applications", Tata McGraw Hill, 4th edition, 2002.

Core – 4
OBJECT ORIENTED SYSTEMS DEVELOPMENT

Unit - I

Overview of Object Oriented Systems Development : Introduction – Two orthogonal views- Development methodology- Object orientation.

Object basics: Introduction-Object Oriented Philosophy- Object – Attributes – Object respond to messages – Encapsulation – Inheritance – Polymorphism – Object relationship and associations. OOSD life cycle : Introduction – Software development process – OOSD Use case Driven Approach – Reusability.

Unit - II

Object Oriented Methodology – Rumbaugh etal's methodology- Booch methodology – Jacobson methodology – Pattern. Unified Modeling Language - Introduction – static dynamic model – UML diagrams – UML class diagrams – Use case- UML dynamic modeling – packages and model organization.

Unit - III

Object Oriented Analysis : Introduction – Business Object Analysis, Use case driven object oriented analysis – Effective documentation. Classification : Introduction – Classification theory – Naming classes. Identifying object relationships, attributes, methods : Association – Super sub class relationship – Aggregation.

Unit - IV

OOD process and design axioms : Introduction – OOD process- Design axioms – Corollaries – Design pattern. Designing classes : Introduction – Designing classes process – Class visibility – Refining attributes – Designing methods and protocols – Packages and managing classes. Access layer: Introduction - Object Store and persistence – DBMS – Logical and physical Database Management System – Distributed Databases and Client Server Computing – Next generation of client Server Computing – Multidata base System – Design Access layer classes

Unit - V

Software Quality Assurance : Introduction – Quality Assurance Tests – Object Orientation on Testing – Testing strategies – Test Cases- Test Plan.

System Usability and Measuring User satisfaction : Introduction – Usability Testing.

Text Book

1. Ali Bahrami, "Object Oriented Systems Development using UML", Tata McGraw-Hill Education Private Limited, 2008

References

1. Brahma Dathan, Sarnath Ramnath, "Object Oriented Analysis, Design and Implementation", Universities Press, 2010.

2. Mahesh P.Matha, "Object-Oriented Analysis and Design Using UML", PHI Learning Private Limited, 2012.

Core - 5
DISTRIBUTED COMPUTING

Unit - I

Fundamentals: What is Distributed Operating System – Evolution of Distributed Computing System – Distributed Computing System Models – Why are Distributed Computing Systems gaining popularity – What is a Distributed Computing System – Issues in Designing Distributed Computing System – Introduction to Distributed Computing Environment.

Introduction to Computer Networks – Network types – LAN –WAN – Communication protocols – Internetworking – ATM Technology

Unit - II

Message Passing: Introduction Desirable features – Issues in PC Message Passing – Synchronization – Buffering – Multidatagram Messages – Encoding and Decoding – Process Addressing – Failure Handling – Group Communication

Unit - III

Remote Procedure Calls : RPC models – Transparency of RPC–Stub generation–RPC messages–Marshaling arguments and results–Exception Handling–Light weight RPC; Distributed Shared Memory: Introduction – General Architecture of DSM system – Design and Implementation Issues of DSM – Granularity – Structure of Shared Memory – Consistency Models – Replacement Strategy – Thrashing.

Unit - IV

Synchronization: Introduction – Clock Synchronization – Event Ordering – Mutual Exclusion – Deadlock – Election Algorithm–Process Management: Introduction-Process Migration– Threads.

Unit - V

Distributed File System: Introduction – Desirable features – File Models – File Accessing Models – File Sharing Semantics – File Caching Schemes – File Replication – Fault Tolerance – Atomic Transactions – Design Principles.

Text Book

1. Pradeep K Sinha, "Distributed Operating Systems – Concepts and Design", PHI, 2003

References

1.Andrew S Tanenbaum , "Distributed Operating Systems", First Edition, PHI.2002

2. Abraham Silberchalz Peter B. Galvin, G.Gagne, "Operating Systems Concepts", Seventh edition, Addision Wesley Publishing Co., 2010.

3.Pabitra Pal Choudhury, "Operating Systems : Principles and Design", PHI, 2009.

Core – 6

ALGORITHM LAB USING C++

Programs should include but not limited to:

1. Write a program that implements Stack
2. Write a program to implement Queue
3. Write a program that implements Priority Queue
4. Write a program that implements Binary Search
5. Write a program that implements Quick Sort
6. Write a program that implements Strassen's matrix multiplication
7. Write a program that implements Prim's Algorithm
8. Write a program that implements Kruskal's Algorithm
9. Write a program that implements All pair shortest path problem
10. Write a program that implements N-Queen Problem
11. Write a program that implements BFS
12. Write a program that implements DFS
13. Write a program that implements Travelling Salesperson Problem
14. Write a program that implements knapsack using greedy

Core – 7

ADVANCED JAVA LAB

Programs should include but not limited to:

1.Write a java code to demonstrate class with constructors

2.Write a java code to demonstrate Inheritance

3.Write a java code to demonstrate Interface

4.Write a java code to demonstrate packages

5.Write a java code to demonstrate Custom Exception

6.Write a java code to create a connection to access database from hard disk using domain server name and display a message SUCCESSFULLY CONNECTED, if the connection is created.

7.Write a java code to fetch the table information using JDBC.

8.Write a java code to update a particular record using JDBC.

9.Create a servlet and display a message using hyperlink .

10.Write a servlet code to change the Explorer background color

11.Write a HTML code to capture the user Input name and E-mail ID and display the information in the next form using JSP

12.Write a simple JSP code to create a form and validate a password

13.Write a java servlet to get information in the first form and display in second form

Core – 8
WEB APPLICATION DEVELOPMENT

Unit - I

ASP.NET Introduction :.NET Programming Framework, , The Common language runtime and .NET Class Library, Features of ASP.NET and Visual studio .NET.

.NET language : Data types - declaring variables - Scope and accessibility - Variable Operators & Operations - Type conversions - Object based manipulations - Conditional and Loop structures - Functions and subroutines.

Types, Objects and Namespaces : Class – object - constructor - Value types and Reference types. Advanced class programming : Inheritance – polymorphism – Interfaces - Exception handling - Multithreading. Understanding namespaces.

Unit - II

ASP.NET Applications **–** File types, Simple Application from start to finish. Code behind compilation - Global .asax application files, ASP.Net configuration.

Web Form fundamentals : Simple page applet- server controls - Deeper look in HTML controls - page classes

Web control classes : Auto postback and web control event- Generating Automatic greeting card.

Unit - III

Validation and Rich Controls : Calendar and Ad Rotator control - Validation Controls – Simple validation example – Regular expression concepts- Customer form validation.

State management : view state - custom cookies - Session state - Session state configuration - Application state.

Unit - IV

ASP.NET Intrinsic Objects **:** HTTP Request Object, HTTP Response Object, HTTP ServerUtility Object, ObjectContext Object

Data Access with ADO.NET **:** Overview of ADO.NET Objects - Characteristics of ADO.NET - ADO.NET object model.

ADO.NET data access : SQL basics – select, update, insert, delete statements. Accessing data - Creating a connection – Defining select statement - Using command with data reader - Updating data. Accessing disconnected data.

Unit - V

Comparing the template control : The Data list - The Data grid - The Repeater - Selecting Items - Editing Items - Paging with Data Grid - Sorting with Data grid.

Web Server and IIS manager, Web services Architecture : The Open Standards Plumbing - WSDL- SOAP- UDDI. Communicating with web service.

Text Book

1 Mathew Mac Donald, “ASP.NET Complete Reference”, TMH 2005.

References

1. Crouch Matt J, "ASP.NET and VB.NET Web Programming", Addison Wesley 2002.
2. J.Liberty, D.Hurwitz, "Programming ASP.NET", Third Edition, O'REILLY, 2006.

Core – 9
OPEN SOURCE TECHNOLOGY

Unit - I

Getting started – Introduction to UNIX, Linux GNU – Programming Linux.

Shell Programming – Basics – Pipes and Redirection – The Shell as a Programming Language – Shell syntax.

Working with files – Linux File Structure –Low level File Access – The Standard I/O Library.

Unit - II

Working with files – Formatted Input and Output – File and Directory Maintenance – Scanning Directories – Errors.

The Linux Environment – Program Arguments – Environment Variables – Time and Date – Temporary Files – User Information – Host Information.

Terminals- Reading from and writing to the terminal.

Unit - III

Why PHP & MySQL – What is PHP? – What is MySQL?

Server-side Web Scripting – Static HTML – Client-side Technologies – Server-Side Scripting

Syntax and Variables – Comments – Variables – Simple types – outputs.

Control and Functions – Boolean expressions – Branching – Looping – Terminating execution – Using functions – Defining your own function – Functions and variable scope.

Unit - IV

Passing information between Pages – GET Arguments – POST Arguments – Formatting Form Variables – PHP super global arrays.

String – Strings in PHP – String Functions.

Arrays and Array Functions – Creating Arrays – Retrieving Values – Multidimensional Arrays – Deleting from Arrays

Numbers – Numerical Types – Mathematical Operators – Simple Mathematical Functions.

Unit - V

PHP/MySQL Functions – Connecting to MySQL – Making MySQL Queries – Fetching Data Sets – Multiple Connections – Error Checking – Creating MySQL Databases with PHP – MySQL Functions.

Displaying Queries in Tables - HTML Tables and Database Tables – Creating the Sample Tables.

Building Forms from Queries – HTML Forms - Basic Form Submission to a Database – Self Submission – Editing Data with an HTML Form.

Textbooks

1) Neil Matthew and Richard Stones "Beginning Linux Programming", 4/e; New Delhi: Wiley-India, 2009.
2) Tim Converse and Joyce Park with Clark Morgon, "PHP 5 and MySQL Bible"; New Delhi: Wiley-India, 2008.

References

1. M.N.Rao, "Fundamentals of Open Source Software", PHI, 2015.
2. Kailash Vadera and Bhavyesh Gandhi, "Open Source Technology", Laxmi Publications, First Edition 2009.
3. Narain Gehani, "The Database Application Book Using the MYSQL Database System", University Press, 2012.

Core – 10
ADVANCED DATA BASE MANAGEMENT SYSTEM

Unit - I

Introduction to Relational Model : Structure of Relational Databases- Database Schema – Keys – Schema Diagrams – Relational Query Language – Relational Operations.

Formal Relational Query Languages : The Relational Algebra – The Tuple relational Calculus – The Domain Relational Calculus.

Unit - II

Database Design and the E-R Model : Overview – The Entity-Relationship model – Constraints – Removing Redundant Attributes in Entity Sets – Entity Relationship Diagrams- Reduction to relational schemas – Entity Relationship Design Issues – Extended E-R Features.

Relational Database Design : Features of good relational Design – Atomic Domains and First Normal Forms – Decomposition Using Functional Dependencies.

Unit - III

Indexing and Hashing : Basic Concepts – Ordered Indices – B^+ Tree Index Files – B^+ Tree Extensions – Multiple Key Access – Static Hashing – Dynamic Hashing – Comparison of Ordered Indexing and Hashing – Bitmap Indices .

Transactions : Transaction Concept – A simple Transaction model – Storage Structure – Transaction Atomicity and Durability – Transaction Isolation – Serializability.

Unit - IV

Concurrency Control : Lock based Protocols – Deadlock Handling – Multiple Granularity – Timestamp Based Protocols – Validation Based Protocols – Multiversion Schemes – Snapshot Isolation – Insert Operations, Delete Operations and Predicate Reads.

Recovery Systems : Failure Classification – Storage – Recovery and Atomicity – Recovery Algorithm – Buffer Management.

Unit - V

Database System Architecture : Centralized and Client Server Architectures – Server System Architectures – Parallel Systems – Distributed Systems.

Parallel Databases : Introduction – I/O parallelism – Interquery parallelism – Intraquery parallelism – Intraoperation parallelism – Interoperation parallelism – Query Optimization.

Distributed Databases : Homogeneous and Heterogeneous Databases – Distributed Data Storage – Distributed Transactions.

Textbook

1. Abraham Silberschatz, Henry F. Korth and S.Sudarshan, "Database System Concepts", Sixth Edition, McGrawHill International Edition, 2011.

References

1. Ramez Elmashree, Shamkant B.Navathe, "Fundamentals of Database Systems", Pearson Education, 2011.

2. C.J.Date, "Introduction to Database Systems", 8th Edition, Pearson Education, 2003.

3. Rajesh Narang, "Database Management Systems", 2nd Edition, PHI, 2012.

Core – 11
SECURITY IN COMPUTING

Unit – I

Cryptography : Terminology and Background – Substitution ciphers - The Caesar cipher, The Vernam cipher, Book cipher; Transposition ciphers.

DES – AES - Public key encryption - RSA encryption - Possible attacks on RSA-Uses of Encryption

Unit – II

Program Security : Secure programs – Fixing faults, Unexpected behavior, Types of flaws; Nonmalicious Program errors

Virus and other malicious code – Kinds of malicious code, How Viruses attach, Document viruses, How viruses gain control, Homes for viruses, Virus Signatures, The source of Viruses, Prevention of Virus Infection.
Targeted malicious code – Trojans, Trapdoors, Salami Attack.

Unit – III

Security in Databases : Security Requirements - Integrity of the database, Element Integrity, Audibility, Access control, User authentication, Availability, SQL injection; Reliability and Integrity – Protection features from the operating system, Two-phase update, Redundancy/Internal consistency, Recovery, Concurrency/Consistency, Monitors; Sensitive data - Access decisions, Types of disclosures, Security versus Precision; Inference – Direct Attack , Indirect Attack; Multilevel databases – Granularity , Security Issues.

Unit – IV

Security in Networks : Threats in Networks – What makes a network vulnerable? Categories of attack, Who attacks Networks?
Network Security Controls – Security Threat analysis, Effect of security in architecture of network, Encryption, Content integrity, Strong authentication, Access controls, Wireless security, Alarms and alerts, Honeypots, Traffic flow security.
Firewalls – Design of firewalls, Types of Firewalls, Personal Firewalls, Comparison of Firewall Types.

Unit – V

Legal and Ethical Issues in Computer Security : Protecting Programs and data – Information and the law - Redress for software failures – Selling correct software, Reporting software flaws.
Computer Crime : Why a separate category for computer crime is needed, Why computer crime is hard to define, Why computer crime is hard to prosecute, Indian Cyber law offences, Cyber Pornography, Accessing Protected System, Tampering with Computer Source code.
Ethical Issues in Computer Security : Differences between the Law and the Ethics, Studying Ethics, Ethical Reasoning.

Text Book

1. Charles P. Pfleeger, Shari Lawrence Pfleeger, “Security in Computing”, Fourth Edition, Pearson Education, 2007.

References

1. Michael Whitman, Herbert J. Mattord, “Management of Information Security”, Third Edition, Course Technology, 2010.
2. William Stallings, “Cryptography and Network Security:Principles and Practices”, Fifth Edition. PHI, 2010.
3. V.K.Pachghare, “Cryptography and Information Security”, PHI, 2013.

Elective - I
1. DATA MINING

Unit - I

Introduction : Basic Data Mining Tasks - Data Mining Versus Knowledge Discovery in Databases - Data Mining Issues - Data Mining Metrics - Social Implication of Data Mining - Data Mining from a Database Perspective

Data Mining Techniques : A Statistical Perspective on Data Mining - Similarity Measures - Decision Trees - Neural Networks - Genetic Algorithms

Unit - II

Classification : Introduction – Statistical - Based Algorithms - Distance-Based Algorithms - Decision Tree-Based Algorithms - Neural Network - Based Algorithms - Rule-Based Algorithms - Combining Techniques.

Unit - III

Clustering : Introduction - Similarity and Distance Measures - Outliers - Hierarchical Algorithms - Partitional Algorithms - Clustering Large Databases - Clustering with Categorical Attributes.

Unit - IV

Association Rules : Introduction - Large Itemsets - Basic Algorithms - Parallel and Distributed Algorithms - Comparing Approaches - Incremental rules - Advanced Association Rule Techniques - Measuring the Quality of Rules

Unit - V

Web Mining : Introduction - Web content Mining - Web Structure Mining - Web Usage Mining. Spatial Mining : Introduction - Spatial Data Overview - Spatial Data Mining Primitives -Generalization and Specialization - Spatial rules - Spatial Classification Algorithms - Spatial Clustering Algorithms

Text Book

1.Marget H.Dunham, “Data Mining Introductory and Advanced Concepts”,Pearson Education 2003.

References

1. G.K.Gupta, “Introduction to Data Mining with Case Studies”, 3rd Edition, PHI,2015.
2. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, “Introduction to Data Mining”, Pearson Education, 2007.
3. Jiawei Han and Micheline Kambar, “Data Mining Concepts and Techniques”, Second Edition, Elsevier, Reprinted 2008.

Elective - I
2. MULTIMEDIA SYSTEMS

Unit - I

Uses of Multimedia Information : Defining the scope of multimedia, Hypertext and Collaborative research, Multimedia and personalized computing, Multimedia on the map, Emerging applications, The challenges.

The convergence of computers, Communications, and entertainment products: The technology trends, Multimedia appliances, Hybrid Devices, Designers perspective, industry perspective of the future, Key challenges ahead, Technical, regulatory, Social.

Architectures and issues for Distributed Multimedia systems: Distributed Multimedia systems, Synchronization, and QOS Architecture, The role of Standards, A frame work for Multimedia systems

Unit - II

Digital Audio Representation and processing : Uses of Audio in Computer Applications, Psychoacoustics, Digital representation of sound, transmission of digital sound, Digital Audio signal processing, Digital music making, Speech recognition and generation, digital audio and the computers.

Video Technology : Raster Scanning Principles, Sensors for TV Cameras, Colour Fundamentals, Colour Video,Video performance Measurements, Analog video Artifacts, video equipments, Worldwide television standards.

Digital Video and Image Compression : Video compression techniques, standardization of Algorithm, The JPEG Image Compression Standard, ITU-T Recommendations, The EPEG Motion Video Compression Standard, DVI Technology

Unit - III

Operating System Support for Continuous Media Applications : Limitation of Work station Operating system, New OS support, Experiments Using Real Time Mach.

Middleware System Services Architecture : Goals of Multimedia System services, Multimedia system services Architecture, Media stream protocol.

Multimedia Devices, Presentation Services, and the User Interface : Client control of continuous multimedia, Device control, Temporal coordination and composition, toolkits, hyper applications.

Multimedia File systems and Information Models : The case for multimedia information systems, The file system support for continuous Media, Data models for multimedia and Hypermedia information, Content- based Retrieval of Unstructured Data.

Multimedia presentation and Authoring : Design paradigms and User interface, barriers to wide spread use, research trends.

Unit - IV

Multimedia Services over the Public Networks: Requirements, Architecture, and protocols, Net work services, applications.

Multimedia Interchange : Quick time Movie File Format, QMFI, MHEG (Multimedia and Hypermedia Information Encoding Expert Group), Format Function and representation, Track model and Object model, Real Time Interchange.

Multimedia conferencing : Teleconferencing Systems, Requirements of Multimedia Communications, Shared Application Architecture and embedded Distributed objects, Multimedia Conferencing Architecture.

Unit - V

High Definition Television and desktop computing : Video versus Computing-Viewing Conditions-Quality-HDTV,ATV,EDTV,IDTV-HDTV Standards – Standardization Issues HDTV standards.

Knowledge based Multimedia systems - Anatomy of an Intelligent Multimedia system

Text Book

John F.Koegel Buford, "Multimedia Systems", Pearson Education, 2012

References

1.Tay Vaughan, "Multimedia – Making it work", Fifth Edition, TMH 2003

2.Ralf Steinmetz and Klara Nahrstedt, "Multimedia:Computing , Communication and Application", Pearson Education, 2009

Elective - I
3. CLOUD COMPUTING

Unit – I

Cloud computing – An Overview : Introduction – History of cloud computing – Characteristics of cloud – Cloud computing model – Advantages and disadvantages of cloud computing – Security, Privacy and trust – Virtualization – Next generation of cloud computing.

Cloud computing Architecture : Introduction - Cloud Architecture – Cloud computing models – Deployment models – Identity as a service.

Unit – II

Virtualization in Cloud : Virtualization – Implementation of Virtualization - Virtualization support at the OS level – Advantages of Virtualization – Application Virtualization - Virtualization implementation techniques – Hardware virtualization – Types of Virtualization – Logical cloud computing model – Virtualization for Data-centre.

Security Issues and challenges in Cloud computing : Introduction - Security challenges in Cloud computing – Information Security in Cloud computing – Security, Privacy and Trust.

Security Management : Introduction – Security in reference architecture – Security Issues in cloud computing – Classification of security issues – Types of attackers – Security risk in

cloud computing – Security Threats against cloud computing – Emerging trends in security and privacy.

Unit - III

Virtualization System specific Attacks : Attacks in cloud computing environment – Attacks in Hypervisor – Security challenges – Desktop virtualization Security – Planning and deployment for secure virtualization.

Web Services : Amazon web services – Microsoft Azure – Google App Engine

Unit – IV

Service Oriented Architecture : SOA components – Design principles of SOA – SOA requirements – Benefits of SOA – Significance of SOA in cloud computing – Enterprise Service Bus – Web Services – Recurring Architectural Capabilities.

Migrating Applications to the Cloud computing : Motivations for migration – Issues in migrating the applications to the cloud – Types of migration – Planning for migrating the application to the cloud – Migration Roadmap. Cloud Computing Applications : Business applications – Finance and banking applications – Cloud computing in education.

Unit – V

Standards in Cloud Computing : Standardization activities – Challenges – Fields of standardization - Standardization organizations in Cloud Computing. Mobile Cloud Computing : Needs of mobile Cloud Computing – Mobile Cloud Computing Architecture – Technologies for MCC – MCC Applications – Challenges in building applications – Platforms.

Microservices : Need of microservices – Microservice architecture – Benefits of Microservices – Drawbacks of microservices – Communication mechanisms – Decentralized data management - Essential ckeck - lists for migration from monolithic to microservices.

Text book

1. V.K.Pachghare, “Cloud Computing”, PHI, 2016.

References

1. Michael Miller, “Cloud Computing”, Pearson Education, New Delhi, 2009

2.Anthony T.Velte,Toby J.Velte,Pobert Elsenpeter,”Cloud Computing”,TMH,2010

3. Kumar Saurbh , “Cloud Computing – Insights into New-Era Infrastructure”, Wiley India, 2011.

4. John W.Rittinghouse and James F. Ransome, “Cloud Computing : Implementation, Management and Security”, CRC press, 2010.

Core – 12
WEB APPLICATION LAB

Programs should include but not limited to:

1. Change the background color using RGB()
2. Implement Currency Converter
3. Demonstrate Event Tracker
4. Write a program using file uploading control
5. Write a program to create a registration page using validation controls
6. Write a program using Session State and Application State variables
7. Write a program to demonstrate the use of Session.TimeOut
8. Write a program using QueryString.

9 Write a program to create Cookies

10. Write a program using DataGrid and DataList controls
11. Write a program to search and store student data in MSAccess
12. Write a program to save customer information and generate electricity bill using MS Access

Core – 13
OPEN SOURCE LAB

Programs should include but not limited to:

1. Create a Relational Database in MySQL , insert values and execute queries using basic and advanced select commands.
2. Perform join operation on relational tables
3. Create Queries using aggregate functions
4. Create views of the database
5. Implement a PHP program to display a Welcome page based on client browser.
6. Implement a PHP program to process HTML forms.
7. Implement a PHP program to demonstrate Object Oriented Programming in PHP
8. Implement a PHP program to demonstrate database handing.
9. Write a PHP program to create a directory, and to read contents from the directory.
10. Execute the Linux commands:
    a) ls, cat, chmod, find, sort, bc, cal, wc
    b) pipe and filter
11. Write a C program to generate Fibonacci series and execute in Linux OS
12. Write a shell program to check whether the given number is Armstrong or not.
13. Write a shell program to generate pay slip of an employee.

Table – 6**:** Course Structure for **M.Sc. (Maths) Degree Programme**

(with effect from the academic year 2017-2018 onwards)

Sem. **(1)**	**Sub. No.** **(2)**	**Subject Status** **(3)**	**Subject Title** **(4)**	**Contact Hrs./ Week** **(5)**	**Credits** **(6)**
I	1	Core - 1	Algebra - I	6	4
	2	Core - 2	Analysis – I	6	4
	3	Core - 3	Analytic Number Theory	6	4
	4	Core - 4	Ordinary Differential Equations	6	4
	5	Core - 5	Numerical Analysis	6	4
			Subtotal	**30**	**20**
II	6	Core - 6	Algebra II	5	4
	7	Core - 7	Analysis II	5	4
	8	Core - 8	Classical Mechanics	5	4
	9	Core - 9	Differential Geometry	5	4
	10	Core - 10	Graph Theory	5	4
	11	Elective - 1	1) Programming With C++ 2) Discrete Mathematics 3) Partial Differential Equations	5	3
			Subtotal	**30**	**23**

III	12	Core - 11		5	4
	13	Core - 12		5	4
	14	Core - 13		5	4
	15	Core - 14		5	4
	16	Core - 15	Research Methodology	5	4
	17	Elective - 2		5	3
			Subtotal	**30**	**23**
IV	18	Core - 16		6	4
	19	Core - 17		6	4
	20	Core - 18		5	4
	21	Core - 19		5	4
	22	Core - 20	Project	8	**8**
			Subtotal	**30**	**24**
			Total	**120**	**90**

For the Project, flexible credits are b/w 5 – 8 & Hours per week are b/w 10 - 16.

Total number of credits ≥ 90 : 90
Total number of Core Courses : 20 (19 T + 1 Prj.)
Total number of Elective Courses : 2
Total hours : 120

SEMESTER I

1.1 Paper 1: ALGEBRA - I

Text Book: Topics in Algebra , I.N. Herstein, 2nd Edition, Wiley India Edition.

Unit I: A Counting Principle – Normal Subgroups and quotient groups – Homomorphisms.

Sections: 2.5, 2.6, 2.7.

Unit II: Automorphisms – Cayley's theorem – Solvable groups.

Sections: 2.8, 2.9.
Supplementary Problems : 10 -17.

Unit III: Permutation groups – Another counting principle.
Sections: 2.10, 2.11.

Unit IV: Sylow's theorems.
Sections: 2.12.

Unit V: Direct products – Finite abelian groups.

Sections: 2.13, 2.14.

1.2 Paper 2: ANALYSIS – I

Text Book: Principles of Mathematical Analysis, Walter Rudin, Third Edition, McGraw Hill International Book Company .

Unit I: Metric spaces – Compact sets – Perfect sets – Cantor sets – Connected sets .

Chapter II : Sections 2.15 to 2.47.

Exercise Problems: Chapter II : 5 -14, 20.

Unit II: Convergence sequences – Sub sequences – Cauchy sequence - Lower and Upper limits – Some special sequences – Series – Series of non negative terms – The number e.

Chapter III : Sections 3.1 to 3.32.

Exercise Problems: Chapter III : 1 - 8.

Unit III: Root test and Ratio test – Power series – Summation by parts – Absolute convergence – Addition and multiplication of series.

Chapter III : Sections 3.33 to 3.51.

Exercise Problems : Chapter III : 9, 11 - 13.

Unit IV: Continuity – Limit of functions – Continuous functions – Continuity and compactness – Continuity and connectedness – Discontinuous – Monotonic functions.

Chapter IV : Sections 4.1 to 4.31.

Exercise Problems : Chapter IV: 1 – 5, 14,15.

Unit V: Differentiation – Derivative of a real function – Mean value theorems – The continuity of derivatives – L'Hospital Rule – Derivatives of higher order – Taylor's theorem.

Chapter V : Sections 5.1 to 5.15.

Exercise Problems : Chapter V : 1 - 5 and 12.

1.3 Paper 3: ANALYTIC NUMBER THEORY

Text Book: Introduction to Analytic Number Theory – Tom M. Apostol – Springer International Student Edition.

Unit I: The fundamental Theorem of Arithmetic.

Chapter 1 and Exercise Problems: 1-11.

Unit II: Arithmetic functions.

Chapter 2: Sections 2.1 -2.8.

Exercise problems: Chapter 2: (1-6).

Unit III: Multiplicative functions and Dirichlet Multiplication.

Sections 2.9 – 2.14.

Exercise problems: Chapter 2: (21-23, 25,26).

Unit IV: Averages of Arithmetical functions.

Chapter 3: (1-9).

Exercise problems: Chapter 3: (1-4).

Unit V: Partial sums of Dirichlet product, Chebyshev's functions – equivalent forms of prime number theorem.

Chapter 3: Sections: 3.10, 3.11 and **Chapter 4:** 4.1 – 4.5.

Exercise problems: Chapter 4: (3,4,5,8,9,10).

1.4 Paper 4: ORDINARY DIFFERENTIAL EQUATIONS

Text Book: Differential Equations with application and historical notes, G.F. Simmons, Second Edition, Tata McGraw Hill.

Unit I: **Second Order linear equations :** General solution of the Homogeneous equations – The use of a known solution to find another – The method of variation of parameters.
Sections: 14 – 16.

Unit II: **Power series solutions:** A review of power series solutions – Series solution of first order equations – Second order equations – Ordinary points.
Sections: 26 – 28.

Unit III: Regular singular points – Legendre polynomials- Properties of Legendre polynomials
Sections: 29, 30, 44, 45.

Unit IV: Bessel functions – The Gamma functions – Properties of Bessel functions.
Sections: 46, 47.

Unit V: **Linear systems :** Homogeneous linear systems with constant coefficients
Sections: 55, 56.

1.5 Paper 5: NUMERICAL ANALYSIS

Text Book: Numerical Methods, S. Arumugam and others, Scikech(2001).

Unit I: Interpolation : Newton's Interpolation Formula – Central difference Interpolation Lagrange's Interpolation formula – Divided differences - Newton's Divided differences formula – Inverse Interpolation – Hermit's Interpolating Polynomial.

Chapter 7: Sections 7.1 to 7.7.

Unit II: Numerical differentiation – Derivatives using Newton's forward, backward, central difference formulae

Chapter 8: Sections 8.1 to 8.3.

Unit III: Numerical Integration –Gaussian Quadrature formula –Numerical evaluation of double integrals.

Chapter 8: Sections 8.5 to 8.7.

Unit IV: Numerical solutions of ordinary differential equations – Taylor's series Method – Picard's Method – Euler's Method – Runge Kutta Method.

Chapter 10: Sections 10.1 to 10.4.

Unit V: Predictor corrector Method – Milnes Method – Adams-Bashforth Method.

Chapter 10: Sections 10.5 to 10.7.

SEMESTER II

2.1 Paper 6: ALGEBRA II

Text book 1: Topics in Algebra, I.N. Herstein, 2nd edition, Wiley Student edition.

Text book 2: A First Course in Rings and Ideals, David M. Burton, Addison – Wesley Publishing Company.

Unit I: Ring Homomorphisms – Ideals and Quotient rings – More ideals and Quotient rings – The field of Quotients of an integral domain.

Text book 1: **Sections:** 3.3 – 3.6.

Unit II: Euclidean rings - A particular Euclidean ring.

Text book 1: **Sections:** 3.7 and 3.8.

Unit III: Polynomial rings – Polynomials over rational field – Polynomial rings over commutative rings.

Text book 1: **Sections:** 3.9 – 3.11.

Unit IV: Certain radicals of a ring – Jacobson radical of a ring – Semi simple ring – nil radical – Primary ring.

Text book 2: **Chapter 8:** Definition 8.1 – Theorem 8.15.

Unit V: Quasi regular – J-semi simple – Direct sum of rings.

Text book 2: **Chapter 8:** Theorem 8.16 – Theorem 8.18 and **Chapter 10.**

2.2 Paper 7: ANALYSIS II

Text Book: **Principles of Mathematical Analysis,** Third Edition, Walter Rudin – McGraw Hill International Book Company.

Unit I: Definition and Properties of Integral – Integration and Differentiation.
Chapter 6: Section: 6.1 – 6.22.
Exercise Problems: Chapter 6: 1, 2, 4, 5, 10, 11.

Unit II: Integration of vector valued functions – Rectifiable arcs, Sequence and Series of functions: Discussion of main problem – Uniform Convergence – Uniform Convergence and Continuity.
Chapter 6: Section: 6.23 – 6.27 & **Chapter 7 :** Section: 7.1 – 7.15.
Exercise Problems: Chapter 7 : 1, 4, 6 and 7.

Unit III: Uniform Convergence and Integration – Uniform Convergence and Differentiation – Equicontinuous families of functions.
Chapter 7: Section: 7.16 – 7.25.

Unit IV: The Stone Weierstrass Theorem - Power Series.
Chapter 7: Section: 7.26– 7.33 and **Chapter 8:** Section: 8.1 – 8.5.
Exercise Problems: Chapter 8: 1 – 5.

Unit V: The algebraic completeness of the complex field – Fourier Series – The Gamma function.
Chapter 8: Section: 8.8 – 8.22
Exercise Problems: Chapter 8: 13, 14, 15.

2.3 Paper 8: CLASSICAL MECHANICS

Text Book: Classical Mechanics, H. Goldstein, second edition, Addison Wesley India edition.

Unit I: Mechanics of particle – Mechanics of a system of particles constraints.

Chapter 1: **Section** 1-3, Problems: 2, 4 and 5.

Unit II: D'Alembert's Principle and Lagrange's equation – Velocity dependent potentials and dissipation functions – Simple applications of Lagrangian formulation.

Chapter 1: **Section** 4, 5 and 6, Problems: 11, 13 and 17.

Unit III: Hamilton's Principle – Some techniques of Calculus of Variation – Derivation of Lagrange's equations from Hamilton's principle – Extension of Hamilton principle to non-holonomic systems.

Chapter 2: **Section** 1 - 4, Problems: 1 - 3.

Unit IV: Reduction to the equivalent one-body problem – The equations of motion and first Integrals – The equivalent one dimensional problem and classification of orbits - The virial theorem.

Chapter 3: **Section** 1 - 4, Problems: 2 - 4.

Unit V: The differential equation for the orbit and integrable power law potentials – The Kepler problem: Inverse square law of force – The motion in time in the Kepler problem – The Laplace – Runge – Lenz vector.

Chapter 3: **Section** 5, 7 - 9.

2.4 Paper 9: DIFFERENTIAL GEOMETRY

Text book: An Introduction to Differential Geometry, T.J.Willmore, Oxford University Press, (17th Impresssion), New Delhi, 2002, (Indian Print).

Unit I: The theory of space curves – Definitions , Arc length – Tangent – Normal and Binormal – Curvature and Torsion.
Chapter 1: Section: 1.1 – 1.5.
Problems: Chapter 1: Miscellaneous Exercise I: 1 – 3.

Unit II: Contact between curves and surfaces – Tangent Surface – Involutes and evolutes – Helices
Chapter 1: Section: 1.6, 1.7 and 1.9
Problems: Chapter 1: Miscellaneous Exercise I: 8 – 12.

Unit III: Definition of a surface – Curves on a surface – Helicoids – Metric – Direction Coefficients.
Chapter 2: Section: 2.1, 2.2, 2.4, 2.5, 2.6
Problems: Chapter 2: Miscellaneous Exercise II : 1 – 4.

Unit IV: Families of curves – Geodesics , Canonical geodesic equation, Normal Property of geodesics (Christoffel symbols not included).
Chapter 2: Section: 2.7, 2.10 – 2.12
Problems: Chapter 2: Miscellaneous Exercise II: 6, 7, 8.

Unit V: Geodesic curvature , The Second Fundamental form – Principal Curvature – Lines of Curvature (Dupin's indicatrix not included).
Chapter 2: Section: 2.15, **Chapter 3:** Section: 3.1 – 3.3.
Problems: Miscellaneous Exercise III: 1 – 5.

2.5 Paper 10: GRAPH THEORY

Text Book: Graph Theory with applications, H.J.A. Bondy and Murthy, The MacMillan Press Limited.

Unit I: Trees - Connectivity – Blocks.
Chapter 2: Section: 2.1 – 2.4. and Chapter 3: Section 3.1 – 3.3

Unit II: Euler tour – Hamilton cycle – Applications.
Chapter 4: Section: 4.1 – 4.3

Unit III: Matching – Perfect Matching – Edge colouring.
Chapter 5: Section: 5.1 – 5.3 & **Chapter 6 :** Sec : 6.1 & 6.2.

Unit IV: Independent sets – Cliques.
Chapter 7: Section: 7.1 – 7.3.

Unit V: Vertex Colouring.
Chapter 8: Section: 8.1 – 8.5.

2.6 Elective(Any One)

2.6.1 PROGRAMMING WITH C++

Text Book: Object oriented Programming with C++ (Fourth Edition), E.Balagurusamy, TMH Publications.

Unit I: Tokens, Expressions and Control Structures.

Chapter: 3

Programming Exercises: 3.1, 3.3, 3.5, 3.7, 3.9, 3.10

Unit II: Functions in C++, Classes & Objects.

Chapter: 4 & 5

Programming Exercises: 4.1, 4.2, 4.5, 4.7, 5.2, 5.5

Unit III: Constructors and destructors, Operator overloading & Type conversions.

Chapter: 6 & 7

Programming Exercises: 6.2, 7.2, 7.3, 7.4

Unit IV: Inheritance – Extending classes, Pointers, Virtual Functions & Polymorphism.

Chapter: 8 & 9

Programming Exercises: 9.1, 9.2

Unit V: Unformatted I/O Operations, Formatted Console I/O Operations, Managing Output with Manipulators, Working with Files.

Chapter: 10.4, 10.5, 10.6, 11

Programming Exercises: 10.1, 10.3, 11.1, 11.2

2.6.2 DISCRETE MATHEMATICS

Text Book: Discrete Mathematics and its Applications (Sixth Edition) – Kenneth H. Rosen. WCB/ McGraw Hill Publications

Unit I: Propositional Logic – Propositional equivalence - Predicates and quantifiers.

Sections: 1.1 - 1.3.

Problems: Section 1.1(1 - 38), Section 1.2(1 - 35) and

Section 1.3(1 – 34)

Unit II: The Basics of counting – The Pigeonhole principle – Generalized permutation and combination.

Sections: 5.1, 5.2 and 5.5

Problems: Section 5.1(1 - 40), Section 5.2(1 - 22) and

Section 5.5(1 – 9)

Unit III: Relation and their properties – n-ary relations and their applications – representing relation – closures of relations.
Sections: 7.1 – 7.4 except Warshall's algorithm
Problems: Section 7.1(All exercise problems), Section 7.2(1 - 27),

Section 7.3(1 – 22) and Section 7.4(1 - 22)

Unit IV: Boolean functions – Representing Boolean functions.
Sections: 10.1 and 10.2
Problems: All exercise problems.

Unit V: Logic Gates –Minimization.
Sections: 10.3 and 10.4
Problems: All exercise problems.

2.6.3 PARTIAL DIFFERENTIAL EQUATIONS

Text Book: Elements Of Partial Differential Equations, IAN N. SNEDDON, McGraw Hill, New Delhi,1983.

Unit I: Methods of Solution of $\frac{dx}{P} + \frac{dy}{Q} + \frac{dz}{R}$ - Pfaffian Differential Forms and Equations - Solution of Pfaffian Differential Equations in three variables .

Chapter 1: **Section:** 3, 5 and 6 (all problems)

Unit II : Partial Differential equations - Origins of first order Partial Differential equations - Linear equations of the first order - Integral surfaces passing through a given curve .

Chapter 2: **Section:** 1,2,4 and 5 (all problems)

Unit III: Cauchy's Method of Characteristics - Compatible systems of First order Equations - Charpit's Method.

Chapter 2: **Section:** 8 - 10 (all problems)

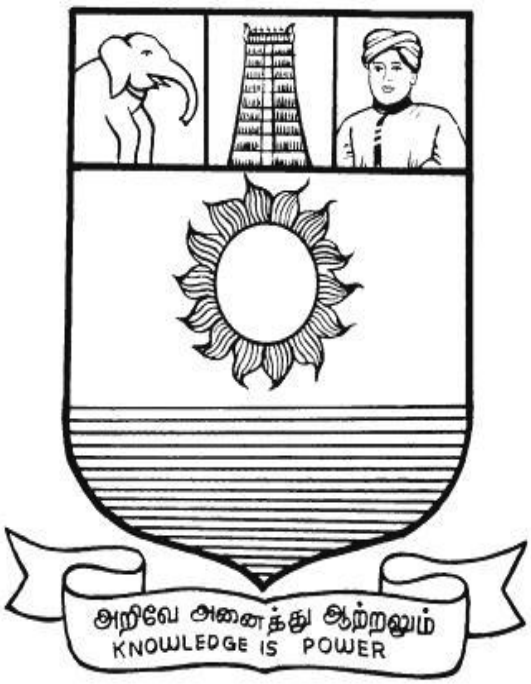
Unit IV: Second order equations in Physics - Linear Partial Differential equations with Constant Coefficients.

Chapter 3: **Section:** 2 and 4 (all problems)

Unit V: Characteristics of Equations in three variables - Separation of variables.

Chapter 3: **Section:** 7 and 9 (all problems)

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI – 12.



BOARD OF STUDIES PG (IT)

(With effect from the academic year 2017-2018 onwards)

Manonmaniam Sundaranar University,

Tirunelveli – 12.

M.SC. NETWORK & INFORMATION TECHNOLOGY

(CBCS - For Colleges)

(2 years – 4 Semesters)

REGULATIONS
(Effective from the academic year 2017-2018 onwards)

1. Eligibility for Admission:

Candidates for admission to the first year of two year M.Sc. Networking and Information Technology shall be required to have passed any degree from a recognized University accepted by the Syndicate of this University.

2. Duration of the Course:

The course shall be extended for a period of two academic years consisting of four semesters with two semesters per year.

3. **Passing Requirement:**

The candidate will be declared to have passed in any subject (including practical and project viva voce) of study if he/she secures not less than 50 marks in the University end semesters examinations of their subjects.

4. **Classification of successful candidates:**

A candidate who qualifies for the degree with 60% or more shall be declared to have passed the examination in FIRST CLASS.

A candidate who qualifies for the degree with the 75% or more shall be declared to have passed the examination in FIRST CLASS with DISTINCTION.

All other successful candidates shall be declared to have passed in SECOND CLASS

5. **Procedure in the Event of Failure :**

If a candidate fails in a particular subject (other than project work) he/she may reappear for the University examination in that subject in subsequent semesters and obtain pass mark.

In the event of failure in project work, a candidate shall reregister for project work and redo the project work in the subsequent and resubmit the dissertation a fresh for evaluation.

6. General Conditions :

(a) A candidate will be deemed to have completed the course of any semester only if he/she has secured not less 75% of attendance in the total number of working days of the concerned semester as a whole shall be followed. The usual procedures of condonation and repeat semester in vogue shall be followed for others.

Notes:

1. Each paper carries an internal component.
2. There is a pass minimum of 50% for external and overall components.
3. Theory Paper

   Assessment Components (External:Internal =75:25)
4. Practical Paper

   Assessment Components (External:Internal =50:50)
5. Internal Assessment

   For theory course

Average of the best two test marks from three compulsory Test : 15 Marks.

Assignment	: 5 marks
Seminar	: 5 marks
Total	: 25 marks

For practical course

Experimental Work	: 20 marks
Record	: 15 Marks
Model Test	: 15 Marks
Total	: 50 Marks

Question Pattern – External Exam(Theory) :

Part-A :	10 Multiple choice Questions (One mark each)	- 10 x 1 = 10 Marks
	(Note: Two Questions per unit)	
Part-B :	5 Questions (either – or type) – (5 marks each)	- 5 x 5 = 25 Marks
	(Note: One Questions per unit)	
Part-C :	5 Questions (either – or type) – (8 marks each)	- 5 x 8 = 40 Marks

(Note: One Questions per unit)

(b) Choice Based Credit System is followed for all the Courses. When a student completes the required credits prescribed for the course, Overall Percentage of Marks (OPM) will be calculated as follows. The marks obtained by the candidate (sum of external and internal marks) in a paper is multiplied by the credits assigned to the paper. Such weighted marks for all the papers are added and divided by the total credit.

Semester	Title of the Subject	Status	Contact Hrs./ Week	Credits	Maximum Marks			Passing Minimum	
					Internal	External	Total	External	Total
I	**Data Communication and computer Networks**	**Core-1**	**5**	**4**	**25**	**75**	**100**	**38**	**50**
	Object Oriented Programming using C++	**Core-2**	**5**	**4**	**25**	**75**	**100**	**38**	**50**
	Visual Programming	**Core-3**	**4**	**4**	**25**	**75**	**100**	**38**	**50**
	Software Engineering	**Core-4**	**4**	**4**	**25**	**75**	**100**	**38**	**50**
	E-Commerce	**Core-5**	**4**	**4**	**25**	**75**	**100**	**38**	**50**
	C++ Programming Lab	**Core Practical-1**	**4**	**2**	**50**	**50**	**100**	**25**	**50**
	Visual programming Lab	**Core Practical-2**	**4**	**2**	**50**	**50**	**100**	**25**	**50**
	Sub total	**7 courses**	**30**	**24**					

Semester	Title of the Subject	Status	Contact Hrs./ Week	Credits	Maximum Marks			Passing Minimum	
					Internal	External	Total	External	Total
II	**Advanced Java Programming**	**Core-6**	**5**	**4**	**25**	**75**	**100**	**38**	**50**
	RDBMS concepts and Oracle	**Core-7**	**5**	**4**	**25**	**75**	**100**	**38**	**50**
	Principles of Information Technology	**Core-8**	**4**	**4**	**25**	**75**	**100**	**38**	**50**
	Embedded Systems	**Core-9**	**4**	**4**	**25**	**75**	**100**	**38**	**50**
	Elective-1 (select any one from Elective –I group)	**Elective-1**	**4**	**3**	**25**	**75**	**100**	**38**	**50**
	Java programming Lab	**Core Practical-3**	**4**	**2**	**50**	**50**	**100**	**25**	**50**
	Oracle Lab	**Core Practical-4**	**4**	**2**	**50**	**50**	**100**	**25**	**50**
	Sub total	**7 courses**	**30**	**23**					

Semester	Title of the Subject	Status	Contact Hrs./ Week	Credits	Maximum Marks			Passing Minimum	
					Internal	External	Total	External	Total
III	**Web Designing**	**Core-10**	**4**	**4**	**25**	**75**	**100**	**38**	**50**
	Operating Systems	**Core-11**	**4**	**4**	**25**	**75**	**100**	**38**	**50**
	Network security and Cryptography	**Core-12**	**4**	**4**	**25**	**75**	**100**	**38**	**50**
	Software Testing	**Core-13**	**4**	**4**	**25**	**75**	**100**	**38**	**50**
	Research Methodology	**Core-14**	**4**	**4**	**25**	**75**	**100**	**38**	**50**
	Elective-2 (select any one from Elective – II group)	**Elective -2**	**4**	**3**	**25**	**75**	**100**	**38**	**50**
	Web Designing and Network Lab	**Core Practical-5**	**4**	**2**	**50**	**50**	**100**	**25**	**50**
	Mini Project	**Core Project-1**	**2+2***	**2**	**50**	**50**	**100**	**25**	**50**
	Subtotal	**8 courses**	**30**	**27**					

Semester	Title of the Subject	Status	Contact Hrs./ Week	Credits	Maximum Marks			Passing Minimum	
					Internal	External	Total	External	Total
IV	**Main Project Lab**	**Core** Project-2	**30+2***	**16**	**50**	**50**	**100**	**25**	**50**
	Subtotal	**1 course**	**30**	**16**					
Total		14T+5P+2Proj+ 2Elect.	**120**	**90**					

*Extra hours for Project

For the Project, **f**lexible credits are b/w 5 – 8 & Hours per week are b/w 10 - 16.

Total number of credits ≥ 90 : 90
Total number of Core Courses : 21 (14 T + 5 P + 2 Prj.)
Total number of Elective Courses : 2
Total hours : 120

List of Electives offered:

Elective – I Group

(A) Management Information System
(B) Big Data analytics

Elective – II Group

(A) Data Warehousing and Mining
(B) Mobile Computing

SEM. I CORE PAPER-1 : DATA COMMUNICATION AND COMPUTER NETWORKS

Unit-I

Introduction : Data Communications – Networks – The Internet – Protocols and Standards. Network Models : The OSI Model – Layers in the OSI Model. Physical Layer and Media : Analog and Digital – Periodic Analog Signals – Digital Signals. Digital Transmission : Digital to Digital Conversion – Analog to Digital Conversion . Transmission Media : Guided Media – Unguided Media. Using Telephone and Cable Networks for Data Transmission : Telephone Network – Digital Subscriber Line. **(13L)**

Unit-II

Data Link Layer : Error Detection and Correction : Introduction – Block Coding – Cyclic Codes – Noisy Channels – HDLC. Multiple Access : Random Access. Wired LANs : Ethernet – Standard Ethernet – Fast Ethernet – Gigabit Ethernet. **(12L)**

Unit-III

SONET/SDH : Architecture – Sonet Layers Virtual-Circuit Networks : Frame Relay and ATM – . Network Layer : IPv4 Address – IPv6 Address. **(13L)**

Unit-IV

Network Layer : Internet Protocol – Internetworking – IPv4 – IPv6. Network Layer :Address Mapping , Error Reporting and Multicasting – ICMP – IGMP. Network Layer : Delivery ,Forwarding, and Routing – Unicast Routing Protocols – Multicast Routing Protocols. **(10L)**

Unit-V

Process-to-Process Delivery: UDP, TCP – Process-to-Process Delivery – User Datagram Protocol(UDP) – TCP. Congestion Control and Quality of Service – Data Traffic – Congestion – Congestion Control – Quality of Service – Techniques to Improve. Application Layer : Name space – Domain Name System – Distribution of Name Space. **(12L)**

REFERENCE BOOKS :

1. Data Communication and Networking – Behrouz A Forouzan – McGraw Hill – 4th Edition - 2006
2. Data and Computer Communications – William stallings – Pearson – 2013
3. Computer Networks – Bhushan Trivedi – Oxford University Press - 2011

SEM. I CORE PAPER-2 : OBJECT ORIENTED PROGRAMMING USING C++

Unit-I

Principles of Object Oriented Programming : Basic Concepts of Object Oriented Programming- Benefits of OOP –Applications of OOP – Tokens, Expressions and Control Structures : Tokens- Keywords- Identifiers and constants-Basic data types- User Defined Data Types – Derived Data types – Symbolic Constants –Type Compatibility – Declaration of Variables –Operators in C++ - Expressions and their types – Control Structures. **(12L)**

Unit- II

Classes and Objects Specifying a class –Defining Member functions – Memory allocation for objects – Static Member functions –Arrays of Objects –Objects as Function Arguments – Friendly functions –Returning Objects – Pointers to Members . Constructors and Destructors – Parameterized Constructors –Multiple Constructors – Constructors with Default Arguments – Copy Constructor – Destructors. **(12L)**

Unit-III

Operator Overloading and Type conversions : Defining Operator Overloading – Overloading Unary Operators –Overloading binary Operators – Overloading binary operators using friends –

Manipulation of Strings using operators – Rules for overloading operators – Type Conversions. Inheritance : Defining derived classes – single inheritance – Multilevel Inheritance – Multiple Inheritance – Hierarchical Inheritance – Virtual base classes – Abstract Classes –Constructors in Derived classes – Nesting of classes. **(10L)**

Unit- IV

Pointers, Virtual Functions and Polymorphism - Pointers – Pointers to Objects – this Pointer – Pointers to Derived Classes – Virtual functions – Pure virtual functions Managing Console I/O Operations : C++ streams – C++ Stream Classes – Unformatted I/O Operations – Formatted Console I/O Operations – Managing Output with Manipulators . **(13L)**

Unit-V

Working with Files – Opening and closing a File – Updating a file – Command-line arguments – Templates – Class templates – Class templates with Multiple Parameters – Function Templates - Function Templates with multiple parameters- Overloading of Template functions –Member function Template-Exception handling Mechanisms. **(13L)**

REFERENCE BOOKS :

1.Object Oriented Programming with C++ - E. Balagurusamy ,Tata Mcgraw Hill Publications – 2006
2. Object Oriented Programming with ANSI and Turbo C++ -Ashok N.Kamthane, Pearson Education Asia Publications.

SEM. I CORE PAPER-3 : VISUAL PROGRAMMING

UNIT-I

Customizing a Form - Writing Simple Programs - Toolbox - Creating Controls - Name Property - Command Button - Access Keys - Image Controls - Text Boxes - Labels - Message Boxes - Grid - Editing Tools - Variables - Data Types - String - Numbers. **(10L)**

UNIT-II

Displaying Information - Determinate Loops - Indeterminate Loops - Conditionals - Built-in Functions - Functions and Procedures. **(12L)**

UNIT-III

Lists - Arrays - Sorting and Searching - Records - Control Arrays - Combo Boxes - Grid Control - Projects with Multiple forms - DoEvents and Sub Main - Error Trapping. **(12L)**

UNIT-IV

VB Objects - Dialog Boxes - Common Controls - Menus - MDI Forms - Testing, Debugging and Optimization - Working with Graphics **(13L)**

UNIT-V

Monitoring Mouse activity - File Handling - File System Controls - File System Objects - COM/OLE - automation - DLL Servers - OLE Drag and Drop – Accessing windows API – Visual basic and Databases – Visual basic and the Internet. **(13L)**

REFERENCE BOOKS :

1. Gary Cornell, 1999, Visual Basic 6 from the Ground up, Tata McGraw-Hill, New Delhi .
2. Noel Jerke, 1999, Visual Basic 6 (The Complete Reference), Tata McGraw-Hill, New Delhi.

SEM. I CORE PAPER-4 : SOFTWARE ENGINEERING

Unit-I

Introductions: Evolving role of software – Software characteristics, components and its applications – Generic view of software engineering – Software process models. **(12L)**

Unit-II

Systems Analysis: Requirements analysis – Analysis principles – Prototyping Software requirement specification – Data modeling, functional modeling and behavioral modeling. **(12L)**

Unit-III

Design concepts: Design and software quality, Design concepts : Abstraction, refinement, modularity, and software architecture control hierarchy structural partitioning and information hiding, Effective modular design: functional independence, cohesion and coupling – design documentation. **(12L)**

Unit-IV

Design Methods: Data design – Architectural design process: transform mapping and transaction mapping – interface design – procedural design. Design for Real – Time Systems : System considerations – real time systems – analysis and simulation of real time systems. **(12L)**

Unit-V

Software Testing Methods : Software testing fundamentals. White box testing: basis path testing and control structure testing – black box testing – testing for specialized environments. Software Testing Strategies: A strategic approach to software testing – unit testing – integration testing – validation testing – system testing. **(12L)**

REFERENCE BOOKS

1. R.S.Pressman ”Software Engineering”, (5th edition) Tata McGraw Hill, 1997.
2. Software Engineering Principles And Practices, Second Edition, Rohit Khurana ITL ESL
3. Software Engineering Principles And Practice, Waman S Jawadekar, Tata McGraw-Hill

SEM. I CORE PAPER-5 : E-COMMERCE

Unit-I

Overview of electronic commerce: introduction-definition of electronic commerce-potential benefits of electronic commerce-internet and www as enablers of electronic commerce-impact of electronic commerce on business models-electronic commerce security-organization of topics-implications for the accounting. Electronic commerce and the role of independent third parties: introduction-consulting practices and accountants-independence-cpa vision problem- new assurance services identified by the aicpa-impact of Electronic commerce on the traditional assurance function-third party Assurance of web based electronic commerce-implications for the accounting. Regulatory environment: introduction-cryptography issues-privacy issues-web linking-domain name disputes-internet sales tax-electronic agreement and digital signature – Internet service providers and international libel laws-implications for the accounting. **(12L)**

Unit-II

Edi electronic commerce and the internet: introduction-traditional Edi system-data transfer and standards-financial Edi-Edi systems and the internet-impact of Edi internet applications on the accounting profession. Risks of insecure system: introduction-overview of risks associated with internet transactions-internet associated risk- intranet associated risk-social engineering-risks associated with business transactions- risks associated with confidentially maintained archival-Master file and reference data- risks associated with virus and malicious-implications of the accounting. Risks management: introduction- control weakness vs control risks – Risk management paradigm – disaster recovery plans- Implications of the accounting. **(13L)**

Unit-III

Internet security standards:-introductions- standard setting issues and Committees - security committees and organization - security protocols and languages-messaging protocols –secure electronic payments and protocols-the role of accountants in internet related standard setting process. Cryptography and authentication: introduction-message security issues- Encryption techniques-key management-additional authentication methods-additional non repudiation techniques. **(11L)**

Unit-IV

Firewalls: introduction – firewall defined – TCP/IP-open system interconnect (OSI)-components of firewall-typical functionality of firewalls- network topology-securing the firewall-factors to consider in firewall design – in-house solutions Vs commercial fire wall software-limitations of security prevention provided by firewall. Introduction-the *set* protocol – magnetic strip cards-smart cards-electronic check-electronic cash. **(12L)**

Unit-V

Intelligent agent: introduction-definition of intelligent agent-capabilities of intelligent agent-level of agent sophistication-agent societies- intelligent agents and electronic commerce-online information Chain - limitations of agents- implications of the accounting. Web based marketing: introduction-the scope of marketing-business marketing and information technology-strategy congruence-the four P's applied to internet marketing – the fifth "P" personalization- internet marketing techniques-online advertisement mechanisms –web site design issues- Intelligent agent and their impacts on marketing techniques**.** **(12L)**

REFERENCE BOOKS

1. M. Greenstein, T. M. Feinman, 2000, Electronic Commerce, Tata McGraw Hill, New Delhi.
2. Kalakota & Whinston, 2000, Frontiers of Electronic Commerce, 5th Indian Reprint, Pearson Edn., Delhi.

I SEMESTER PRACTICAL LISTS

C++ Programming - Practical Lists

1) **Write programs for the demonstration of following in C++**

    1. Classes and Objects
    2. Function Overloading
    3. Constructors and Destructors
    4. Friend function
    5. Inline Function
    6. Operating Overloading
    7. Conversion function
    8. Inheritance
    9. Method Overriding
    10. Virtual Functions
    11. Virtual Base Class
    12. Working with Files
    13. Function Templates and Exception Handling
    14. Class Template

2) Write C++ program using classes to find the smallest number in an array of "N" elements using pointers.
3) Design classes such that they support the following statements:
    a. Rupee to dollar conversion
    b. Dollar to Rupee conversion
4) To overload stream operators for reading or displaying contents of vector class's objects as below

    cin>>v1;cout<<v2;

5) Define a class to represent a bank account, Data members;

1. Name of the Depositor
2. Account Name
3. Type of Account
4. Balance amount in the account

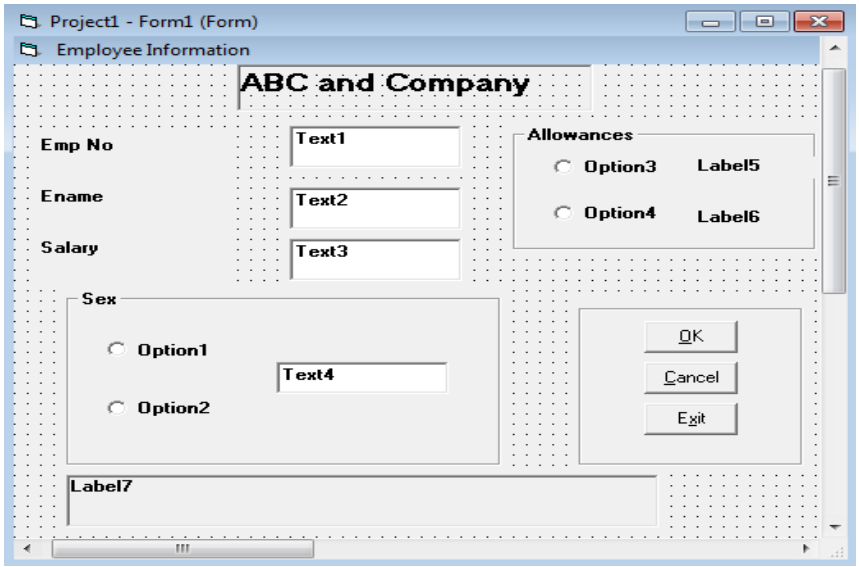
Member Function

1. Assign initial values
2. To deposit an amount
3. To withdraw an account
4. To display name and balance

Write a main program to test the program.

Visual Programming Lab – Practical Lists

1. Create a Text box Demo using command button Clear Text InsertDate, Show Message
2. Write a program using if... then, if ... else...end if, for..next loop and select case.
3. Display Date and Time using Timer control with Text Box and command Button.
4. Show the Adding, removing Demo using Combo box.
5. Create a new Standard Exe project, Enter the code in the Form Load event procedure. During run time the caption, mouse pointer, window state, Height and width properties should be changed.
6. Display a Demo using Common Dialog Box.
7. Create a Database using Text Box, Combo Box, Check Box, Label Box, Label Box, Frame and Command Button.
   Design your form as shown below.



- Whenever the Textbox "TEXT1" gets the focus it must be cleared.
- The Textbox "TEXT1" should accept only numbers.
- The user must not be allowed to go out of the Text box "TEXT1"when it is empty

- The Text box “TEXT2”must accept only alphabets (uppercase)
- The Text box “TEXT3” should accept only a maximum of 8 digits and only numbers
- “TEXT4” is to input a special allowance to the female candidates. So the user must be allowed to enter values in it only if the candidate is a female candidate
- If any of the allowances is applicable to the candidate it must be displayed in the respective label boxes

  HRA -2500.00

  DA-3000.00
- When the user clicks the “OK” button a confirmation message must be displayed in the respective label box “Label7”
- When the user clicks the “Cancel “ button a cancellation message must be displayed in the above mentioned label control and all the textboxes must be cleared .
- When the user clicks the “Exit “ button stop the execution of the program .

8. Develop a application using Frame ,Check box, Option box.
9. Design your form with 19 commands & a Text box and perform a Calculator Project ,which can able to work as like a Windows Calculator.
10. Write a function procedure to find simple interest
11. Write an event procedure to find the sum of numbers from 1 to selected value. Use a horizontal scroll bar to set the maximum value.
12. Create a Data base with the following given fields using Data Visual Manger Student Number, Name, Tamil, English, Maths, Physics, Chemistry marks.
13. Create a Menu Control using File New, Open, Save, Save as, Close, Exit, Edit, Option, Help
14. Create the pop- up menu items Bold, Italic, Underline, Blue, Green, Red, Black, Exit. Place a text box in the form. On selecting an item in the pop-up menu the corresponding effect should be displayed.

SEM. II CORE PAPER-1 : ADVANCED JAVA PROGRAMMING

Unit-I

Introducing Java-The Evolution of Java-The logical evolution of C to C++ and Java-Object oriented programming concepts and java programming with java. Getting started with Java Developer’s kit(JDK)- The Java developer’s environment. The Java browser and the world wide web –Navigating the world wide web –using URL’s- web surfing with Java enchanced browsers –Web-Hot spots for Java developers-Java tools-Java language. **(12L)**

Unit-II

Fundamentals of Java language-Token-Using data types-Expressions-Declarations-control flow-Building objects-An introduction to classes- working with objects-packages-Inheritance-Interfaces-threads-exceptions-streams. **(10L)**

Unit-III

Java API packages, The structure of API Packages. Using the Java API, API web reference Structure. The Java Applet class, Java language- packages and its classes. The AWT class library-Introduction to the AWT-Using the frame class to implement application windows-Implementing dialog boxes with dialog class –organizing the components using the panel and layout classes-using common GUI controls-using Fonts - image related classes-using scroll bars. The java I/O and utility class libraries. The Net and debug class libraries **(13L)**

Unit-IV

Defining the applet structure- building the applet- The Java extensions to HTML – Adding animation to web documents. The reducing animation flickers- Publishing a Java- presentation on the web. Applets reuse-adding functionality to existing applets –when to reuse –when to rewrite-extending an applet-Testing the extended applet.

JDBC: Java Database Connectivity, Types of JDBC drivers, Writing JDBC applications, Types of Statement objects, Types of resultset, Inserting an updating records, using transactions. **(13L)**

Unit-V:

Java Servlets: Java Servlets and CGI Programming –A Simple Java Servlet –Anatomy of a Java Servlet Reading Data from a Client –Sending Data to a Client – Working with Cookies Java Server Pages: JSP-JSP tags-Tomcat-Request String –User sessions-Cookies-Session Object. **(12L)**

REFERENCE BOOKS

1. Peter Norton And William Stanek –Peter Norton's Guide to Java Programming-Techmedia-1997
2. Alan.R.Willamson and Ceri L.Moran-Java Database Programming –Prentice Hall 1997.
3. C.Muthu, Programming with Java, 2nd Edition ,VNI
4. Joseph O'Neil, Java Beans Programming, TMH

SEM. II CORE PAPER-2 : RDBMS CONCEPTS AND ORACLE

Unit-I

Introduction – Purpose of data base systems – Data Models – Data Languages- Transaction management- storage Management-DBA –Database Users – System Structures – E-R Models- Entity and Entity Relationships – Mapping constraints and E-R Diagrams. **(10L)**

Unit-II

Structure of Relational databases– Relational Algebra – Tuple Relational calculus – Domain Relational Calculus- Relational commercial languages (SQL, QBE, QUEL)- Integrity constraints –Normalization – Boyce –Codd – Third and Fourth normal forms – domain – Key normal form. **(13L)**

Unit-III

Basic SQL Operations – creating a table – Insert- Rollback-Commit – AutoCommit-Delete- Update- Select, From, where and Order by -Single value tests – Like – simple tests against a list of values – Combining logic – Combining tables -Dropping tables - Dropping a column- creating a table from a table – Date functions – Conversion functions- Translate-Decode-Creating a view – Advanced sub queries-Outer joins-Natural & Inner joins-Union, Intersect & Minus – synonyms- indexes- Tablespaces -Clusters- Sequences. **(12L)**

Unit-IV

Basics of Object – Relational databases: Objects – Abstract Data types – Nested tables - Varying arrays – Large objects –References - Object Views – Naming conventions for objects- Structure of an Object.

Users, Roles and Privilege: Creating a user – password management - Three Standard roles – Format for Grant command – Revoking privileges – what users can Grant: Moving to another user- Create synonym – Create a role – Granting privileges to a role – Granting a role to another role – Adding password to a role – Removing a password from a role – Enabling & Disabling roles – Revoking privileges from a role – dropping roles. **(13L)**

Unit-V

An Introduction to PL/SQL: Pl/SQL overview- Declarations section - Executable commands section – Exception handling section – Triggers: Syntax – Types of Triggers: Row Level – statement – level – before & after – instead of – Schema – Database – Level triggers – Enabling & Disabling triggers – Replacing & Dropping triggers – Procedures, functions & Packages: syntax – Compile – Replace – Drop procedure, Functions & Packages – Cursor Management. **(12L)**

REFERENCE BOOKS

1. Database System Concepts– Abraham Silberchatz, Henry k. Horth, McGraw Hill – 2001.
2. ORACLE 9i – The Complete Reference – Kevin Loney, George Koch & The Experts at Tusc, Tata McGraw Hill Publishing company Ltd., 2002.

SEM.II CORE PAPER-3 : PRINCIPLES OF INFORMATION TECHNOLOGY

Unit-I

INTRODUCTION TO COMPUTERS **–** Generations of modern computers – Classification of digital computer systems – Anatomy of a digital computer – computer software – Hardware/software interaction – Classification of software – Operating systems (functions & classification of Os) – Introduction to Database Management system (DBMS – benefits – functions – DB users). **(12L)**

Unit-II

Telecommunications - Introduction to Telecommunications: Analog and Digital Signals - Modulations - Types of modulations - Pulse modulation techniques – digital modulation – modems

Computer Networks: Overview of networks - Communication processors - Communication media - Telecommunication Software – Types of network – network topology.

Communication System : Radio- TV – Microwave systems – Communication satellites – Radar – Fiber optics – ISDN – ADSL – T1 & T3 line connection. **(12L)**

Unit-III

Introduction to Multimedia – **Multimedia Applications**:- Multimedia in education and training – Multimedia in entertainment – multimedia in marketing – **Introduction to Virtual reality**: History of VR – present uses of VR – Future of VR. **(10L)**

Unit-IV

New Technologies in Information Technologies- Introduction to Hypermedia – Artificial Intelligence & Business Intelligence – Knowledge Discovery in Databases (KDD) – Data mining and On_Line Analytical Processing (OLAP)- Geographical Information System(GIS) **(13L)**

Unit-V

Application of Information Technology -Computers in business and Industry – Computers at Home – Computers in education and training- Computers in Entertainment Science, Media & Engineering- Mobile computing. **(13L)**

REFERENCE BOOKS

1. Fundamental of Information Technology (second edition), Alexis Leon and Mathew Leon-Leon Vikas publication.

2. Information Technology – Dennis P.Curtin, Kim Foley, Kunalson, TATA McGRAW – Hill edition.

SEM.II CORE PAPER-4 : EMBEDDED SYSTEMS

Unit-I

Embedded systems Overview - Design Challenge – Optimizing Design Metrics, Processor Technology, IC Technology – Introduction- Full Custom (VLSI) IC Technology -Semi Custom (ASIC) IC Technology, Programmable Logic Device (PLD) IC Technology.-Design Technology, Trade – Offs- Custom Single – Purpose Processors: Hardware - Combinational Logic, Sequential Logic, Custom Single - Purpose Processors Design, Optimizing Custom Single - Purpose Processors. **(12L)**

Unit-II

General Purpose Processors: Software – Introduction- Basic Architecture-Operation-Programmer‘s View - Development Environment - Application – Specific Instruction – Set Processors, Selecting a Microprocessor, General Purpose Processor Design - Standard Single - Purpose Processors: Peripherals – Introduction - Timers - Counters and watchdog Timers - UART - Pulse width modulators - LCD Controllers - Keypad Controllers. **(12L)**

Unit-III

Memory - Introduction, Memory write ability and storage permanence - Common Memory Types - Composing Memory, Memory Hierarchy and cache - Advanced RAM. Interfacing – Introduction Communication Basics - Microprocessor Interfacing: I/O Addressing - Microprocessor Interfacing: Interrupts - Microprocessor Interfacing: Direct Memory Access - Arbitration, Multilevel Bus Architectures - Advanced Communication Principles - serial Protocols - Parallel Protocols-wireless protocols. **(10L)**

Unit-IV

State Machine and Concurrent Process Models - Introduction, Model vs Languages, Text vs Graphics, An Introductory example- A Basic State Machine Model: Finite – state machines-Finite - state machine with data path Model: FSMD - Using state machines- HCFSM and the State charts Language- Program – state machine model- process model Concurrent processes - Communication among Processes - Synchronization among processes - Implementation, Data flow model- Real time systems. **(13L)**

Unit-V

Advanced Embedded Systems: ATmega Processors-Introduction-architecture-instruction set-SREG-general purpose registers-stack-interrupt vectors AT 8535 Processor-Serial Ports-Memory map-Addressing modes-Operational features and programming aspects-control block-choosing the prescalar-ATmega Analog to digital converters-Serial I/O-Programmable logic-

Introduction to Xmega family-Infrared communication-Data encryption and decryption-DMA. **(13L)**

REFERENCE BOOKS

1. Frank Vahid/Tony Givargis – Embedded System Design, A unified Hardware /Software Introduction – John Wiley & Sons Inc.
2. B.Kanta Rao-Embedded Systems-PHI Learning Private Limited, 2011.

ELECTIVE-I Group (A) : MANAGEMENT INFORMATION SYSTEMS

Unit-I

Introduction to Management of Information Systems-Introduction - Role and Importance of Management-Process of Management –Organization structure and theory –Strategic Management of Business. **(12L)**

Unit-II

Basics of Management Information Systems-Basics of Management Information Systems-Decision making –Information Systems-Systems analysis and design –development of MIS-Choice of information Technology.

Nature of it decision, Information Technology to implementation plan, choice of the information Technology and the Management Information System. **(12L)**

Unit -III

Application of Management Information Systems- Application in Manufacturing Sector - Applications in Service Sector – Decision Support Systems – Enterprise Management Systems. **(10L)**

Unit-IV

Technology in Management Information Systems – Technology of Implementation Systems-Database Management Systems – Object Oriented Technology : Conceptual presentation. Client- Server architecture – Networks. **(12L)**

Unit -V

Business Reprocess Engineering, Data Warehouse: Architecture of Implementation, Electronic Business Technology, WEB: A tool for Business Management. Case study: A Comprehensive case study on MIS, Information Management. System Development Cycle, Enterprise Management System, MIS in Research environment, Role of MIS in Consumer Goods Industry, Role of MIS in Capital Goods Industry, Comparison of Internet and Intranet Applications, knowledge of Management. **(14L)**

REFERENCES BOOKS

1. W.S. Jawadekar - Management Information Systems – Second Edition - Tata McGraw Hill -2002.
2. Robert Schulthesis & Mary Summer - Management Information Systems- TheManager's View – Tata McGraw Hill -1999.

ELECTIVE-I Group (B) BIG DATA ANALYTICS

Unit-I

A new paradigm for big data: Scaling with a traditional database – Desired properties of a Big Data System-The problems with fully incremental architectures-Lambda Architecture-Recent Trends in Technology.

Batch Layer: DATA model for Big DATA - The properties of data- the fact-based model for representing data- Graph schemas. **Data Model for Big Data:** Why serialization framework? - Apache thrift – Limitations of serialization frameworks. **(12L)**

Unit-II

Data Storage on the batch layer: Storage requirements for the master dataset – Choosing a storage solution for the batch layer – How distributed filesystems work – Storing a master dataset with distributed filesystem – Vertical partitioning – Low-level nature of distributed filesystems – Storing the SuperWebAnalytics.com master dataset on a distributed filesystem. **(10L)**

Unit-III

Data storage on the batch layer: Illustration: Using the Hadoop Distributed File System – Data storage in the batch layer with Pail – Storing the master dataset for SuperWebAnalytics.com.

Batch layer: Motivating examples – Computing on the batch layer – Recomputation algorithms vs. incremental algorithms –Scalability in the batch layer – MapReduce: a paradigm for Big Data computing – Low-level nature of MapReduce-Pipe diagrams: a higher-level way of thinking about batch computation

Batch layer: Illustration: An illustrative example- Common pitfalls of data-processing tools – An introduction to JCascalog – Composition.

An example batch layer: Architecture and algorithms: Design of the SuperWebAnalytics.com batch layer – Workflow overview – Ingesting new data – URL normalization – User-identifier normalization – Duplicate pageviews – Computing batch views. **(13L)**

Unit-IV

Serving layer: Performance metrics for the serving layer- The serving layer solution to the normalization/denormalization problem- Requirements for a serving layer database- Designing a serving layer for Super WebAnalytics.com – Contrasting with a fully incremental solution.

Serving layer: Illustration: Basics of ElephantDB – Building the serving layer for SuperWebAnalytics.com **(12L)**

Unit-V

Speed Layer: Realtime views: Computing realtime views – Storing realtime views – Challenges of incremental computation – Asynchronous versus Synchronous updates – Expiring realtime views.

Realtime views: Illustration: Cassandra's data model – Using Cassandra.

Queuing and stream processing: Queuing – Steam processing – Higher-level, one-at-a-time stream processing – SuperWebAnalytics.com speed layer.

Queuing and stream processing: Illustration: Defining topologies with Apache Storm – Apache Storm clusters and deployment –Guaranteeing message processing – Implementing the SuperWebAnalytics.com unique-over-time speed layer.

Lambda Architecture in depth: Defining data systems – batch and serving layers – Speed layer – Query layer.

Case Studies: An example of Batch Layer implementation. **(13L)**

REFERENCE BOOKS:

1. "Big Data Principles and best practices of scalable real-time data systems", Nathan Marz, James Warren, Manning publications co., Edition 2016, published in India by Dreamtech Press, 19-A, Ansari Road, Daryaganj, New Delhi.

2. Big Data: A Revolution That Will Transform How We Live, Work, and Think by Viktor Mayer-Schönberger, Kenneth Cukier Published March 5th 2013 by Houghton Mifflin Harcourt.

II SEMESTER PRACTICAL LISTS

JAVA PROGRAMMING LAB –Practical Lists

1. Programs using simple java classes
2. Preparation of employee payroll using arrays and control structures
3. Write a program to prepare mark sheet using inheritance
4. Prepare a salary slip of an employee with personal details using interface
5. Write a java program using string classes
6. Write a java program to design a calculator to perform arithmetic operation
7. Write a java program to create and implement an interface
8. Write a java program to create a thread
9. Program Using runnable interface
10. Write a program using java utilities
11. Database applications using JDBC connectivity
12. Simple Java AWT application
13. Simple Java Servlet application
14. Simple JSP internet application.

ORACLE LAB –Practical Lists

1. Table creation and Manipulations – Insert, Delete, Select and Update
2. Use of constraints – primary key, references, unique, not null, default etc. in Table creation.
3. Creation and use of sequence, index schema objects in table manipulations
4. PL/SQL program to generate Multiplication Table
5. PL/SQL program for cursor Management
6. PL/SQL program for Raising application error.
7. Create of function to check whether the given string is a palindrome or not.
8. PL/SQL program for demonstrating user defined Exception in oracle
9. PL/SQL program for demonstrating built-in Exception

10. PL/SQL program for demonstrating built-in Exception

11. Creation of procedure for electricity bill preparation using table

12. PL/SQL program for demonstrating trigger procedure.

SEM. III CORE PAPER-1: WEB DESIGNING

Unit-1 Web programming Basics and Installations

Web Publishing: A Quick look-HTML 4.0: the web Publishing Foundation- HTML basics- Putting your Server to work-Server side programming- XML Basics. **(12L)**

Unit-II Installation and Configuration

Getting up and running: Installation Quick Start Guide- Installing and configuring MySql- Installing and configuring Apache-Installing and configuring PHP. **(10L)**

Unit-III PHP Language Structure

The Building blocks of PHP- Flow Control Functions in PHP- Working with Functions- Working with Arrays- Working with Objects- Working with Strings, Dates and Time- Working with Forms- Working with Cookies and User Sessions- Working with Files and Directories Working with Images **(14L)**

Unit-IV PHP and MySQL Integration

Understanding the Database Design- Process Learning Basic SQL Commands Using Transactions and Stored Procedures in MySQL- Interacting with MySQL Using PHP. **(12L)**

Unit-V Basic Projects

Managing a Simple Mailing List- Creating an Online Address Book- Creating a Simple Discussion Forum- Creating an Online Storefront and shopping Cart Mechanism- Creating a Simple Calendar- Restricting Access to Your Applications- Logging and Monitoring Web Server Activity- Application Localization- Working with XML- Connecting to Web Services Apache Performance Tuning and Virtual Hosting- Setting Up a Secure Web Server- Optimizing and Tuning MySQL. **(12L)**

REFERENCE BOOKS:

1. Sam Teach Yourself PHP, MySQL and Apache All in One, 5th Edition, Julie Meloni

2. Dynamic Web Publishing, Second Edition, Shelley Powers, Techmedia

3. Steve Suehring, Tim Converse and Joyce Park, ”PHP 6 and MySQL 6 Bible”, Wiley India

reprint, 2009.

4. Robert Sheldon, Geoff Moes, ”Beginning MySQL”, Wrox, 2005.

5. BEN FORTA, ”MySQL Crash course “SAMS, 2006.

SEM. III CORE PAPER-2 : OPERATING SYSTEMS

Unit-I

Operating System Overview: Objectives and Functions - Processes: Process Description and Control – UNIX SVR4 Process Management – Threads and Multithreading – Symmetric Multiprocesing - Windows Thread Management - Solaris Thread and SMP Management - Linux Thread Management - Android Thread Management **(13L)**

Unit-II

Mutual Exclusion and Synchronization: Semaphores – Monitors - Message Passing – producer-consumer problem – readers writers problem - Principles of Deadlock – Deadlock prevention – Avoidance – Detection **(12L)**

Unit-III

Virtual Memory Management: Paging – segmentation - Operating System Software policies - Windows Memory Management - Android Memory Management - Uniprocessor Scheduling: Types of Scheduling - Scheduling Algorithms - Real-Time Scheduling **(10L)**

Unit-IV

I/O Management and Disk Scheduling: I/O Buffering - Disk Scheduling – RAID - File Management : File Organization and Access - Secondary Storage Management – File Allocation Methods – Free Space Management - Windows File System - Android File Management - Embedded Operating Systems: Characteristics – Ecos **(13L)**

Unit-V

Operating System Security: Basic concepts - Intruders and Malicious Software - viruses - Distributed Processing, Client/Server, and Clusters: Client/Server Computing - Distributed Message Passing - Remote Procedure Calls – Clusters - Windows Cluster Server – Sun Cluster **(12L)**

REFERENCE BOOKS:

1. Operating Systems-Internals and Design Principles, Williams Stallings, Pearson, 8th Edition, 2014.
2. Modern Operating Systems, Andrew S. Tanenbaum, Pearson,, 4th Edition, 2014.
3. Operating System Concepts, Abraham Silberschatz , Peter B. Galvin, Greg Gagne, John Wiley & Sons, 8th Edition, 2008.

SEM. III CORE PAPER-3 : NETWORK SECURITY AND CRYPTOGRAPHY

Unit-I

Introduction, Attacks, services and Mechanisms - security attacks - security services - A model for internetwork security - Internet standards and RFCS. Classical Encryption Techniques: symmetric cipher Model - Substitution Techniques -Transportation Techniques Rotor Mechanism – Steganography. **(12L)**

Unit-II

Block ciphers and the data encryption standard simplified DES - Block Cipher Principles -The Data encryption standard -The strength of DES - Differentials and Linear Cryptanalysis -Block Cipher design principles -Block Cipher modes of operations. Public Key Cryptography and RSA: Principles of Public - Key Cryptosystems The RSA Algorithm. **(13L)**

Unit-III

Key Management; Other Public-Key Cryptosystems: Key Managements- Diffie Hellman Key Exchange-Elliptic curve Arithmetic - Elliptic curve Cryptography Message Authentication & Hash functions: Authentication Requirements-Authentication functions-message Authentication Codes- Hash functions- Security of Hash functions & MACS. Digital Signatures -Authentication Protocols -Digital Signature Standard. **(13L)**

Unit-IV

Authentication applications: Kerberos X 509 Authentication service. Electronic Mail security: Pretty good Privacy - S/MIME 445 IP Security: IP Security overview - IP Security Architecture -Authentication Header - Encapsulation security Payload. **(10L)**

Unit-V

Web Security: Web Security Considerations - Secure Sockets Layer and Transport Layer Security - Secure Electronic Transactions System Security: Intruders - Intrusion detection - Password Management. Firewalls: Firewalls Design Principles - Trusted Systems **(12L)**

REFERENCE BOOKS:

1. William Stallings,"CRYPTOGRAPHY AND NETWORK SECURITY - PRINCIPLES AND PRACTICES", Pearson Education, Third Edition, 2003.
2. William Stallings,"NETWORK SECURITY ESSENTIAL - APPLICATIONS AND STANDARDS", Pearson Education, 2003.
3. Atul kahate,"CRYPTOGRAPHY AND NETWORK SECURITY", TMCH, 2003

4. Charlie Kanfman, Radio Pearlman, Mike Speciner, ”NETWORK SECURITY”, Second Edition, Pearson Education Asia.

SEM. III CORE PAPER-4 : Software Testing

Unit-I

Purpose of Software Testing – Some Dichotomies – A model for testing – Playing pool and consulting oracles – Is Complete testing possible – The Consequence of bugs – Taxonomy of Bugs. **(10L)**

Unit-II

Software testing fundamentals – Test Case design – Introduction of Black box testing and White box testing – Flow graphs and path testing – Path testing Basics – Predicates, Path Predicates and Achievable Paths – Path Sensitizing – Path Instrumentation – Implementation and Application of Path testing. **(12L)**

Unit-III

Transaction flow testing – Transaction Flows-Techniques – Implementation Comments- Data Flow Testing –Basics – Strategies – Applications, Tools and effectiveness- Syntax testing – Why, What, How – Grammar for formats – Implementation – Tips. **(13L)**

Unit-IV

Logic based testing – Motivational overview – Decision tables – Path expressions – KV charts – Specifications – States, state graphs and transition testing – State Graph – Good & bad states – State testing metrics and Complexity. **(13L)**

Unit-V

Testing GUIs – Testing Client – Server Architecture – Testing for real-time system – A strategic approach to software testing –Issues – Unit testing – Integration testing – Validation Testing – System testing – The art of Debugging. **(12L)**

REFERENCE BOOKS

1. Boris Beizer, Software testing techniques, Dreamtech Press, Second Edition – 2003.
2. Myers and Glenford.J., The Art of Software Testing, John-Wiley & Sons,1979
3. Roger.S.Pressman, Software Engineering – A Practitioner s Approach, Mc-Graw Hill, 5th edition, 2001
4. Marnie.L. Hutcheson, Software Testing Fundamentals, Wiley-India, 2007.

SEM. III CORE PAPER-5: RESEARCH METHODOLOGY

Unit-I

Research Methodology: An Introduction - Meaning of Research - Objectives of Research - Types of Research, Motivation in Research - Research Approaches, Significance of Research - Research Methods Verses Methodology - Research and Scientific Method - Research Process - Criteria of Good Research - Problems Encountered by Researchers in India. Defining the Research Problem: What is a Research Problem? - Selecting the Problem - Technique Involved in Defining a Problem - Research Design: Meaning - Need for research Design - Features of a

Good Design - Important Concept relating to Research Design - Different Research Designs - Basic Principles of Experimental Designs. **(12L)**

Unit-II

Sampling Design: Census and sample survey - Implications of a sample design - Steps in sample design - Criteria of selecting a sampling procedure - Characteristics of a good sample design - Different types of sample designs - How to select a random sample? - Random sample from an infinite Universe - Complex random sampling designs - Measurement and scaling Techniques: measurement in research - Measurement scales - Sources of error in measurement - Tests of sound measurements - Technique of developing measurement tools - Scaling, meaning of scaling - Scale classification bases - Important scaling techniques - Scale construction techniques. **(12L)**

Unit-III

Methods of Data Collection - Collection of Primary Data - Observation Method - Interview method - Collection of Data through Questionnaires - Collection of Data through Schedules - Some Other Methods of Data Collection - Collection of Secondary Data - Selection of Appropriate Method for Data Collection - Interpretation and Report writing - Meaning of Interpretation, Why Interpretation? - Technique of Interpretation, Precaution in Interpretation - Significance of Report Writing - Different Steps in Writing Report - Layout of the Research Report - Types of Reports - Mechanics of Writing a Research Report - Precautions for Writing Research Reports. **(12L)**

Unit-IV

Chi-Square Test for large samples – Definition of Chi-Square – Limitations of Chi-Square test - Chi-Square test as a test of goodness of fit and as a test of independence – Yate's correction and its applications – Analysis of variance(ANOVA) : Concept – One way ANOVA – ANOVA in test in Latin Square Design **(12L)**

Unit - V

Algorithmic Research – Introduction - Algorithmic Research Problems - Types of Solution procedure/Algorithm - Steps of Development of Algorithm - Steps of algorithmic Research - Design of Experiments and Comparison of Algorithms - Meta Heuristics for Combinatorial Problems - The Computer: Its Role in research - The computer and Computer Technology - The Computer System - Important Characteristics - Computer Applications- Computers and Researchers. **(12L)**

REFERENCE BOOKS

1. C.R.Kothari, "Research Methodology Methods and Techniques", (Second Revised Edition), New Age International Publishers, New Delhi, 2010.
2. R.Panneerselvam, "Research Methodology", PHI Learning Private Limited, New Delhi, 2009.

ELECTIVE-II Group (A) : DATA WAREHOUSING AND MINING

Unit-I

Introduction: Data Mining tasks – Data Mining versus Knowledge Discovery in Data bases – Relational databases – Data warehouses – Transactional databases – Object oriented databases – Spatial databases – Temporal databases – Text and Multimedia databases – Heterogeneous databases - Mining Issues – Metrics – Social implications of Data mining **(12L)**

Unit-II

Data Preprocessing: Why Preprocess the data – Data cleaning – Data Integration – Data Transformation – Data Reduction – Data Discretization. **(11L)**

Unit-III

Data Mining Techniques: Association Rule Mining – The Apriori Algorithm – Multilevel Association Rules – Multidimensional Association Rules – Constraint Based Association Mining **(11L)**

Unit-IV

Classification and Prediction: Issues regarding Classification and Prediction – Decision Tree induction – Bayesian Classification – Back Propagation – Classification Methods – Prediction – Classifiers accuracy **(13L)**

Unit-V

Clustering Techniques: cluster Analysis – Clustering Methods – Hierarchical Methods – Density Based Methods – Outlier Analysis – Introduction to Advanced Topics: Web Mining , Spatial Mining and Temporal Mining **(13L)**

REFERENCE BOOKS

1. J. Han and M. Kamber , 2001, Data Mining: Concepts and Techniques, Morgan Kaufmann, .New Delhi-27
2. M. H.Dunham, 2003, Data Mining : Introductory and Advanced Topics , Pearson Education, Delhi.
3. Paulraj Ponnaiah, 2001, Data Warehousing Fundamentals, Wiley Publishers.
4. S.N. Sivananda and S. Sumathi, 2006, Data Mining, Thomsan Learning, Chennai.

ELECTIVE-II Group (B) MOBILE COMPUTING

Unit-I

Introduction: Wireless transmission, Frequencies for radio transmission, Signals, Antennas, Signal Propagation, Multiplexing, Modulations, Spread spectrum, MAC, SDMA, FDMA, TDMA, CDMA, Cellular Wireless Network. **(12L)**

Unit-II

Telecommunication systems: GSM, GPRS, DECT, UMTS, IMT-2000, Satellite Networks, Basics, Parameters and Configurations, Capacity Allocation, FAMA and DAMA, Broadcast Systems, DAB, DVB. **(12L)**

Unit-III

Wireless LAN: IEEE 802.11, Architecture, Services, MAC, Physical layer, IEEE802.11a-802.11b standards, HIPERLAN, BlueTooth. **(12L)**

Unit-IV

Mobile IP, Dynamic Host Configuration Protocol, Routing, DSDV, DSR, Alternative Metrics **(12L)**

Unit-V

Traditional TCP, Classical TCP improvements, WAP, WAP 2.0, WML Basics, WML Cards. **(12L)**

REFERENCE BOOKS

1. Jochen Schiller, ”Mobile Communications”, 2/e, PHI/Pearson Education, 2003.
2. William Stallings, ”Wireless Communication and Networks”, PHI/Pearson Education, 2002
3. Kaveh Pahlaven, Prasanth Krishnamoorthy, ”Principles of Wireless Networks”, PHI/Pearson Education, 2003.
4. Hazysztof Wesolowshi, ”Mobile Communication Systems”, John Wiley and Sons Ltd, 2002.

III SEMESTER PRACTICAL LIST

WEB DESIGNING AND NETWORK LAB

Web Designing – Practical Lists

1. Write a HTML code to display information about your college use

   1)Bold Tag

   2)Centre Tag

   3)Heading & Font tags. Add background colour and picture

2. Create a HTML document to display a list of four flowers and link each one to another document displaying brief description of the flower. Add pictures wherever possible.

3. Create a table to display the marks obtained in the exam.

4. Write an HTML code to display a list of 5 cars in a frame .Link each one to a brief description in second frame The left frame should display the list and the right frame should display the paragraph about the frame.

5. Page hit counter
6. Input/output operations
7. Reading/writing files and Directories
8. Calendar application using PHP
9. MySQL Connectivity and Database manipulations
10. Session maintenance in PHP.

Network- Practical Lists

1. Write a socket program for Echo commands

2. Write a socket program for Ping commands

3. Write a socket program for Talk commands

4. Create a socket (TCP) between two computers and enable file transfer between them.

5. Write a socket for HTTP for Web page upload & download

6. Create a Socket (UDP)

7. Write a program for TCP Module implementation

8. Perform a case study for the shortest path routing algorithms to select the network and to select the network path.

Table - **3** : Common Course Structure for **P.G. Degree Programme in Science – M.Sc. (General)** #

(with effect from the academic year 2017-2018 onwards)

M.SC. PHYSICS

Sem. (1)	Sub. No. (2)	Subject Status (3)	Subject Title (4)	Contact Hrs./ Week (5)	Credits (6)
I	1	Core - 1	Classical Mechanics	6	4
	2	Core - 2	Mathematical Physics I	6	4
	3	Core - 3	Integrated Electronics	5	4
	4	Core - 4	Non Linear Dynamics	5	4
	5	Core - 5 Practical - 1	General Physics Experiments I	4	2
	6	Core - 6 Practical – 2	Electronics Experiments I	4	2
			Subtotal	**30**	**20**
II	7	Core - 7	Mathematical Physics II	5	4
	8	Core - 8	Condensed Matter Physics	5	4
	9	Core - 9	Microprocessor & Microcontroller	4	4
	10	Core - 10	Numerical Methods & C++ Programming	4	4
	11	Core - 11	Field Work	4+2	3
	12	Core - 12 Practical - 3	General Physics Experiments Ii	4	2
	13	Core - 13 Practical - 4	Electronics Experiments II	4	2
			Subtotal	**30**	**23**

#

1.) Bio-Chemistry	2.) Biotechnology
3.) Botany	4.) Dietics and Food Management
5.) Electronics	6.) Electronics & Communication
7.) Geology	
8.) Hotel Management and Catering Science and Applied Nutrition	
9.) Nutrition and Dietics	10.) Physics
11.) Zoology	

Sem. (1)	Sub. No. (2)	Subject Status (3)	Subject Title (4)	Contact Hrs./ Week (5)	Credits (6)
III	14	Core - 14	Quantum Mechanics I	6	4
	15	Core - 15	Electromagnetic Theory	6	4
	16	Core - 16	Statistical Mechanics	5	4
	17	Core - 17	Research Methodology	5	4
	18	Core - 18 Practical - 5	Advanced Physics Experiments I	4	2
	19	Core - 19 Practical - 6	Microprocessor Experiments	4	2
			Subtotal	**30**	**20**
IV	20	Core - 20	Quantum Mechanics II	4	4
	21	Core - 21	Spectroscopy	4	4
	22	Core - 22	Nuclear and Particle Physics	4	4
	23	Core - 23 Practical - 7	Advanced Physics Experiments II	4	2
	24	Core - 24 Practical - 8	C++ Programming	4	2
	25	Elective - 1	Elective / Field Work / Study Tour	3+3	3
	26	Core - 25	Project	7+9	8
			Subtotal	**30**	**27**
			Total	**120**	**90**

+ Extra hours for the Field Work/Study Tour/Project

For the Project, **f**lexible credits are b/w 5 – 8 & Hours per week are b/w 10 - 16.

Total number of credits ≥ 90 : 90
Total number of Core Courses : 25 (15 T + 8 P + 1 Prj. + 1 FW.)
Total number of Elective Courses / F.W. / S.T.: 1
Total hours : 120

Core - 1 Classical Mechanics

Unit I Fundamental Principles and Lagrangian Formulation

Mechanics of a particle and a system of particles - Conservation laws - Constraints - Generalised Co-ordinates - Principle of Virtual work - D'Alembert's principle and Lagranges equations - Applications of Lagrange's equations - Hamilton's principle - Lagrange's equation from D'Alembert's principle.

Unit II : Motion Under a Central force : Two body problem

Equivalent one body problem - General features of Central force motion - Equivalent one dimensional problem - General features of the orbits - Motion under inverse square law - Kepler problem - Virial theorem - Unbound motion Rutherford scattering.

Unit III : Rigid Body Dynamics

Mechanics of a rigid body - Displacement of a rigid body - Orthogonal transformation - Eulerian angles - Infinitisinal rotation - Coriolis effect - Kinematics of a rigid body moments and products of inertia - K.E.of a rigid body - Euler's equation of motion - Torque free motion.

Unit IV : Hamilton's Formulation

Hanilton's equation from variational principle - Principle of least action – Applications- Legendre transformation - Canonical transformations - Lagrange and Poisson brackets - Equation of motion and conservation theorems in Poisson's brackets - Hamilton Jacobi method - Application to Harmonic osciallator - Hamilton's characteristic function - Separation of variable - Action angle variables - Kepler problem in action angle variables.

Unit V : Mechanics of Small Oscillations

Stable and unstable equillibrium - Formulation of the problem - Lagrange's equation of motion for small oscillations - Properties of T,V and w - Normal Co-ordinates and normal frequencies of vibration - Double pendulum - Free vibrations of linear triatomic molecule.

Books for Study :

1. Helbert Goldstein, Charles P.Poole John Safco, Classical Mechanics, Pearson, Chennai.
2. Gupta Kumar, Sharma, Classical Mechanics, Prakati Prakasham, Meerut.

Core 2 Mathematical Physics I

Unit I Vector Analysis

Gauss drivergence theorem - Deductions from Gauss divergence theorem - Green's theorem - Green's theorem in a plane - Classification of vector fields.

Unit II Matrices

Eigen values; Eigen Vectors - Characteristic equation of matrix - Cayley Hamilton theorem - Some important theorems of eigen values and eigen vectors - diagonalisation of matrices - Differentiation and integration of matrices - Power of matrics - Exponential of a matrix - Matrices in Physics.

Unit III : Special Functions :

Bessel differential equation and Bessels' function of I Kind - Generating function - Recurrence relations - Laguarre's differential equation and Laguerie polynomial - Generating function - Recurrence relations.

Unit IV : Fourier's Integral Transforms

Introduction - Fourier's transform (FT) - Properties of FT - FT of a derivative - Fourier sin and cosine transforms of derivatives - FT of functions of two or three variables - Finite FT - Simple applications of FT.

Unit V : Laplace Integral Transforms

Laplace Transform (LT) - Properties of LT - LT of derivation of a function - LT of periodic functions - Properties of inverse LT - Convolution theorem - Evaluation of inverse LT by convolution theorem - Application of LT.

Book for Study :

1. Sathya Prakash, Mathematical Physics, Sultan chand & sons, New Delhi.

Books for Reference :

1. Applied mathematics for Engineer and Physics,. Louis A.Pipes Lawrence R.Harvill, Mc Graw Hill Ltd., 1970.

2. Eugune Buthov, Mathematical Physics, Addision Weslay 1968.

Core 3 Integrated Electronics

Unit I Devices, Applications and Integrated Circuits

FET-Types of FET-Characteristics and applications of FET, MOSFET- SCR, DIAC,TRIAC-High frequency device-Inegrated Circuits-IC Fabrication Technology - Steps in Fabrication - Integrated Resistors and Capacitors-VLSI Technology.

Unit II Digital Electronics

Logic Families - DTL, RTL,TTL, ECL, I^2L,CMOS,NMOS and PMOS - DTL type AND, OR, NAND and NOR gates - RTL and TTL type NAND - CMOS NOR and CMOS NAND - Flip Flops: RS-RST-D- JK- JK Master/Slave- Asynchronous Counters and Synchronous Counters - Registers.

Unit III OP AMP and Applications

Characteristics and Parameters -DC Analysis of IC OP AMP- Applications of OP AMP - Instrumentation amplifier -Sample and Hold System- Analog Multiplexer -Integrator - Differentiator- Design of Analog circuits for the solution of Simultaneous and Differential Equations- Filters: First and Second order LOW,HIGH and BAND pass filters.

Unit IV Timer, VCO, PLL, and Applications

Timer-555 Timer IC-Internal Architecture and Working-Modes of Operation: Monostable and Astable operation- Applications-Voltage Control Oscillator - IC 566-PLL Concept-PLL IC 565 - Application- Frequency multiplexer - FSK Modulation and Demodulation.

Unit V Electronic Measurement and Control

Sensors and Transducers - Measurement and Control - Signal Conditioning and Recovery -Impedance Matching - Amplification (OP Amp based Feedback Amp, Instrumentation Amp) - Noise and Noise Sources -Filtering and Noise Reduction -Shielding and Grounding - Fourier Transform - Lock- in Detector/Amplifier - Box-Car Integrator or Averager - Modulation Techniques.

Books for Study:

1. Integrated Electronics Analog and Digital Circuits and Systems, Second Edition, Jacob Millman, Christos C Halkias, Chetan Parikh, Tata McGraw Hill Education Private Limited, NewDelhi.
3. Analog and Digital Electronics, U.A. Bakshi, A.P.Godse, Technical Publications, Pune.

Books for Reference :

1. Introduction to Semiconductor Devices M.S.Tyagi, John Wiley and Sons.
2. Electronic instrumentation, P.P.L. Regtien, VSSD Publications, 2005

Core 4 Nonlinear Dynamics

UNIT I Nonlinearity, linear and nonlinear oscillators

Dynamical systems-linear and nonlinear forces-Mathematical implications of nonlinearlty- Working definition of nonlinearity-Effects of nonlinearity-Linear oscillators and predictability- Damped and driven nonlinear oscillators.

UNIT II Equilibrium points, bifurcations and chaos

Equilibrium points-General criteria for stability-Classification-Some simple bifurcations - Saddle node, pitch fork, transcritical and Hopf bifurcations-Discrete dynamical systems-Logistic map-Equilibrium points and their stability-period doubling phenomenon-chaos.

UNIT III Chaos in nonlinear electronic circuits

Linear and nonlinear circuit elements-nonlinear circuits-Chua's diode-Autonomous case-Bifurcations and chaos-Chaotic dynamics of MLC circuit-Analogue circuit simulation-Some other useful nonlinear circuit - Colpitt's oscillator.

UNIT IV Fractals

Self similarity-Properties and examples of fractals-Fractal dimension-Construction and properties of some fractals-Middle one third cantor set-Koch curve-Sierpinski triangle-Julia set-Mandelbrot set-Applications of fractals.

UNIT V Solitons

Linear waves-Linear non dispersive wave propagation-Linear dispersive wave propagation-Nonlinear dispersive systems-Korteweg de vries equation- solitary and cnoidal waves-Numerical experiments of Zabusky and Kruskal-birth of solitons—Properties of solitons-applications of solitons.

Book For Study:

1. Nonlinear dynamics, Integr ability, Chaos, Patterns, M. Lakshmanan and S.Rajasekar, Springer, Berlin, 2003.

Books for Reference:

1. Chaos in nonlinear oscillator, controlling and synchronization, M.Lakshmanan and K.Murali.(World Scientific, Singapor,1997.)
2. Deterministic chaos, H.G.Schuster,(Verlag,Weinheim,1998.)

Core 5 Practical 1

General Physics Experiments I

Any 5 Experiments

1. ***Susceptibility***
   a. Determination of susceptibility of the given paramagnetic solution by Quinke's Method for various normalities,
   b. Determination of Magnetic Moment and Bohr Magnetron from graph and by calculation for various normalities.
2. ***Cauchy's Constant***
   a. Determination of Cauchy's Constant by spectrometer.
   b. Verification of the experimental result with graphically obtained value.
3. ***Michelson's Interferometer***

   Determination of wavelength of a source and thickness of a thin transparent medium by forming interference pattern,
4. ***Anderson's Bridge***

   Determination of self inductance of the given coil - (different turns/coil).
5. ***Force Constants***

   Calculation of force constants of a molecule from the vibrational spectral data
   - At least 3 spectrum
6. ***Solar Absorption Spectrum***

   Importance of Solar Absorption spectrum and Fraunhofer lines Determination of wavelength of various absorptions.
7. ***Thickness of a thin material/ diameter of a thread.***

   Determination of thickness of a very thin material or diameter of a thread using LASER diffraction and also by Airwedge method. Comparison of the results. Variation in thickness/diameter with Load.

Core 6 Practical 2

Electronics Experiments - I

Any 5 Experiments

1. ***Series Voltage Regulator***

   Construction of a series voltage regulator using transistor (as an error amplifier) - study the regulation factors (line regulation, load regulation) - to find out the percentage of regulation.

2. ***Schmitt Trigger***

   Designing of a Schmitt trigger circuit using transistors - Trace the input and output waveforms - Draw Hysteresis curve and calculate hysteresis voltage both theoretically and experimentally.

3. ***Wave Form Generators***

   Construction of a triangular and a ramp wave generator using OP Amp and construction of 5555 timer based square wave generator.Theoretical calculation of the frequency of the output wave for various

   R and C values with experimental verification.

4. ***Counters and Decoders***

   Construction and study of Modulus countrs (2 to 9) using IC 7490 or any equivalent IC. Use a 7 segment decoder and a 7 segment display to show output.

5. ***Analog to Digital Conversion***

   Construction of ADC converter using Comparator and an Encoder ICs - Measurement of the digital outputs for various input voltages - Resolution measurement.

6. ***Construction of Constant Current Source***

   Construction of a constant current source using OP Amp and transistor/ FET(floating and grounded load). IR chareteristics.

7. ***FET Characteristics and Amplifier***

   Drain and Transfer characteristics of FET - FET parameters from the characteristics. Designing of a voltage amplifier using FET - Frequency response and bandwidth of the amplifier.

Core 7 Mathematical Physics II

Unit I Complex analysis

Functions of complex variable - Analytic functions - Cauchy -Riemann differential equation - Harmonic functions - Cauchy's integral theorem - Cauchy's integral formula - Derivatives of analytic functions - Residues and their evaluations - Cauchy's residue theorem.

Unit II Group theory

Concept of a group - Abelian group - Cyclic group - Subgroup - Coset - Classes - Conjugate subgroups - Isomorphism and homomorphism - Reducible and irreducible representations - Some important theorems on representations - Orthogonality theorem.

Unit III Special functions II .

Introduction - Legendre differential equation and Legendre polynomial - Generating functions - Recurrence relations - Hermite differential equation and Hermite polynomial - Generating function - Recurrence relations.

Unit IV Partial Differential Equations

Solution of heat flow equation (Method of separation of vriables) – Linear flow in semi infinite solid : Temperature on one face given as sinusoidal function of time – Variable linear flow in an infinite bar – two dimentional heat flow - three dimentional heat flow – Heat flow in circular plate (use of cylindrical co ordinates) – Equation of motion for the vibrating string – Vibrations of a rectangular membrane - Vibrations of a circular membrane

Unit V Tensor analysis

Introduction - Scalar, contravarient and covarient vectors - Tensor of higher ranks - Algebraic operations of tensors - Symmetric and anti symmetric tensor - Fundamental tensor - Tensors in dynamic of a particle - Tensors in elasticity - Moment of inertia tensor.

Book for Study:

1. Mathematical Physics, Sathyapakash, Sultan Chand &Sons, New Delhi.

Books for Reference:

1. Applied Mathematics for Engineers and Physicsts, Louis A.Pipes, Lawrence R, Harvill, McGraw-Hill Ltd, 1970
2. Matrices and Tensors in^{1} Physics- A.W.Joshi, 3rd edition, New Age International Publishers, New Delhi, 1995.

Core 8 Condensed Matter Physics

Unit I Crystallography and crystal binding

Classification of crystals - Two dimensional Brava's - Brava's lattices in 3 dimensional - crystals of inert gases-ionic crystals-covalent crystals-metals-hydrogen bonds-atomic radii-analysis of elastic strains-elastic compliance and stiffness constants-elastic wave in cubic crystals.

Unit II Lattice vibrations

Lattice waves - properties of Lattice waves - vibratimal modes of a finite one - dimensional lattice of identical atoms - diatomic linear lattice - quantizaion of lattice vibrations – phonons momontum - Inelastic scattering by phonons, by long wave length phonons- X rays by phonons- neutrons by phonons

Unit III Free electron theory, Energy bands and Semiconductor crystals

Energy levels in one dimension-free electron gas in three dimensions-heat capacity of the electron gas-Electrical conductivity and Ohm's law-Hall effect-thermal conductivity of metals-Bloch functions-Kronig-Forder-magnons - antiferro magnetic order - Ferromagnetic domains - Origin of domains.

Unit IV Dia, Para, Ferro and Anti ferro magnetism

Langevin diamagnetism equation - quantum theory of diamagnetism -quantum theory of paramagnetism - Hund rules - Paramagnetic susceptibility of conduction electrons-ferromagnetic order-magnons - antiferro magnetic order - ferromagnetic domains - origin of domains.

Unit V Dielectrics, Ferroelectrics and Super conductivity

Macroscopic electric field - Local field at an atom - Dielectric constant and polarizability - Structural phase transitions - Ferroelectric crystals -Ferroelectric domains - Piezoelectricity - occurrence of supcrconductivity -Meissner effect - thermodynamics of superconducting transition - London equation - coherence length - BCS theory of superconductivity - single particle tunneling - DC Josepson and AC Josepson effects.

Book for study :

1. Introduction to Solid State Physics,Charles Kittel, Seventh Edition Wiley-India sixth reprint 2007.

Books for reference

l. Solid State Physics -R J Singh,Pearson First impression 2012

2. Solid Stale Physics-S 0 Pillai New age international Publishers

Core 9 Microprocessor 8085 and Microcontroller 8051

Unit I Introduction to 8085 Microprocessor

Pin diagram and description - Bus System, Control Signals, Status Signals- Clock System - Latching of Address Bus - Interrupt System - Direct Memory Access- Internal architecture - ALU- Registers organization - Special purpose Registers and Counters - Flags - Program Status Word.

Unit II Programming 8085

Assembly Language Programming - Assembler - Instruction Format of 8085-Instruction Set - Addressing Modes - Instruction Cycle, Machine Cycle and T-Slates - Timing Diagram of Read, Write machine Cycles and some basic Instructions - 8 bit and 16 bit addition and subtraction- Loops and Branching - Multiplication and Division in 8085-Searching and Sorting - Finding smallest/biggest number in an array - Time delay calculation- Stack and Subroutines - Software Interrupts and ISR- Data Transfer Schemes.

Unit III Interfacing and peripheral devices

Address Space of 8085- Address space partition- Memory Interfacing - Memory map and Address decoding- Interfacing of RAM (2K x 8 & 4K x 8) and ROM (2R x 8 & 4K x 8) - I/O mapped I/O and Memory Mapped I/O interfacing Schemes - Ports- Interfacing chips: Nonprogrammable Port 8212 - Programmable Peripheral Interface (PPI) 8255 architecture, Control Signals and operating Modes - Programmable Interval Timer (PIT) 8253 .

Unit IV Micro Controller 8051

Introduction - Comparison of Microcontroller & Microprocessor - Pin Diagram and description - Block Diagram of 8051 and Internal Architecture - Clocks - Registers- Flags- Internal Memory, SFR and I/O Ports - External Memory and decoding- Instruction Set and Addressing Modes of 8051- Features available in 8051: Timer and Counters, Timer Modes - Serial Port and Serial Data Transfer.

Unit V Micro Processor based system design and a Applications

Design considerations - Sensors and Transducers - Sample and Hold Circuits- - Interfacing Keyboard and multiplexed seven segment displays - DAC and ADC interfacing - Square, Rectangular and Ramp Wave Generation - Temperature measurement and control - Digital Clock - Stepper Motor Control.

Books for Study:

1. Fundamentals of Microprocessor and Microcontrollers by B. Ram- Dhanpat Rai Publications, 5th Edition
2. Microprocessor and microcontroller system (First Edition) by Godse and Godse , Technical Publication Pune
3. The 8051 Microcontroller and Embedded Systems Using Assembly and C, 2nd Ed. Muhammad Ali Mazidi, Janice G. Mazidi, Rolin D. McKinlay, Pearson India.

Books for Reference:

1. Microprocessor Architecture, Programming and Applications with the 8085, Ramesh S. Gaonkar-4th Ed. Penram International.
2. The 8051 Microcontroller Architecture, Programming and Applications - Kenneth J. Ayala - Penram International Publishing.

Core 10 Numerical Methods and Programming in C++

Unit I Roots of equations and eigen-value problems

Newton-Raphson method. Secant Method. Muller's Method - Lin -Bairstow's Method. Linear Algebraic Equations: Gauss elimination - Gauss-Jordan - Gauss-Jacobi - Inverse of a matrix by Gauss Jordan elimination method.

Unit II Curve Fitting / Interpolation

Curve fitting: Linear Least square fitting - Nonlinear Fit- Fitting a Polynomial Function, Exponential function - Cubic spline fitting – Interpolation: Fundamental theorem of finite difference, Finite difference interpolation with equally spaced: Newton's forward and backward difference formulae - Unequally spaced: Lagrangian interpolation formula.

Unit III Numerical differentiation and integration

Numerical Differentiation : Methods based on interpolation: non uniform & uniform nodal points - Methods based on finite differences: forward & backward difference formulae. Numerical Integration: Trapezoidal Rule, Simpson Rule - Monte-Carlo evaluation of integration. Methods based on undetermined coefficients: Gauss-Legendre, Gauss - Lagurre, Gauss - Hermite integration methods.

Unit IV Solution to ordinary and partial differential equations

Ordinary Differential Equations- Taylor's Series Method- Euler's Method-Euler's modified method - Runge -Kutta 2nd and 4th Order Methods-Predictor- Corrector Methods-Solution to partial differential equations

Unit: V C++ Programming applications

Programme structure: header files, local, global and static variables, input and output statements; Euler's Method: Charging and discharging of a condenser; Runge-Kutta methods: Radioactive Decay; Newton-Raphson method: Solution van der Waals equation; Gauss elimination method: Currents in Wheatstone's bridge; Linear fitting. - least square method : Cauchy's constant; Simpson's and Monte-Carlo methods : Evaluation of (integral) area under the curve;Eigenvalues and eigenvectors of symmetry matrices; Numerical differentiation: Newton's Law of cooling.

Books for Study:

1. M.K.Jain, S.R.K. Iyengar, R.K. Jain, Numerical Methods for Scientific and Engineering computation, 3r edition, New age international (P) Ltd, Chennai (1998).
2. E.Balgurusamy, Object Oriented Programming with C++, Tata McGraw Hill, New Delhi (2000).

Books for Reference :

1. M.K. Venketraman, Numerical Methods in Science and Engineering 2nd Ed., National Publishing Co., Chennai(2010).
2. E. Balagurusamy, Computer Oriented Statistical and Numerical Methods, Macmillan India Ltd, New Delhi (2000).

Core 11 Field work

Core 12 Practical 3

General Physics Experiments II

Any 5 Experiments

1. ***Hyperbolic fringes***

   Determination of Young's modulus, Bulk modulus, Rigidity modulus, poisson's ratio and compressibility of the given material by forming Hyperbolic fringes.

2. Ultrasonic Interferometer

Determination of velocity of ultrasonic sound in the given liquid and compressibility of the liquid.

3. Young's Double Slit

Determination of .wave length of the light source or width of the double slit using Laser source for a) standard kit b) lab/custom made double slit

4. Mutual Inductance

Determination of mutual inductance between a pair of coils. Study of variation of mutual inductance for various distances and angles between the coils and determination of coefficient of coupling in each case. Graphical determination of break in coupling for distance and angle.

5. XRD - Crystallographic Parameters

a) Braggs' Law of Diffraction - derivation,

b) Definition of Cry stallo graphic Parameters - d-Spacing and lattice parameters.

c) Crystal systems and d-spacing in different crystal systems.

d) Content of ICDD file (formerly known as JCPDS)

e) Determination of unit cell dimensions

f) Crystal parameter for the given XRD spectrums,

6. Optical Fibre Characteristics

Determination of

a. Numerical aperture and acceptance angle

b. Attenuation in the fibre and c. Loss due to air gaps and coupling.

Core 13 Practical 4

Electronics Experiments - II

Any 5 Experiments

1. Filters

Design and construction of II order Active Filters (Low pass, High Pass and band pass) using 1C 741 for a particular frequency - Draw frequency response curve for each case.

2. UJT Characteristics and Relaxation Oscillator

Characteristics study of UJT - construction of a relaxation Oscillator. using

UJT to produce the saw tooth wave. Frequency response of the output for various R and C values.

3. Phase Shift and Phase Shift Circuit

Design a Phase shifter circuit using Op-Amp - Measurement of the Phase shift of the input wave for various R and C combinations - Comparison of the experimental output with theoretical values.

4. Digital to Analog Conversion

Construction of Weighted Resistor and R-2R Ladder Network D/A converters using IC 741- Graphing input and output voltages - Resolution Measurement.

5. SCR Characteristics and power control

Characteristics study of SCR - Construction of a power controller device using SCR.

6.*Code Converters*

Construction of Code converters using ICs - Tabulate input and output for various decimal numbers

a. BCD to Excess-3 b. BCD to Gray

c. Excess-3 to BCD d. Gray to Excess-3

7. Analog Computation.

Solve the given 2 variable simultaneous equations by constructing the Analog computers using Op-Amps.

Sample Eqns. a) X+2Y =4 ; 2X+Y = 5 b) 3P + 2Q = 18 ; P + Q =7.

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI
PG - COURSES – AFFILIATED COLLEGES
Course Structure for M.A. (Economics)
(Choice Based Credit System)
(With effect from the academic year 2017-2018 onwards)

Sem. (1)	Sub. No. (2)	Subject Status (3)	Subject Title (4)	Contact Hrs./ Week (5)	Credits (6)
III	13	Core - 9	Mathematical Methods for Economics	6	4
	14	Core - 10	Development Economics	6	4
	15	Core - 11	Financial Economics	6	4
	16	Core - 12	Research Methodology	4	4
	17	Elective - 5	Micro Finance	4	3
	18	Elective - 6	Industrial Economics/Econometrics	4	3
	Subtotal			**30**	**22**
IV	19	Core - 13	Labour Economics	5	4
	20	Core - 14	Human Resource Management	5	4
	21	Core - 15	Public Economics and Public Finance	4	4
	22	Core - 16	Health Economics	4	4
	23	Core - 17	Project	12	8
			Subtotal	**30**	**24**
			Total	**120**	**90**

For the Project, **f**lexible credits are b/w 5 - 8 & Hours per week are b/w 10 - 16.

Total number of credits ≥ 90 : 90
Total number of Core Courses : 17 (16 T + 1 Project.)
Total number of Elective Courses : 6
Total hours : 120

MSU / 2017-18 / PG –Colleges / M.A. Economics / Semester –III / Ppr.no.13 / Core -9

MATHEMATICAL METHODS FOR ECONOMICS

2L+2T+2P 4C

Objective : At the end of the course the student will be able to use the mathematical tools to anlayse the economic problems

Unit – I :Matrix Algebra **6L+6T+6P**

Concept of Matrix – Types of Matrices – Basic Operations – Addition, Substraction and Multiplication and Matrices – Rank and Inverse of a Matrix – Determinants and their basic Properties. Application of Matrix in Economy-Input- Output model

Unit – II : Linear Equations **6L+6T+6P**

Consistency of a System of Linear Equations – Solutions of a System of Linear Equations – Cramer's Rule – Matrix Inverse Method – Guass – Jordan method. Input – Output Analysis – Simple Problems.

Unit – III : Differentiation and its Application **6L+6T+6P**

Rules of Differentiation – Conditions for Maxima and Minima of a Function – Simple Application of Derivatives – Finding Marginal Functions from Total Functions – Elasticity of Demand – Relationship Between AC and MC using Derivatives – Maximization of Profit and Revenue - Minimization of Cost – Partial Derivatives and their Applications in Economics – Optimization of Functions with Two Independent Variables – Cobb-Douglas Production Function – Eulers' Theorem – Constrained Maxima and Minima and its Applications.

Unit – IV : Integration **6L+6T+6P**

Concept of Integration – Rules of Integration – Definite and Indefinite Integration – Application of Indefinite Integration to derive Total Function from Marginal Function – Application of Definite Integration to find out Consumer's Surplus and Producers Surplus.

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Unit – V :Linear Programming **6L+6T+6P**

Basic Concepts – Formulation of Linear Programming Problem – Structure and Variables – Feasible, Basic and Optimal Solutions – Graphical method of Solving Linear Programming Problem – Applications of Linear Programming Problem – Conversion of Primal to Dual.

Text Book

A.C.Chiang – Fundamental Methods of Mathematical Economics

References :

1.R.G.D. Allen, Mathematical Analysis for Economists.

2.Metha and Medhani – Mathematics for Economists.

3.Edward T. Dowling – Mathematical Methods for Business and Economics.

DEVELOPMENT ECONOMICS 2L+2T+2P 4C

Course Objective: At the end of the course the student will be a development economist

Unit I 6L+6T+6P

Nature of Development Economics-Role of values in development economics-Nature of western economic theory-Limited relevance of traditional theory-Economics as social systems-the need to go beyond simple economics-third world social systems as part of an interdependent international social system

Unit II 6L+6T+6P

Diverse structures and common characteristics of developing nations-similarity within diversity-diverse structure of third world economics-size and income level-historical background-physical and human resource endowments-political structure power and interest groups –common characteristics of developing nations-relative growth rates of national and per capita incomes- distribution of national income-extent of poverty, health and education-vulnerability in international relations

Unit III **6L+6T+6P**

Economic growth and development - Factors affecting economic growth: capital, labor and technology, current scenario of agricultural labour in India. Distinguish between economic growth and development.

UNIT IV **6L+6T+6P**

Classical theory of development - Adam Smith, Ricardo, Malthus and J.S.Mill; Kar -Marx and development of capitalistic economy - Theory of social change, surplusvalue and profit - Schumpeter and capitalistic development - innovation.

UNIT V APPROACHES TO DEVELOPMENT **6L+6T+6P**

Theories of growth and development - Vicious circle of poverty, circular unlimited supply of labor; big push, balanced and unbalanced growth, critical minimum effort thesis, low income equilibrium trap; Ranis and Fei model - Dualism. Harrod–Domar model- *Solow Model*.

Text Book: 1.Economic Development in the Third World Michael P. Todaro

2.K.R. Gupta, Economic Growth Models, Atland Publishers

References:

1.Adelman, I. (1961), Theories of Economic Growth and Development, Stanford University Press, Stanford.
2.Behrman, S and T.N. Srinivasan (1995), Handbook of Development Economics, vol. 3 Elsevier, Amsterdam.
3.Brown, M. (1996), On the Theory and Measurement of Technical Change, Cambridge University Press, Cambridge, Mass.
4.Dasgupta, P. (1993), An Enquiry into well being and Destitution, Clarendon Press,Oxford.
5.Debraj Ray, (1998). Development Economics, Princeton *University Press*.
6.Ghatak, S. (1986), An Introduction to Development Economics, Allen and Unwin, London.
7.Gillis, M., D.H. Perkins, M.Romer and D.R. Snodgrass (1992), Economics of
8.Development, (3rd Edition), W.W. Norton, New York.
9.Hayami, Y. (1997), Development Economics, Oxford University Press, New York.
10.Sen, A.K. (Ed.) (1990) Growth Economics, Penguin, Harmondsworth.
11.Solow, R.M. (2000), Growth Theory: An Exposition, Oxford University Press, Oxford.

FINANCIAL ECONOMICS

2L+2T+2P 4C

Objective of the course: At the end of the course a student will be a financial analyst

UNIT I Nature and Role of Financial system 6L+6T+6P

Money and finance – money and near money – financial intermediation and financial intermediaries – the structure of the financial system – functions of the financial sector – indicators of financial development – equilibrium in financial markets – financial system and economic development - criteria to evaluate assets : risk and financial assets – types of risk – return on assets, risk – Return Trade off – Valuation of securities

UNIT II Structure of interest rates 6L+6T+6P

Theories of interest rate determination – level of interest rates – long period and short period rates – term structure of interest rates – spread between lending and deposit rates – administered interest rates – appropriate interest rate policy

UNIT III Non-bank financial Intermediaries 6L+6T+6P

Definition and types of non-bank financial institutions : Their growth and impact on India's economic development, measures taken to control their operations

UNIT IV Financial markets 6L+6T+6P

Role and structure of money market and capital market – call money market. Treasury bill market, commercial bill market including commercial paper and certificate of deposits, discount market – government securities market – markets for derivatives : futures and options, and other derivatives : types, uses and pricing of derivatives – primary and secondary market for securities ; SEBI : its impact on the working of capital market in India ; IRDA and its role in financial markets

UNIT V International Financial Markets 6L+6T+6P

Nature, organization and participants – exchange rates – devaluation and depreciation – working of floating exchange rates since 1973 – risk hedging and futures in exchange rates –

international financial flows, forms and volume – rise and fall of Brettonwood institutions – international liquidity – Reforms in international monetary system for developing countries – lending operation of World Bank and its affiliates – working of IDA and IFC. Growth of regional financial institutions. Asian Development Bank and its lending activities; Asian Development Bank and India. Euro-dollar and Euro currency markets : their developmental role and regulation at the international level

REFERENCE BOOKS:

1. M.A. Shakila Banu, Finance and Securities Market in India, Abhijeet Publications, Delhi, 2011.
2. L.M.Bhole & Jitendra Mahakud, Financial Institutions and market, Tata McGraw Hill, New Delhi, 2011.
3. D.M.Mithani, The Economics of Global trade and Finance, Himalaya Publishing House, Mumbai, 2007.
4. V.A.Avathani, International Finance, Himalaya Publishing House, Mumbai, 2011.
5. Robert Bruner, Case Studies in Finance, Tata McGraw Hill, New Delhi, 2006.
6. Giancardo Gandolf, International Finance in Open Economy, Micro Economy, Springer Publishing House, New York, 2006.

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RESEARCH METHODOLOGY 4L+0T+0P 4C

Objective of the course: At the end of the course the student will be able to undertake independent micro or macro issues that warrant research and help in policy making.

Unit I **10L+0T+0P**

Foundation of Research -The Scientific Approach – Aims of Social Sciences – Scientific Revolution – Role of Methodology – Research Process – Conceptual Foundation of Research – Economic Theory and Method – Axiomatic, Mathematical and Historical Methods – Theory, Models and Empirical Research – Basic Elements in Research – Identification of a Research Problem –Objectives of research-motivation in research-types of research-criteria of a good research-defining a research problem-selecting a problem-review of literature

Unit II **10L+0T+0P**

Research design-need for research design-different types of designs-experimental design-Sampling design-census and sample survey –steps in sampling design-critria for selecting a sampling procedure-characteristics of a good sampling design- how select a random sample-Hypothesis formulation and testing – Research Process

Unit III **10L+0T+0P**

Measurement and scaling techniques-Measurement in research-sources of error in measurement tests-scaling –important scaling techniques

Unit IV **15L+0T+0P**

Data Collection Methods

Principles and Process in Data Collection – Primary Data – Case Study Method – Survey Research — Preparation of Structure Interview Schedule – Construction of Questionnaire – Pilot Study – Classification and Tabulation – Diagrammatic Representation – Secondary Data – Sourcing of data - Processing and analysis of data and interpretation

Unit V **15L+0T+0P**

Report writing-significance of report writing-different steps in writing report-layout of research report-mechanics of writing a research report- referencing systems-research, Policy Making and Advocacy and Activism- influencing policy making-through debates, newsletters, networking with policy makers, - Advocacy and Activism- Skills needed for Advocacy and Activism-Presentation of Research findings-presentation skills –use of published research for policy making and advocacy.

Text Book

1.C.R. Kothari, Research Methodology, Wiley Eastern Limited

Reference Books

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1.C.T. Kurien, A Guide to Research, Sage Publishers
2. Chava Nachimias and David Nachimias, Research Methods in the Social Services.
3.Herbert Wesberg and brew D. Bower, An Introduction to Survey Research and Data Analysis, W.H. Freeman and Company

MSU / 2017-18 / PG –Colleges / M.A. Economics / Semester –III / Ppr.no.17 / Elective - 5

Micro Finance **2L+0T+2P 3C**

Objective of the course: At the end of the course the student will be able to join an MFI or start one.

Unit I 6L+0T+6P

Meaning and Scope – Importance of Micro Finance – Assumptions of Microfinance – Micro-finance: Lessons from International Experience –Models of Microfinance Across the World-Microfinance Delivery Methodologies – Structures of Intermediation for Microfinance in India – Microfinance Products Under Both SHG and MFI Models – Recommendations of Malegam Committee – Code of Conduct for Microfinance Institutions in India

Unit-II 6L+0T+6P

SHG Bank Linkage programme – Joint Liability Groups(JLGs) – Microfinance Institutional Approach – Bank Partnership Model – Banking Correspondent Model – Penetration of Microfinance – MPI and MPPI - Micro-finance Institutional Structure: Types of MFIs – Constraints in Mainstreaming of MFIs and Challenges Faced by the Sector – Portfolio Securitization – SHG-2 – National Rural Livelihood Mission

Unit-III 6L+0T+6P

Financial Inclusion –Need for Financial Inclusion- Present Reach of Banking – Initiatives of Reserve Bank of India – Initiatives of NABARD – Impact Assessment – Impact Monitoring – Microfinance and Poverty Assessment Tools

Unit-IV 6L+0T+6P

The Role of an MFI – Minimalist v/s Integrated – Financial Services/Products – Non-financial Services Designing Microfinance Products – Liquidity Management – Characteristics of Financial Statements – Components of Financial Statements – The Accounting Equation – The Chart of Accounts – Financial Reporting Formats – Some Special Transactions – Mechanics of Accounting – The Revenue Model of an MFI – Cost Volume and Profit (CVP) Analysis – Measuring Operating Efficiency and Productivity in MFIs – Factors Affecting Operating Expenses – Operating Efficiency – The Negative Side – What can the MFIs do to be More Efficient?

Unit-V 6L+0T+6P

Types of Risks for – MFIs –Managing Credit Risk – Financial System – Meaning of a Bank – Functions of Banks – Emerging Trends in Banking – Banking Regulation – Types of Customers

and their Accounts – Compliance to State Acts Like Enacted by Andhra Pradesh State – Guidelines on Priority Sector – Targets and Classification – Compliance to RBI Guidelines on NBFC-MFIs – Self Regulation – The Micro Finance Institution (Development and Regulation) Bill,2012.

(Optional----A student will have to put in atleast 25 hours of internship in any one of the Microfinance institutions in the jurisdiction of the university during free time.)

Text Book:

Micro-Finance Perspectives and Operations, Macmillan education India Pvt. Ltd.

MSU / 2017-18 / PG –Colleges / M.A. Economics / Semester –III / Ppr.no.18 / Elective – 6 (a)

INDUSTRIAL ECONOMICS 2L+0T+2P 3C

Objective of the course: At the end of the course a student will be a opinion leader and consultant in industrial economics

UNIT I FRAMEWORK AND PROBLEMS OF INDUSTRIAL ECONOMICS 6L+0T+6P

Concept and organization of a firm — Ownership, control and objectives of the firm; Passive and active behaviour of the firm.

UNIT II MARKET STRUCTURE 6L+0T+6P

Sellers' concentration; Product differentiation; Entry conditions; Economies of scale; Market structure and profitability; Market structure and innovation; Theories of industrial location — Weber and Sargent Florence; Factors affecting location.

UNIT III MARKET CONDUCT 6L+0T+6P

Product pricing — Theories and evidence; Investment expenditure — Methods of evaluating investment expenditure; Theories and empirical evidence on Mergers and acquisitions (M & As) and diversification.

UNIT IV MARKET PERFORMANCE 6L+0T+6P

Growth of the firm — Size and growth of a firm; Growth and profitability of the firm; Constraints on growth; Productivity, efficiency and capacity utilization — Concept and measurement, Indian situation.

UNIT V INDIAN INDUSTRIAL GROWTH AND LABOUR 6L+0T+6P

Classification of industries; Industrial policy in India — Role of Public and private sectors; Recent trends in Indian industrial growth; MNCs and transfer of technology; Liberalization and privatization; Regional industrial growth in India; Industrial economic concentration and remedial measures; Issues in industrial proliferation and environmental preservation; Pollution control policies. Structure of industrial labour; Employment dimensions of Indian industry; Industrial legislation; Industrial relations; Exit policy and social security; Wages and problem of bonus — labour market reforms.

MSU / 2017-18 / PG –Colleges / M.A. Economics / Semester –III / Ppr.no.18 / Elective – 6 (a)

Text Books

1. Singh, A. and A.N. Sadhu (1988), Industrial Economics, Himalaya Publishing House, Bombay
2. Divine, P.J. and R.M. Jones et. al. (1976), An Introduction to Industrial Economics, George Allen and Unwin Ltd., London.
3. Industrial and Labour Economics, MUKUND Mahajan, SD Geet, Nirali Prakashan publishers

References

1.Ahluwalia, I.J. (1985), Industrial Growth in India, Oxford University Press, New Delhi.
2.Barthwal, R.R. (1985), Industrial Economics, Wiley Eastern Ltd., New Delhi.
3.Cherunilam, F. (1994), Industrial Economics : Indian Perspective (3rd Edition), Himalaya Publishing House, Mumbai.
4.Desai, B. (1999), Industrial Economy in India (3rd Edition), Himalaya Publishing House, Mumbai.
5.Government of India, Economic Survey (Annual).
6.Hay, D. and D.J. Morris (1979), Industrial Economics : Theory and Evidence, Oxford University Press, New Delhi.
7.Kuchhal, S.C. (1980), Industrial Economy of India (5th Edition), Chaitanya Publishing House, Allahabad.

MSU / 2017-18 / PG –Colleges / M.A. Economics / Semester –III / Ppr.no.18 / Elective – 6 (b)

ECONOMETRICS ***2L+0T+2P 3C***

Course objective: At the end of the course the student will be able to use the econometric tools to analyse the economic issues.

UNIT – I CONCEPTS & METHODOLOGY 6L+0T+6P

Definition and Scope : Introduction – Origin, Definition, Objectives, characteristics and scope of econometrics, some basic concepts of econometrics, limitations of econometrics – specification bias - Tools of the study – Methodology of econometric Research –Economic models – Economic and econometric models – Time series model and cross section model.

UNIT II BASICS OF ESTIMATION 6L+0T+6P

Estimator – Estimation – Properties of estimators – small sample properties of estimators – large sample properties of estimators – OLS and maximum likelihood method – statistical properties of least squares estimators - Assumptions of OLS.

UNIT III SIMPLE REGRESSION ANALYSIS 6L+0T+6P

The simple regression model – Estimation of Linear and non- linear regression lines - importance of the BLU properties. The Gauss-Markov theorem – hypothesis testing – Goodness of fit (R^2) – 't' Test - 'F' Test - Reporting the results of regression analysis – applications (Numerical Problems)

Unit IV: Multiple Linear Regression Model: 6L+0T+6P

Multiple Linear Regression Model – Matrix formulation – Least squares Method of Estimation – Testing of coefficient of determination.

Unit V: Qualitative Independent and Dependent Variable 6L+0T+6P

Regression on dummy independent variables – Regression on dummy dependent variables – Linear Probability Model – Logit Model – Probit Model and Tobit Model.

Text Book

1. Apte,P. G. - Text Book of Econometrics (1999) Tata McGraw Hill.

REFERENCE BOOKS :

1.Econometrices : Theoretical foundation and empirical perspectives, Dilip Nachane, Oxford University Press, 2006.

2. Koutsoyiannis, Theory of Econometrics, S.Chand & Co, New Delhi, 1978.

3. Johnston- Econometric Methods (3rd Ed.) McGraw Hill 1985.

4. R.C.Pindyock and D.L.Rubinfeld – Econometric Models and Economic Forecasts, 1988.

5. S.P.Singh, H.P.Singh & Anil K Parashar, Econometrics, S.Chnad & company, New Delhi, 1991.

6. D.Gujarati – Basic Econometrics, Tata McGraw Hill, New Delhi, 2010.

7. Rakesh Jalal, Structures of Econometrics, Cyber Tech Publications, New Delhi, 2012.

8. Introductory Econometrics, Barreto , Cambridge University Press, (ISBN-9780521132589)

MSU / 2017-18 / PG –Colleges / M.A. Economics / Semester –IV / Ppr.no.19 / Core – 13

LABOUR ECONOMICS 3L+0T+2P 4C

Course Objective: The student will be sensitized to the needs of labour and take a proactive stand to frame policies in the field of labour market.

UNIT I LABOUR MARKETS 9L+0T+6P

Nature and characteristics of labour markets in developing countries like India; Paradigms of labour market analysis — Classical, neo-classical and dualistic economy; Demand for labour in relation to size and pattern of investment; Choice of technologies and labour policies; Supply of labour in relation to growth of labour force; Labour market policies; Mobility and productivity of labour; Rationalization; Methods of recruitment and placement; Employment service organization in India.

UNIT II EMPLOYMENT 9L+0T+6P

Employment and development relationship — Poverty and unemployment in developing countries; Unemployment — Concept, Types, and Measurement, particularly in India; Impact of rationalization, technological change and modernization on employment in organized private industry, Public sector and employment in agricultural sector; Analysis of educated unemployment; Employment policy in Five Year Plans and its evaluation.

UNIT III WAGE DETERMINATION 9L+0T+6P

Classical, neo-classical and bargaining theories of wage determination; Concepts of minimum wage, living wage and fair wage in theory and practice; Discrimination in labour markets; Wage determination in various sectors — rural, urban, organized, unorganized and in informal sectors; Non-wage component of labour remuneration; Inflation-wage relationship at micro and macro levels; Productivity and wage relationship; Analysis of rigidity in labour markets; Asymmetric information and efficiency of labour markets in wage determination; National wage policy; Wages and Wage Boards in India; Bonus system and profit sharing.

UNIT IV INDUSTRIAL RELATIONS 9L+0T+6P

Theories of labour movement — Growth, pattern and structure of labour unions in India, Achievements of labour unions; Causes of industrial disputes and their settlement and prevention mechanism; Role of tripartism; Current trends in collective bargaining; Role of judicial activism; Labour legislation in India; Indian labour laws and practices in relation to international labour standards.

UNIT V STATE AND LABOUR **9L+0T+6P**

State and social security of labour — Concept of social security and its evolution; Social assistance and social insurance; Review and appraisal of states policies with respect to social security and labour welfare in India; Special problems of labour: Child labour, female labour, Discrimination and gender bias in treatment of labour; Receding state and its effect on working of labour markets; Labour market reforms — Exit policy, need for safety nets, measures imparting flexibility in labour markets; Second National Commission on Labour; Globalization and labour markets.

Text Book

1. Industrial and Labour Economics, MUKUND Mahajan, SD Geet, Nirali Prakashan publishers

Reference Books

1.Datt, G. (1996), Bargaining Power, Wages and Employment: An Analysis of Agricultural Labour Markets in India, Sage Publications, New Delhi.
2.Hajela, P.D. (1998), Labour Restructuring in India: A Critique of the New Economic Policies, Commonwealth Publishers, New Delhi.
3.Jhabvala, R. and R.K. Subrahmanya (Eds.) (2000), The Unorganised Sector: Work Security and Social Protection, Sage Publications, New Delhi.
4.Lester, R.A. (1964), Economics of Labour, (2nd Edition), Macmillan, New York
5.McConnell, C.R. and S.L. Brue (1986), Contemporary Labour Economics, McGraw-Hill, New York.
6.Papola, T.S., P.P. Ghosh and A.N. Sharma (Eds.) (1993), Labour, employment and Industrial Relations in India, B.R. Publishing Corporation, New Delhi.
7.Rosenberg M.R. (1988), Labour Markets in Low Income Countries in Chenery, H.B. and T.N. Srinivasan, (Eds.), The Handbook of Development Economics, North-Holland, New York.
8.Venkata Ratnam, C.S. (2001), Globalization and Labour-Management Relations: Dynamics of Change, Sage Publications/Response Books, New Delhi.

MSU / 2017-18 / PG –Colleges / M.A. Economics / Semester –IV / Ppr.no.20 / Core – 14

Human Resource Management 3L+0T+2P 4C

Objective of the course: At the end of the course the student will be familiar with the HR principles and practice.

Unit I Human Resource Management 9L+0T+6P

Evolution of human resource management – The importance of the human factor – Objectives of human resource management – Role of human resource manager – Human resource policies.

Unit II The concept of best fit employee 9L+0T+6P

Importance of Human Planning – Forecasting human resource requirement – Internal and External sources. Selection process screening – Tests - Validation – Interview – Medical examination – Recruitment introduction – Importance – Socialization benefits.

Unit III Training and executive development 9L+0T+6P

Types of training methods purpose benefits resistance. Executive development programmes – Common practices - Benefits – Self-development – Knowledge management.

Unit IV Sustaining employee interest 9L+0T+6P

Compensation plan – Reward – Motivation – Theories of motivation.

Unit V Performance evaluation 9L+0T+6P

Method of performance evaluation – Feedback – Industry practices. Promotion, Demotion, Transfer and Separation – Implication of job change.

Text Book

1.Human Resource Management S.D. Geet, A.D. Deshpande, ,Nirali Prakashan publishers
2. Bernadin , Human Resource Management ,Tata Mcgraw Hill ,6th edition 2006.

Books for reference

1. Decenzo and Robbins, Human Resource Management, Wiley, 8th Edition, 2007.
2. Dessler Human Resource Management, Pearson Education Limited, 2007
3. Mamoria C.B. and Mamoria S. Personnel Management, Himalaya Publishing Company, 2007

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PUBLIC ECONOMICS AND PUBLIC FINANCE 4L+0T+0P 4C

Course objective : At the end of the course the student should be able to frame public policies for governance.

Unit I: The Theory of Public and Private Goods 10L+0T+0P

Efficiency of Public Goods – Private preference for Public goods –Voluntary Exchange Theory –Samuelson Theory-Externalities –Negative Externalities –Positive Externalities and inefficiency.

Unit II: Allocation of Resources 10L+0T+0P

Opportunity cost and Allocation - Efficient Allocation of Resources –Optimum Budget.

Unit III: Taxation and Public Expenditure 10L+0T+0P

Sources of Revenue –Kinds –Direct and Indirect Tax –Merits and Demerits –Income Tax –Progressive –Regressive –Degressive Tax –Double Taxation - **Public Expenditure:** Canons of Public Expenditure – Reasons for the growth of Public Expenditure -Wagner's views on Public Expenditure –Peacock – Wiseman Hypothesis –Samuelson and Musgrave Approach – Colin clark Hypothesis.

Unit IV: Public Debt 15L+0T+0P

Meaning –Causes –Classification - Sources -Burden – Kinds of burden - Measurement of Debt Burden –Redemption of Public debt -
Budget in India –Process –Procedure –Purpose of Budget –Types –Revenue and capital Budget -Performance Budgeting –Principles of Budget - Deficit Financing –Meaning –Methods – Effects –Limitation –Deficit Financing in India.

Unit V:Federal Finance 15L+0T+0P

Allocation of Revenue -Resources between Centre and States –Division of Functions – Division of Resources – Central Resources – State List –Finance Commission –Functions – Major Recommendations of 12th and 13th Finance Commission - Local Finance –Meaning and Importance –Sources for Finance for Local Governments –Role of Panchayat Raj –Gramsabha –Finances of Municipalities and Municipal Corporations.

Text Book

1.Public Economics in India, Theory and Practice, J.R .Gupta Atlantic Publishers and Distributors
2.Public Finance in Theory and Practice, R.A.Musgrave and P.B.Musgrave, R.A.Musgrave and P.B.Musgrave, McGraw Hill Publications,5^{th}Edition ,1989

References:

1. Lectures on Public Economics, Atkinson, A.B and J.E.Siglitz (1980), Tata McGraw Hill, New York

2. Public Finance and Public Choice, John Cullis and Philip Jones, Oxford University Press Ist Edition, 1998

3. Public Finance, B.P.Tyagi Revised by Dr.H.P.Singh, Jai PrakashNath& Co

4. Public Finance, Harvey Rosen, McGraw Hill Publications, 7thEdition, 2005

5. Public finance, Its theory and working in India, Bhargava (2004), Chaitanya Publishing House

6.Public Economics, Myles, G New York, NY: Cambridge University Press, 1995. ISBN: 0521497698.

7.Public Finance, R.K.Lekhi, - Jogindar Singh Publishers

MSU / 2017-18 / PG –Colleges / M.A. Economics / Semester –IV / Ppr.no.22 / Core – 16

Health Economics 4L+0T+0P 4C

Objective of the course: At the end of the course a student should become public policy analyst in health care system.

Unit I The National and International Health Scene: **10L+0T+0P**

Health output and input indicators and their correlation with the level of economic development and with the public expenditure on health.

Unit II Traditional Health care: **10L+0T+0P**

Growth of Allopathy,Homeopathy and Indian Traditional Medicine –Educational Institutions in India –Hospitals in Rural and Urban India –Measures taken by Government. A review of the Indian National Health Policy

Unit III Resource Allocation in the Health Sector : **10L+0T+0P**

Resource allocation problems in private and Government Hospitals –The problem of multiple services of a hospital -Pricing of these services and the choice of the mix of services –The tradeoffs between quantity and quality -Production Function .productive efficiency and equity considerations applied to the hospital sector, spatial distribution of health care facilities and services –The demand for health services and the role of physician –The pharmaceutical companies –TRIPs and Health care

Unit IV Evaluation of Benefits and Cost of Health Services : **15L+0T+0P**

Private benefits and private costs pf providing health services –The failure of the market to provide essential health services –The provision of Health services by the Government –The application of benefit cost analysis to public Health and Family Planning projects-The role of Health in economic development –Value of output lost due to number of sick days –Benefits and costs (both private and social) of training to professional manpower such as physicians –dentists, pharmacists, nurses.

Unit V Financing of Health Services: **15L+0T+0P**

A review of per capita and public expenditure on Health services over time and in different parts of the country –An Analysis of the sources (public) finance for health –The need for a general health insurance – the need for a special insurance for the poor ,disabled and the aged –A comparative analysis of alternative payment system, prepayment scheme –saving linked direct insurance system etc. Financing health service through specific (Health Cess) and general (direct and indirect taxes)Local government revenues –The role of financing institutions in financing health services.

Text book:

Health Economics, Jay Bhattacharya, timothy Hyde, Peter Tu, Macmillan Education, Palgrave

Reference:

1. Banerjee, D. (1975), social and Cultural Foundations of Health Service Systems of India, Inquiry, Supplement to Vol. XII, June. 29
2.Banerjee, D. (1982), Poverty, class and Health Culture in India, Vol. I Parchi Prakashan, New Delhi.
3. Gandhian Institute for rural and Family Planning (1972), studies on Mortality in India, Monograph Series No. 5.
4. Government of India (1983), National Health Policy, New Delhi.
5. Indian Council of Social Science Research and Indian Council of Medical Research (1981), Health for All 2000 a. D. ICSSR, Delhi.
6. Madan, T. N. (1969), Who Chooses Modern Medicine and Why, Economic and Political Weekly, pp. 1475-84.
7. Madan, T. N. 91980), Doctors and Society –Three Asian Case Studies, Vikas Publishing House, Delhi.
8. Naik, J. P. 91977), An alternative System of Health Care services in India – Some Proposals, ICSSR, Delhi.
9. Feldstein, M. S. (1977), Economic analysis of Health Service Efficiency, North Holland, Amsterdam.
10. Jimenez E. (1987), Pricing Policy in the Social Sectors, The John Hopkins University Press, New York.

MSU / 2017-18 / PG –Colleges / M.A. Economics / Semester –IV / Ppr.no.23 / Project

Project Work : Contact hours 12 Credit 8.

At the end of the semester a student will have to submit a project report duly approved by the Guide and the Head. Ensure that one day (5 Hours) in a week is completely left free to enable students move to different institutes or to the field. A total of 25 hours of library work is mandatory in the semester preferably in the early part of the semester to make students read research articles. Inflibenet account can be given to students.

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI
PG - COURSES – AFFILIATED COLLEGES
Course Structure for M.A. (English)
(Choice Based Credit System)
(With effect from the academic year 2017-2018 onwards)

Sem.	Sub 'Pr.No.	Subject status	Subject Title	Hrs/ week	Credits
III	13	Core – 9	Literary Theory and Criticism II	6	4
	14	Core – 10	World Literature in English Translation	6	4
	15	Core – 11	Shakespeare	6	4
	16	Core – 12	Research Methodology	4	4
	17	Elective -5	Commonwealth Literature	4	3
	18	Elective – 6	History of English Language and Linguistics (Elective VI)	4	3
			Sub Total	30	22
IV	19	Core – 13	Literature and Ecology	5	4
	20	Core – 14	Diasporic Women's Writing	5	4
	21	Core – 15	Postcolonial Writings	4	4
	22	Core – 16	English Language Teaching	4	4
	23	Project	Dissertation	12+	8
			Sub Total	30	24

MSU / 2017-18 / PG –Colleges / M.A.(English) / Semester -III /Ppr.no.13 / Core -9

Literary Theory and Criticism –II

Hrs	Credits
6	4

OBJECTIVES

1. To impart knowledge on new theories and the consequent association of ideas generated thereof.
2. To make the students understand the concepts and applications of theories.

OUTCOME

This course deals with the various strategic points involved with a new directionality in learning.

Unit – I

Mark Schorer - from *Technique as Discovery*

Roman Jakobson - "Two Aspects of Language and Two Types of Aphasic Disturbances"

(20L)

Unit – II

Jonathan Culler - "Structuralism and Literature"

Roland Barthes - "The Death of the Author"

(20L)

Unit – III

Terry Eagleton -"Introduction" in*Literary Theory: An Introduction*

Stephen Greenblatt - "Resonance and Wonder"

(20L)

Unit – IV

Edward Said - "Introduction" in *Orientalism*

HomiBhabha - "Introduction" in *Location of Culture*

(15L)

Unit – V

Sandra Gilbert & Susan Gubar – excerpts from *The Madwoman in the Attic*

Simone de Beauvoir - "Woman as the Other" from *The Second Sex*

(15L)

Source Texts

1. S. Ramaswami& V.S. Sethuraman. *The English Critical Tradition: An Anthology of English Literary Criticism*. Vol 2 Chennai: Trinity Press
2. *Modern Literary Theory: a Reader* Eds. Philip Rice & Patricia Waugh. London: Bloomsbury
3. RohanSavarimuthu.*Literary Theory and Criticism since 1930.* Chennai: New Century Book House.
4. *The Norton Anthology of Theory and Criticism. 2nd Edition*. Eds. Cincent B. Leitch et al. New York: W.W. Norton & Company.

Recommended Reading

1. Elaine Showalter. *The New Feminist Criticism*
2. Jonathan Culler. *Literary Theory: A Very Short Introduction*
3. Peter Barry. *Beginning Theory: An Introduction to Literary and Cultural Theory*
4. Terry Eagleton. *Literary Theory: An Introduction*

World Literatures in English Translation

Hrs	Credits
6	4

OBJECTIVES

1. To introduce the students to new areas of literature.
2. To make the students understand the cultural and the moral precepts of various nations.

OUTCOME

This course deals with the various genres that demonstrate an overall view of nations.

Unit – I Poetry

Virgil - The Aenied (Book I Lines 1 – 222)

(15L)

Unit – II Prose

St. Augustine - The Confessions (Book I Chapter 1 – 19)

(15L)

Unit – III Drama

Sophocles - Oedipus Rex

Bertolt Brecht - Mother Courage and Her Three Children

(20L)

Unit – IV Short Stories

Anton Chekov - The Lady with the dog

SaadatHasanManto - The Price of Freedom

Guy de Maupassant - The Diamond Necklace

Leo Tolstoy - God Sees the Truth but Waits

(20L)

Unit – V Fiction

Albert Camus - The Stranger

OrhanPamuk - My Name is Red

(20L)

Shakespeare

Hrs	Credits
6	4

OBJECTIVES

1. To introduce the students to the fundamentals of drama as enunciated by Shakespeare.
2. To make the students understand the technical nuances of Elizabethan Drama.

OUTCOME

This course deals with the various plays that demonstrate an overall comprehension of the Elizabethan Age.

Unit – I

Midsummer Night's Dream

(18L)

Unit – II

Hamlet

(18L)

Unit – III

Measure for Measure

(18L)

Unit – IV

Antony and Cleopatra

(18L)

Unit – V

Quartos and Folios

Textual Criticism

Shakespearean Criticism

Historical Plays

Narrative Poems

(18L)

Reference:

A.C. Bradley – Shakespearean Tragedy

G. Wilson Knight – The Wheel of Fire , The Imperial Theme

A.W. Pollard – Shakespeare Folios and Quartos

Britannica Encyclopaedia on Shakespeare

Research Methodology--

Hrs	Credits
4	4

OBJECTIVES

1. To introduce the students to the research methodology associated with future courses in literature.
2. To make the students understand the methodology of research.

OUTCOME

This course deals with the various strategies involved in the preparation of dissertation/thesis/journal papers.

Unit – I

Research and Writing

Plagiarism and Academic Integrity

(12L)

Unit – II

The Mechanics of Writing

(12L)

Unit – III

The Format of the Research Paper

Abbreviations

(12L)

Unit – IV

Documentation: Preparing the list of Works Cited

(12L)

Unit – V Novel

Documentation: Citing Sources in the text

(12L)

Reference:

MLA Hand Book for Writers of Research Papers – 8th Edition

Commonwealth Literature

Hrs	Credits
4	**3**

OBJECTIVES

1. To impart the knowledge of colonial expansions enacted by the British regime.
2. To make the students understand the East-West cultural conflicts.

OUTCOME

This course deals with the literatures of various countries as having been impacted upon by colonialism.

Unit – I Poetry

Derek Walcott - "Ruins of a Great House"
"A Far Cry from Africa"
Mervyn Morris - "Judas"
Razia Khan - "My Daughter's Boyfriend"
Judith Wright - "The Harp and the King"

(12L)

Unit – II Drama

George Ryga - Indian

(12L)

Unit – III Fiction

BapsiSidhwa - Ice Candy Man

(12L)

Unit – IV Fiction

Margaret Laurence - Diviners

(12L)

Unit – VNon-fiction

Arundhati Roy- Walking with Comrades

(12L)

MSU / 2017-18 / PG –Colleges / M.A.(English) / Semester -III /Ppr.no.18 / Elective - 6

History of English Language and Linguistics

Hrs	Credits
4	3

OBJECTIVES

1. To impart the knowledge of the science of language.
2. To make the students understand the evolution of the English language.

OUTCOME

This course deals with the impact factors of ancient languages.

Unit – I English Language

Place of English in the Indo-European Family of Languages

Old English, Middle English, Modern English, Global English,

Grimm's Law, Verner's Law

(12L)

Unit – II Influences

Latin, French, Greek, Scandinavian

(12L)

Unit – III Linguistics

What is Linguistics?

Modern Linguistics: A Historical Survey

(12L)

Unit – IV

I C Analysis

TG Grammar

(12L)

Unit – V Phonetics

Phonetics: Classification of English Vowels and Consonants

Stress and Intonation

Transcription

(12L)

Reference:

F.T. Wood – An Outline History of English Language

Phonetics: Macmillan Publication

Peter Roach – English Phonetics and Phonology. Cambridge University Press.

LalithaRamamoorthy – A History of English Language and Elements

Baugh, A.C. A History of the English Language (1973)

George Yule. *The Study of Language Fifth Edition*

MSU / 2017-18 / PG –Colleges / M.A.(English) / Semester -IV /Ppr.no.19 / Core - 13

Literature and Ecology

Hrs	Credits
5	4

OBJECTIVES

1. To direct the students into a new focus of literature.
2. To make the students understand the relationship of literature with issues of nature.

OUTCOME

This course deals with nature issues and the writers' concern for Nature.

Unit – I Introduction

Ecology, Literature and Language

Peter Barry – *Beginning Theory*3rd Edition *(*Chapter 13 "Eco Criticism")

(15L)

Unit – II Poetry

S.T. Coleridge	-	To Nature
Emily Dickinson	-	Summer Shower
Toru Dutt	-	Our Casuarina Tree
MuhammedIqbal	-	A Mountain and a Squirrel

(15L)

Unit – III Prose

Terry Tempest William	-	Refugee: An Unnatural History of Family and Place
Margaret Atwood	-	Survival – Chapter I Nature the Monster

(15L)

Unit – IV Fiction

AmitavGhosh	-	The Hungry Tide
Margaret Atwood	-	Surfacing

(15L)

Unit – V Drama

William Shakespeare	-	As You Like It

(15L)

Reference:

1. *The Eco Criticism Reader: Landmarks in Literary Ecology* by Harold Fromm and CheryllGlotfelty
2. *The Environmental Imagination: Thoreau Nature Writing and the Formation of American Culture* by Lawrence Buell
3. *Bloomsbury* by N. Krishnaswamy

MSU / 2017-18 / PG –Colleges / M.A.(English) / Semester -IV /Ppr.no.20 / Core – 14

Diasporic Women's Writing

Hrs	Credits
5	4

OBJECTIVES

1. To impart the knowledge of the feminine/feminist perceptions of life.
2. To make the students understand the universal feminine issues.

OUTCOME

This course deals with the women writers of various countries whose writings are expressions of the feminine dilemma.

Unit I Poetry

ChitraBanerjee Divakaruni - Cutting the Sun
My Mother Combs My Hair
DebjaniChatterjee - All Whom I Welcome Leave
Just Middling

(15L)

Unit II Prose

ChimamandaNgoziAdichie - We Should All Be Feminists
MeenaAlexander - MigrantPoetics(from *Poetics of Dislocation*)

(15L)

Unit III Drama

Uma Parameshwaran - Sons Must Die
Julia Cho - 99 Histories

(15L)

Unit IV Fiction

Gita Hariharan- Fugitive Histories
JhumpaLahiri - The Lowland

(15L)

Unit V Fiction

ZadieSmith - White Devil
MeeraSyal - Anita and Me

(15L)

Reference:

MeenaAlexnader,*Poetics of Dislocation* ,University of Michigan Press,2009.
Esther Kim Lee(Editor), *Seven Contemporary Plays from the Korean Diaspora in the Americas,* Duke of University Press,2012.
ChimamandaNgoziAdichie, *We Should All BeFeminists*, Vintage Books 2012.
Joel Kurotti, *Writing Imagined Diasporas: South Asian Women Reshaping North American Idnentity,* Cambridge Scholars Publishing, Newcastle, 2007.
MukeshYadev, *The Panorama of South-Asian Diaspora Literature*, Yking Press, Jaipur, 2012.
Arvind Kumar Jha and Ram Kumar Naik, *Indian Diaspora Literature in English*, Raj Publication, New Delhi, 2014.
Uma Parameshwaran, *Sons Must Die* and Other Plays, (South Asian and Canadian Literature Series), Prestige, New Delhi 1998.

MSU / 2017-18 / PG –Colleges / M.A.(English) / Semester -IV /Ppr.no.21 / Core – 15

Postcolonial Writings

Hrs	Credits
4	4

OBJECTIVES

1. To impart the knowledge of colonial expansions enacted by the British regime.
2. To make the students understand the East-West cultural conflicts.

OUTCOME

This course deals with the literatures of various countries as having been impacted upon by colonialism.

Unit I -- Poetry

Gabriel Okara - "Once Upon a Time"

ArunKolhatkar - "Woman"

Kamala Wjratne -"To a Student"

(12L)

Unit II --Prose

A.K Ramanujan - " Is There an Indian Way of Thinking?"

(An Informal Essay in *The Collected Essays of A.K.Ramanujan)*

Chinua Achebe - Thoughts on the African Novel

(12L)

Unit III-- Drama

GirishKarnard - Tughlaq

Wole Soyinka - Lion and the Jewel

(12L)

Unit IV --Fiction

J. M Coetze - Disgrace

Salman Rushdie – Midnight's Children

(12L)

Unit V-- Fiction

Patrick White - The Tree of Man

Arundhati Roy - The God of Small Things

(12L)

English Language Teaching –

Hrs	Credits
4	4

OBJECTIVES

1. To make the students aware of the new trends in English Language Teaching.
2. To make the students understand the new communicative patterns.

OUTCOME

This course deals with various skills associated with English Language Teaching.

Unit I -- Listening Skills

- Introduction and Definition
- Listening Process
- Listening in Language Teaching
- Teaching Listening

(12L)

Unit II-- Speaking Skills

- Introduction and Definition
- Direct Method
- Situational Method
- Factors affecting Learners' Speaking

(i) Cognitive Factors
(ii) Linguistic Factors
(iii) Affective Factors

(12L)

Unit III -- Reading Skills

- Introduction and Definition
- Silent and Loud Reading
- Learning Structures
- Pronunciation

(12L)

Unit IV-- Writing Skills

- Introduction and Definition
- Grammatical Skills

(i) Linkers
(ii) Vocabulary

- Coherence and Cohesion
- Paragraph Writing

(12L)

Unit V-- Testing

- Introduction and Definition
- Features of a Good Test
- Types of Tests

(i) Achievement Test
(ii) Proficiency Test
(iii) Diagnostic Test
(iv) Aptitude Test

(12L)

Textbooks

1. Ray Mackay**,** ***A****Basic Introduction to English Language Teaching.*

2. Roger Hawkey, *A Modular Approach to English Language Skills.*

3. G.Ramabadracharyulu et al. ,*Methods of Teaching English Language.*

MSU / 2017-18 / PG –Colleges / M.A.(English) / Semester -IV /Ppr.no.23 / Project

Dissertation Writing and Viva-Voce

Hr	Credits
12+	8

OBJECTIVES

1. To make the students apply the strategies of research so that the project work might evolve as an illustration of all research methodologies.
2. To help the students gain a practical knowledge of research.

OUTCOME

This project helps the students with a practical knowledge and understanding of literature.

The students are expected to submit a Dissertation of about 50 pages on preferably a recent writer not included in the current syllabi.

The dissertation will be evaluated on the basis of the students' understanding of the topic, their knowledge of the fundamental aspects of research and their ability to document and present their work in accordance with the concepts of research methodology.

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI
PG - COURSES – AFFILIATED COLLEGES
Course Structure for M.A. History
(Choice Based Credit System)
(With effect from the academic year 2017-2018 onwards)

Sem. (1)	Sub. No. (2)	Subject Status (3)	Subject Title (4)	Contact Hrs./ Week (5)	Credits (6)
III	13	Core – 9	History of India 1765 AD -1947 AD	6	4
	14	Core - 10	History of England (1688-1958 AD)	6	4
	15	Core – 11	History of Europe 1789 A.D -1945 AD	6	4
	16	Core - 12	Historiography- Theory and Methods	4	4
	17 18	Elective – 5 &6	History of USA (1776 -1865 AD) Human Rights Panchayat Raj (Choose any two)	4 4	3 3
	Subtotal			**30**	**22**
IV	19	Core – 13	History of India since 1947A.D	5	4
	20	Core – 14	History of USA 1865-1945 AD	5	4
	21	Core – 15	History of China 1839-1964 AD	4	4
	22	Core – 16	History of Political Thought.	4	4
	23	Core - 17	Project	12 +	8
			Subtotal	**30**	**24**
			Total	**120**	**90**

For the Project, flexible credits are b/w 5 - 8 & Hours per week are b/w 10 - 16.

Total number of credits ≥ 90 : 90
Total number of Core Courses : 17 (16 T + 1 Prj.)
Total number of Elective Courses : 6
Total hours : 120

LTPC
2404

HISTORY OF INDIA FROM 1765 AD TO 1947

The syllabus covers the entire panorama of events right from the ascendency of British power in India and its eventful collapse due to Indian freedom movement.

The study will create a deep and intense feeling of nationalism and love for Mother India

UNIT: I - Establishment of British Supremacy in India

Take over of Mysore: Anglo-Mysore Wars (1766-1799)-Fall of the Marathas- Maratha Wars (1775-1818) Annexation of Sind and Punjab- Anglo-Sikh wars (1845-1849) **(17L)**

UNIT: II – Challenges to British Power and Reform Movements

Minor Revolts against the British- The great upheaval of 1857-Causes, Nature and Significance.-Hindu Revivalism-Brahma Samaj- Rajaram Mohan Roy-Devendranath Tagore-Kesab Chandra Sen- Prarthana Samaj- Arya Samaj- Ramakrishna Mission- Theosophical Society. Muslim Revivalism: The Aligarh Movement. **(19L)**

UNIT: III - Rise of Nationalism

Factors for the rise of Nationalism-Pre-Congress Associations: Political Associations in Bengal, Bombay and Madras Presidencies. Indian National Congress – Growth of the Congress from 1885-1905. The Moderates –Objectives, Techniques and achievements – The Revolutionaries **(16L)**

UNIT: IV - Freedom Movement between 1905 - 1947

Partition of Bengal- Swadeshi Movement –Rise of Muslim Communalism- Formation of Muslim League- Surat Split- First World War and the Home Rule Movement- Lucknow Pact-Advent of Gandhi on the political scene of India- His ideology –Congress League Scheme-Reaction to Rowlatt Act- Satyagraha launched by Gandhi –The Khilafat and the Non Co-operation Movements- The Swarajya Party- Simon Commission- Nehru Report- Jinna's fourteen points- Civil Disobedience Movement- Salt Satyagraha- Gandhi –Irwin Pact-Round Table Conferences- Communal Award- Poona Pact. **(20L)**

UNIT: V- Last Phase of the Freedom Movement

Impact of Second World War- August Declaration – Individual Satyagraha- Cripps Proposal-Quit India Movement- Demand for Pakistan- C.R Formula- Wavell Plan- Simla Conference-Cabinet Mission Plan- Mountbatten Plan- Indian Independence Act of 1947 **(18L)**

(Total =90L)

BOOKS FOR REFERENCE:

1. Agarwal, R.C., - National Movement and Constitutional development in India, S. Chand and Conpany Ltd, New Delhi 1981.
2. Grover B.L - A New Look at Modern Indian History, S. Chand & company Ltd, 2004.
3. Keswani K.B. – History of Modern India 1800-1984, Himalaya Publishing House .Bombay 1985
4. Namboodripad - A History of Indian Freedom Struggle, Social Scientist Press,Trivandrum 1986
5. Parshotam Mehra -A Dictionary of Modern Indian History 1707-1947, Oxford University Press, Delhi,1985.
6. Shilesh Chandra - Modern India 1800-1947,Alfa Publications New Delhi.

LTPC
2404

HISTORY OF ENGLAND (1688 – 1958 AD)

The Syllabus covers the entire history from the Glorious Revolution to the establishment of British Common Wealth of Nations and the outline of British Constitution.

The Study enables to know the true nature of the past History of England and how it overcame its obstacles that impeded its progress.

UNIT: I - The Glorious Revolution:

Glorious Revolution Causes, Events, Significance - Downfall of James II - Bill of Rights 1689-Consitutional Significance- Act of Settlement 1701- William III and the development of Cabinet system- Role of Political Parties in the reign of William III and Queen Anne. **(16L)**

UNIT: II – Hanoverian Succession (1714- 1820)

Significance of Hanoverian Succession- George I (1714-1727)- Sir Robert Walpole (1721-1742)- Origin and growth of the Party System- Evolution of the Cabinet System- George III(1760-1820)- His Personal Rule

(19L)

UNIT: III – Parliamentary Reforms-

Reforms Act of 1832 – The Chartist Movement – The Second Reforms Act of 1867- The Third Reform Act 1884- Parliamentary Act of 1911- The Reform Act of 1918 – The Reform Act of 1928- The Parliament Act of 1949. (17L)

UNIT: IV Growth of the Colonial policy

Old colonial System , its Decline- New Colonial System- Establishment of British Common wealth of Nations – Durham Report – Imperial War Cabinet (1917)-Dominion Status before and after the first World War- Balfour Report 1926 – Statute of Westminster 1931 – Growth of Dominions From 1931- 1947 .

(18L)

UNIT: V Main outlines of British Constitution :

Features of the English Constitution – Conventions- The King of England – The Cabinet System- The British Parliament – Rule of Law in England

(20L)

(Total = 90L)

BOOKS FOR REFERENCE:

1. Adams, George Burton – Constitutional History of England, Johathan Cape, London 1971
2. Mahajan, V.D. – England since 1485, Sultan Chand and Sons, New Delhi, 1974
3. Sachdeva and Gupta - British Consitutional History , Ajanta Prakashan Publishers, Delhi 1983.
4. Sinha, J.P – Constitutional History of England, Kendar Nath Ramnath Publishers, Meerut, 1978.
5. Theodre F. T. Plucknett - English Constitutional History , Sweet and Maxwell Ltd., London , 1960
6. Venkatraman, T.K. – Constitutional History of British Vol. II, Jeyam and Company, Madras, 1958

LT PC
2 4 0 4

HISTORY OF EUROPE (1789 A.D – 1945 A.D)

The syllabus deals with the changes that have taken place in Europe after the French Revolution .It also deals with the predominant role that Europe played in global affairs and the decline of western Europe after the World Wars.

The study enables to know the dangers of war on humanity, how people suffer under dictatorships and how the individuals and nations of Europe made a tremendous sacrifice to achieve their goals.

UNIT: I - Europe from 1789-1870

French Revolution- Causes Course and Results – Napolean Bonaparte – Administration- Wars- Continental system – Defeat and Decline. The Congress of Vienna – Its achievements. The Holy Alliance- Concert of Europe- Revolution of 1830- Revolution of 1848- Napolean III-Foreign Policy. Third Republic of France **(20L)**

UNIT: II - National Movement in Europe

Unification of Italy and Germany – Bismarck- Career and Achievements. The Eastern Question- The Greek War of Independence – The Crimean War- The Russo- Turkish War and the congress of Berlin – Young Turk Movement- The Balkan wars. **(18L)**

UNIT: III - European Alliances and the First World War

The Triple Alliance and the Triple Entente- First World War-Causes, Course and Results- Peace of Paris- League of Nations.

(16L)

UNIT: IV – Dictators and the Enlightened Despot

Locarno Pact- Kellong Briand Pact – Russian Revolution – Facist Italy- Mussolini-Weimar Republic and its failure- Nazi Germany – Turkey under Mustafa Kamal Pasha. **(17L)**

UNIT: V - Europe since 1939

Second World war- Causes, Course and Results- U.N.O. Europe after the Second World war- Cold War-Various Alliances in West and East_ Europe Common Market- Domination of the Two super powers in Europe.

(19L)

(Total =90L)

BOOKS FOR REFERENCE:

1. Anthony Wood - Europe 1815-1960, Longman Group Ltd, 1988.
2. Charles Downer Hazen and S.P Verma - Modern Europe upto 1945, S. Chand & Company Ltd,1984.
3. David Thomson - Europe since Napoleon, Penguin Books, 1977.
4. Grant A.J - -Europe in the Nineteenth and twentieth centuries , Sixth edi. Longman Groups Ltd, London 1976.
5. Gokhale B.K. – Modern Europe 1858 – 1960, Himalaya Publishing House 1987.
6. Vidhyadhar Mahajan - History of Modern Europe since 1789, S. Chand & company Ltd, New Delhi 1981.

LTPC

4 004

HISTORIOGRAPHY: THEORY AND METHODS

The syllabus covers the basic concepts , perceptions, theories and methods of historiography

The study enables to acquaint knowledge in the scientific study of history and the methodology in a logical way.

UNIT: I - Meaning of History

Definition- Scope and Purpose- Art or Science - Kinds of History- Relation with other disciplines-Uses ,Lessons and Abuses of History. **(10L)**

UNIT: II - Theories and Concepts

Causation and Change –Cyclical Theory –Great Man Theory , Theory of Repetition , Theory of Progress-Historical Materialism-Historical Determinism - Positivism , Historicism. **(12L)**

UNIT: III – Writings on History:

Greek ,Herodotus and Thucydides –Roman, Livy and Tacitus-Church ,Eusebius st. Augustine - History in Renaissance Age, Machiavelli - History in Enlightenment Era, Gibbon- Scientific History, Ranke and Toynbee. **(13L)**

UNIT: IV - Historians and classical works

Orientalist :Sir William Jones , Imperialist: James Mill, Nationlist: Bhandarkar, Marxist: D.D.Kosambi, Romila Thapar, Sabaltern studies: Ranajit Guha. **(11L)**

UNIT: V - Methods and Tools:

Forms and Types of Research- Requirements of a Research Scholar- Choosing the subject of research – Hypothesis- Collection of Date- Analysis of Data - Criticisms –Synthesizing - Presentation of Thesis, Foot-notes – Abbreviations-Italics- Dates and Figures. Electronic Sourses -Documentation – Bibliography, Appendix, Glossary and Index. **(14L)**

(Total = 60L)

BOOKS FOR REFERENCE:

1. Bikash Bhaltacharya - An introduction to Historiography, Dominant Publishers and Distributors Pvt Ltd, New Delhi 2011.
2. Collingwood R.G -The Idea of History, Oxford University Press, Delhi, 1988.
3. Krishna Nadar G, - A Text Book of Historical Method and Historiography Karuna Publications, Trivandrum 1995.
4. Rajjayan K. – History in Theory and Method, Ratna Publications, Madurai, 1997.
5. Shiek Ali - History its Theory and Method, Macmillan India Ltd, Madras, 1991.

LTPC
2 2 03

HISTORY OF USA (1776 – 1865 AD)

The study covers the entire events right from the Independence of America, its journey towards westward expansion, its marvelous capability of becoming a federation , to its victory in abolishing slavery at the cost of Abraham Lincoln's life.

The study enables to acquaint knowledge about the political , diplomatic and cultural aspects of U.S.A and its importance to the world.

UNIT: I - American War of Independence

The war of Independence- Causes – course – Peace Treaty of Paris 1783- Reasons for the failure of the English – Results- The Making of the Constitution – Aftermath of the war of Independence.

(11L)

UNIT: II - Federalists in Power.

The New Republic 1789-1801- George Washington- John Adams, Thomas Jefferson. The Democrat(1801-1809) James Madison (1809-1817) the war of 1812- The Peace of Ghent 1814- The Hartford Convention (Dec, 1814- Jan, 1815) (**13L)**

UNIT: III - Monroe Doctrine and Jackson Democracy

James Monroe (1817-1825);J.Q. Adams (1825-1829)- Acquisition of Florida – Missouri Compromise 1820- John Marshall,– Monroe Doctrine – Andrew Jackson and His Democracy(1829-1837) **(14L)**

UNIT: IV - Territorial Expansion

Colonization of Texas and Oregon, The Mexican War ,Purchase of Alaska 1868-; James Buchanan(1857-1861**)** **(10L)**

UNIT: V - Abraham Lincoln

Early Career _ War between the states. North and South before the War- Emancipation of slaves – Results of the Civil war- Reconstruction of the South- The Lincoln Plan

(Total = 60L)

BOOKS FOR REFERENCE:

1. Alfred H. Kelly et.al -The American Constitution its origins and development, Tata Megraw Hill Publishing company Ltd. New Delhi 1986.
2. Majumdar R.K -History of United States of America upto 1865, III Edition 1984,New Delhi.
3. Rajayyan .K - A History of the United States of America, Ratna Publications, Madurai 2000.
4. Samuel Eliot Morison et.al - A concise History of the American Republic II Edition
5. Subramanian .N - A History of USA ,Printed at Ajantha Atchakam, Vaadipatti 1995.

LTPC
2 20 3

HUMAN RIGHTS

The syllabus deals with human rights, emerging areas of human rights, human rights violation and its remedial measures.

The study enables to know the essentiality of human rights for the dignified human existence.

UNIT: I - Evolution of Human Rights

Evolution – Definition – Theories of Human Rights - Kinds of Human Rights: Natural, Historical, Moral and Legal. Man's Natural Rights – Magna Carta (1215) Petition of Rights (1627) Lockean Civil Rights – American Human Rights – French Declaration of Human Rights. Human Rights after the II World War **(13L)**

UNIT: II - Universalisation of Human Rights

Genocides and Demand for Human Rights – Universal Declaration of Human Rights - International Covenant on Civil and Political Rights – optional protocol - International Covenant on Economic, Social and Cultural Rights - International Commission on Human Rights. U.N. General Assembly and Human Rights International Court of Justice

(14L)

UNIT: III – European and Indian Instruments of Human Rights

European Convention on Human Rights - Mexican Declaration - Fundamental rights and Directive Principles **(10L)**

UNIT: IV - Emerging areas of Human Rights

Issues of refugees, Migrants, Women's issues; Female feticide and infanticide – illegal confinements – rapes and deaths under police custody– bonded labour – child labour, traffic in women and minor girls, rights to dissent. **(11L)**

UNIT: V – Human Rights Violations

Human Rights Violations in prison and police stations – Amnesty international court of Justice, National Human Rights Commission – Nongovernmental Organizations, Consumer redressal cells, Peoples Union for Democratic Rights (PUDR) **(12L)**

(Total = 60L)

BOOKS FOR REFERENCE:

1. Adil-ul-Yasin, Archana Upadhyay - Human Rights, Akansha Publishing House,
2. Andrews, J.A. Hins. W - International Protection of Human Rights, Bombay 1986.
3. Desai A.R. (ed) -Violations of Democratic Rights in London. 1987,New Delhi.
4. P.K.Meena - Human Rights – Theory and Practice, MurariLal and sons, New Delhi 2008.
5. Nirmal. C. J (ed) -Human Rights in India Historical Social and Political Perspective. New Delhi. 1999.
6. Suriendar Khanna - Violence against women and Human Rights, Swastic Publishers Delhi 2009.

LTPC

2 2 03

PANCHAYAT RAJ

The syllabus deals with all the aspects of Panchayat Raj including the genesis, growth, its administration and the participation of the people.

The Study enables to know that Panchayat Raj , a decentralised form of government acts as the foundation of India's Political System where each Village is responsible for its own affairs.

UNIT: 1 – Origin of Panchayat Raj

Concept of Panchayat Raj, scope and purpose – Evolution of Panchayat Raj system in India Little Republics – Local Administration under the Mauryas – Manrams and Kuttambalams in Ancient Tamil Nadu – Local self government under the Cholas, the Pandyas and the British – Ripons Experiment – Achievements and Failures **(14L)**

UNIT: II - Panchayat Raj after Independence

Mahatma Gandhi's Concept of Panchayat Raj – Vinobhaji's Views on Gramodhan and Boothan Movement – Committees on Panchayat Raj after independence – 73rd and 74th Constitutional Amendment. Raj Nagar Palika – Provision – Methods of implementations, Powers and Functions – Hurdles – Finance and Bureaucratic red tapsim **(13L)**

UNIT: III - Panchayat Raj system in Tamil Nadu

Panchayat Raj system from 1687 to 1920 – Action of the British Government between 1920 – 1947 Subsequent changes from 1947 to 2001 – Constitutional Assembly – Debates on Panchayat Raj – Two Tier system under Kamaraj and Direct Election under MGR **12L)**

UNIT: IV – Panchayat Raj and Finance

Sources of Income, Areas of Expenditure - Finance Commissions and their recommendations, Budget Allocation of Financial Management in the Local Bodies **(10L)**

UNIT: V - Panchayat Administration

Panchayat Meetings – Resolutions Decision making, implementation. Community Development Scheme, and Programmes, Jawahar Rozgar Yojana, IRDP, Public participation in Panchayat (11L)

(Total =60L)

BOOKS FOR REFERENCE:

1. Aman Kumar - Panchayat Raj and women empowerment Aadi Publications, Jaipur.
2. Anlet Sobitha Bai W - Panchayat Raj, Sharon Publications,Marthandam,2009.
3. Bhaktapada Sinha Roy - Panchayat Raj and Rural Development , Abhijet Publications , Delhi 2008.
4. Goel S.L , Shalini Rajneesh - Panchayati Raj in India , Theory and practice ,Deep and Deep Publications Pvt.Ltd. New Delhi
5. Raghava Rao, D.V - Panchayat and Rural Development.
6. Sundar Ram D - Role of Panchayat Raj institutions in 60 years of Independence , India, Kanishka Publishers , New Delhi 2008.

LTPC
3 20 4

HISTORY OF INDIA SINCE 1947AD

The study discusses about the importance of world peace, India's relations with other countries, the development made in various fields and about the true heroes of our nation

The study enables to know why world peace is important for the development of any country and how diverse and complex was India's socio-economic and political development.

UNIT: I - Post Independent India

– Integration of Princely States : Kashmir, Hyderabad and Junagadh – Role of Vallabhai Patel – Re Organization of states – General Elections - Party System. **(13L)**

UNIT: II - India's Foreign Policy

India's Foreign Policy: Its Basic Concepts – Panchasheela and Non Alignment – India and its Neighbours: Indo- Pak Relations, Indo- Sri Lankan Relations, Indo – Bangladesh Relations and Indo – China Relations. India and the UNO, Commonwealth, SAARC, NAM, Indo - US and Indo – Russian Relations – India and Disarmament. **(15L)**

UNIT: III - Development of Economy and Education

Economic Development : Planning in India – Five year Plans– NITI Aayog – Welfare Programs of the Government – IRDP, Jawahar Rozgar Yojana, etc – Growth of Education: Radhakrishnan Commission – A.L Mudaliar Commission – Kothari Commission – Acharya Ramamurthi Commission – etc., National Literacy Mission – New Educational Policy (1986) – Navodaya Schools and Kendriya Vidyalayas. **(16L)**

UNIT: IV -Development of Science and Technology

Development of Science and Technology : Atomic Energy Commission (AEC) and its Programs – Indian Space Research Organization (ISRO) and its Programs – Defence Research and development Organisation (DRDO) and its Programs – Missile Technology and its development – Bio Technology – Green, White and Blue Revolutions. Development of Communications – Railways, Roadways, Airways. **(17L)**

UNIT: V - Makers of Modern India

Makers of Contemporary India : Nehru, Patel, Indira Gandhi, CV Raman, Radhakrishnan, Visveswarayya, H.J. Bhaba, Vikram Sarabhai, H.N. Sethna, Shanthi Swarup Bhatnagar, B.C. Roy, M.S. Swaminathan, Vargheese Kurian and A.P.J. Abdul Kalam. **(14L)**

(Total = 75L)

BOOKS FOR REFERENCE:

1. Appadorai A. – Select Documents on India's Foreign policy and Relations 1947-1972,Vol-I, Oxford University Press, Delhi 1982.
2. Bipan Chandra – India after Independence 1947-2000, Penquin Books , India 2000.
3. Grover B.L - A New Look at Modern Indian History, S.Chand and Company Ltd, 2004.
4. Keswani K.B. -History of Modern India 1819 – 1964, Himalaya Publishing house, Bombay I edition, 1990
5. Pail R. Brass –The Politics of India Since Independence, II Edi, Cambridge University Press,1995.
6. Percival Spear - The Oxford History of Modern India 1740-1975. II Edition, Oxford University press, Delhi 1992.

LTPC

3 2 0 4

HISTORY OF USA, 1865 – 1945 A.D.

The subject covers the civil war of America, its participation in both world wars and the resurgence of U.S.A as a world power.

The study enables to acquaint the basic concepts of political life in U.S.A , the great experiments in federal democracy and the world wide significance of U.S.A.

UNIT: I –Civil War:

Civil War – Causes, Course, Results, Significance. Abraham Lincoln – Post Civil War Reconstruction - Agricultural Expansion – Rise of Big business – Labour movements. **(15L)**

UNIT: II –Growth of Imperialism

Growth of Imperialism – Sherman Anti – Trust Act of 1890 - Spanish American War – Annexation of Hawai - Philippines and Caribbean – Pacific problems. **(14L)**

UNIT: III – Rise of Progressivism

Rise of progressivism – Theodore Roosevelt - Square Deal – Domestic policy – Big Stick Diplomacy – Taft and Dollar Diplomacy. **(13L)**

UNIT: IV – America and the First World War:

Role of America in the First World War – Woodro Wilson – His Fourteen points – Great Depression and its effects – Hoover administration. **(16L)**

UNIT: V - America as World Power:

Franklin D. Roosevelt – New Deal – America and the Second World War – War time Conferences – Establishment of UNO – Resurgence of USA as World Power. **(17L)**

(Total = 75L)

BOOKS FOR REFERENCE:

1. Rajayyan.K, - A History of United States, Ratna Publications Madurai, 2000.
2. Subramanian. N. - A History of USA, Ennes Publications, Madurai

3. Hill.C.P.	–	A history of United states, Arnold Honimann publishers, New Delhi, 1976.
4. John.A. Krout	-	United States Since 1865, Barners and Noble publishers, New York 1966.
5. Marshal Smelser,	-	American History at a Glance, Barners and Noble, New York, 1966.
6. Sharma Mahmood, Delhi, 2012.	-	The History of United States, Pearson Publications,

LTPC
4 0 04

HISTORY OF CHINA 1839-1964.AD

The study discusses how the western powers forcefully pierced through the thick curtain which China had drawn for centuries , the China's acceptance of exploitation of western powers for decades and its heights after the exploitation.

The study enables to understand the isolated life of China till the beginning of 20th century and how China dominated those nations which were trying to dominate it till yesterday.

UNIT: I - Historical Background

Ch'in Dynasty to Ming Dynasty, Manchu Dynasty- China in the first half of the 19th century. Opening of China: Advent of Europeans-Canton trade-Political organisation-Religion and Philosophy Confucianism - Taoism- Buddhism. **(14L)**

UNIT: II - Western Influence on China

China's relations with Europe- First Opium War 1839-42-Causes, Results, Significance - Taiping Rebellion(1850)- Causes,Results and Impact: Second Opium War 1856-58 Causes-Results and Impact- Hundred days of reforms (1893)- Sino-Japanese conflict (1894-95)-Consequences. **(13L)**

UNIT: III - Revolution of China and aftermath :

The Revolution of 1911-Causes, Course and Results-Dr. Sun-Yat-Sen-Dawn of Chinese Republic- Causes for the Downfall of Manchu Dynasty- Yuan- Shei- Kai- China and the first World War- May Fourth Movement-Washington Conference. **(12L)**

UNIT: IV - Kuo-Min-Tang Communist struggle:

Rise and fall of Kuo-Min- Tang, Chiang- Kai- Sheik- Formation of the Communist Party-Second Sino- Japanese War(1937-45)- China and the Second World War- Mao- Tse- Tung-Establishment of the People's Republic of China. **(11L)**

UNIT: V - China since 1949:

Achievements of the Communist Party after 1949- Cultural Revolution- China's Foreign Policy- Relations with Russia , America, Tibet and India. **(10L)**

(Total = 60L)

BOOKS FOR REFERENCE:

1. Ahmed L.L - A Comprehensive History of the Far East , S. Chand & co Ltd 1981
2. David .M.D - - Rise and Growth of Modern China – Himalaya Publishing House,1986
3. Harold .M. Vinacke - History of the Far East in Modern times, Kalyani Publications New Delhi , 1982
4. Paul N. Clayde Burton. F. Beers -The Far East - Prentice Hall of India Private Ltd, New Delhi 1985
5. Rao B.V - History of Asia from Early Times to 2000A.D, Sterling Publishers Pvt Ltd,2000

LTPC
4 00 4

HISTORY OF POLITICAL THOUGHT

The syllabus covers the various philosophies and view points of political thinkers from the ancient Greek to Modern.

The study enables to know about the principle concepts of political thinkers who formulated their concepts for the benefit and betterment of the people.

UNIT: I - Nature of Political Thought

Origin of State – Concept-Functions- Sovereignty in the state – Code of conduct of the state – Theory of Divine Origin of State.

(10L)

UNIT: II - Greek and Roman Political Thought:

Socrates – His teachings – Plato – His political ideas –Aristotle – Father of political Science - Roman Political Thought - Contribution of Romans to European Political Thought.

(11L)

UNIT: III - Medieval Political Thought :

Influence of Christianity on the growth of Political Thought- Political Ideas of St. Augustine – St . Ambrose _ His Political Philosophy_ Medieval Secularism. **(12L)**

UNIT: IV - Modern Political Thought :

Machiavelli – Writings – Political views about state – Father of Modern Political Thought . Thomas Hobbes – Views about Sovereignty – Secularism , Natural Rights – Liberty and law – Hobbes Political Philosophy – Importance . John Locke – Theory of Separation of powers – Natural Rights and Natural laws. Montesquieu – Views on laws , Forms of Government.

(14L)

UNIT: V - Indian Political Thought :

Gandhi__His Contributition_ Ram Mohan Roy – Social Liberalism – Vivekananda – His Polital Thought – Sri – Aurobindo – Political Philosophy – M.N.Roy – Communist thought – Ram Manohar Lohia – Socialist thought.

(13L)

(Total = 60L)

MSU / 2017-18 / PG –Colleges / M.A. History / Semester –IV / Ppr.no.22 / Core - 16

BOOKS FOR REFERENCE:

1. Mukhi.H.R -History of Eastern Political Thought, Plato to Present Day 10th Edition , Surjeet Book Depot Publishers, Delhi 1998
2. G.Sreedathab - Western Political Thought and Theories, Deep Publications Pvt, Ltd, New Delhi, 2006
3. Das H.H and Pastro P.S.N – Indian Political Traditions Sterling Publishers Private Ltd 1988
4. K.N Sharma – Modern Political Analysis Malhotra Book Depo, Jullunder, 1980.
5. Roy B.N - Political Theory ,Authors Press 2006
6. Venkata Rao.V - A History of Political theories ,S. Chand and Company Ltd. New Delhi 1983.

MANONMANIAM SUNDARANAR UNIVERSITY

TIRUNELVELI

PG - COURSES – AFFILIATED COLLEGES

Course Structure for M.Sc. Botany

(Choice Based Credit System)

(with effect from the academic year 2017- 2018 onwards)

Sem. (1)	Sub. No. (2)	Subject Status (3)	Subject Title (4)	Contact Hrs./ Week (5)	Credits (6)
III	14	Core - 14	Taxonomy of Angiosperms and Economic Botany	6	4
	15	Core - 15	Biochemistry and Biophysics	6	4
	16	Core - 16	Computer Applications and Bioinformatics	5	4
	17	Core - 17	Research Methodology, Bioinstrumentation and Biological techniques	5	4
	18	Core - 18 Practical - 5	Taxonomy of Angiosperms, Economic Botany, Research Methodology, Bioinstrumentation and Biological techniques	4	2
	19	Core - 19 Practical - 6	Biochemistry, Biophysics, Computer Applications and Bioinformatics	4	2
			Subtotal	**30**	**20**
IV	20	Core - 20	Plant Physiology	4	4
	21	Core - 21	Plant Ecology and Conservation Biology	4	4
	22	Core - 22	Applied Biotechnology	4	4
	23	Core - 23 Practical - 7	Plant Physiology and Applied Biotechnology	4	2
	24	Core - 24 Practical - 8	Plant Ecology and Conservation Biology	4	2
	25	Elective - 1	Medicinal Botany and Dietetics	3+	3
	26	Core - 25	Project	7+	8
			Subtotal	**30**	**27**
Total				**120**	**90**

+ Extra hours for the Project

For the Project, flexible credits are b/w 5 – 8 & Hours per week are b/w 10 - 16.

Total number of credits ≥ 90	**:**	**90**
Total number of Core Courses	**:**	**25 (15 T + 8 P + 1 Prj. + 1 FW.)**
Total number of Elective Courses / F.W. / S.T.	**:**	**1**
Total hours	**:**	**120**

Taxonomy of Angiosperms and Economic Botany

L	T	P	C
2	4	0	4

Prerequisite:

Basic knowledge in Plant Morphology and Taxonomy gained from Undergraduate programme

Objectives:

- To learn about identification and classification of plants
- To learn about preparation of herbarium and molecular Plant Systematics
- To understand the economic importance of plants in day to day life

Outcome:

- Graduates will easily identify common and economically important plants
- Acquisition of knowledge about conservation of economically important plants
- Herbal remedy knowledge acquisition

Taxonomy of Angiosperms and Economic Botany

UNIT- I

Principles - Classification - (a) Artificial - Linnaeus (b) Natural -Bentham and Hooker (c) Phylogenetic – Cronquist.

Taxonomic hierarchy - Species concept - Binomial nomenclature: Principles of ICBN - Typification - Principles of Priority - Effective and Valid publication - Citation - Retention and Rejection of names. Preparation of Herbarium Identification and preparation of keys and its significance.

L	T	P
8	14	0

(22 Hrs.)

UNIT- II

A detailed study with special reference to the following families:

Study of P**olypetalae families:** Magnoliaceae, Zygophyllaceae, Sapindaceae, Combretaceae, Lythraceae, and Cucurbitaceae.

Study of **Gamopetalae families:** Apocynaceae Convolvulaceae, Pedaliaceae, Acanthaceae, Boraginaceae, Bignoniaceae, Scrophulariaceae, and Verbenaceae.

L	T	P
7	12	0

(19Hrs.)

UNIT - III

Study of **Monochlamydeae families:** Euphorbiaceae, Amaranthaceae, Nyctaginaceae, Aristolochiaceae and **Monocotyledons**: Commelinaceae, Orchidaceae and Poaceae.

L	T	P
4	8	0

(12Hrs.)

UNIT – IV

Modern Plant Systematics: Taxonomic evidences - from Morphology, Anatomy, Embryology, Chemotaxonomy. Digital / Virtual herbaria.

Molecular Systematics: Use of molecular markers and applications of RFLP, ISSR, DNA Bar-coding.

L	T	P
4	12	0

(16 Hrs.)

UNIT – V

General account on **Economic Botany** - Utilization of selected crop plants - Cereals- (Rice, Millets - Ragi); Spices and Condiments - (Cardamom, Pepper); Commercial crops - Fibre (Jute); Timbers (Teak, Red Sander); Resins and Gums (Asaefoetida, Gum Arabic); Fixed oils (Gingelly, Sunflower); Volatile oils - (Rosemary); Beverages (Tea, Coffee); Natural dyes (Indigo, Henna) and Drug Yielding Plants (Nilavembu and Indian Ginseng)

L	T	P
7	14	0

(21 Hrs.)

(Total: 90Hrs.)

Text books:

1. N.S.Subramaniam, *Modern Plant Taxonomy*. Vikas Publishing House. New Delhi, 1995.
2. N. V. Naik, *Taxonomy of Angiosperms*. Tata McGraw–Hill Publ Co. Ltd., New Delhi, 2000.

Reference books:

1. M.Ahmedullah and M.P. Nayar. Endemic Plants of the Indian Region. Vol. I. Botanical Survey of India. Howrah, 1987.
2. A. Cronquist, An Integrated System of Classification of Flowering Plants. Columbia University Press, New York, 1981.
3. P.H. Davis, and V.H. Heywood, *Principles of Angiosperms Taxonomy*. Robert E. Kreiger Pub. Co., New York, 1973.

4. J.S. Gamble, and C.E.C. Fischer. Flora of the Presidency of Madras. Vols. I - III. Botanical Survey of India. Calcutta, 1967.
5. H.J. Harrison, New Concepts in Flowering Plant Taxonomy. Hieman Educational Books Ltd., London, 1971.
6. A.N. Henry and M. Chandrabose. An Aid to International Code of Botanical Nomenclature. Today & Tomorrow's Printers and Publishers. New Delhi, 1980.
7. Heywood, V.H. and Moore, D.M. Current Concepts in Plant Taxonomy. Academic Press, London, 1984.
8. C. Jeffrey, Introduction of Plant Taxonomy, Cambridge University Press, Cambridge, 1982.
9. G.H.M. Lawrence, Taxonomy of Vascular Plants. The Macmillan Company. New York, 1951.
10. M.P. Nayar, "Hot Spots" of Endemic plants of India, Nepal and Bhutan. Tropical Botanic Garden and Research Institute, Thiruvananthapuram, India, 1996.
11. M. G. Simpson, Plant Systematics. Elsevier Academic Press, California, USA, 2010.
12. V.V. Sivarajan, Introduction to the Principles of Plant Taxonomy. Oxford & IBH Publishing Company Ltd., New Delhi, 1996.

Practicals

1. Identification of plant species included in the syllabus.
2. Preparation of dichotomous key.
3. Identification of Binomial using flora (J.S. Gamble).
4. Dissection and technical description of plant species from any locally available plants.
5. A study tour of Taxonomic interest (any area) – Submission of an album with 10 photographs and 10 herbarium plant specimens from the prescribed families with a field note book.
6. Spotters for Economic Botany - to know the family, binomials of economically important plants, their parts and economic importance.

Biochemistry and Biophysics

L	T	P	C
2	4	0	4

Prerequisite:

Basic knowledge on structure and role of biomolecules - gained from undergraduate programme

Objectives:

- To gain advanced knowledge about plant biomolecules
- To understand different metabolic pathways occurring in a cell
- To provide an advanced integral knowledge and understanding of topics in Biochemistry and Biophysics

Outcome:

- Acquisition of analytical and presentational skills
- Graduates will have a solid foundation and in-depth understanding of current topics in Biochemistry
- knowledge gained about biofluorescent and bioluminescent compounds could be used in as molecular reporters in medical field

UNIT -I

Biochemistry and Biophysics

Biomolecules: Carbohydrates - properties of mono, oligo and polysaccharides. Structure and properties of trioses, tetroses, pentoses, hexoses, maltose, sucrose, starch and pectin-glycosidic linkage, isomerism and mutarotation. Glycoproteins, amino sugars**.**

L	T	P
8	12	0

(20 Hrs.)

UNIT- II

Amino acids and proteins, ionic forms of amino acids. Zwitterion, isoelectric pH, optical isomers of amino acids and physical properties of amino acids.

Formation of peptide bond - peptides - structure of polypeptides - primary, secondary, tertiary and quaternary protein structure - super secondary structures. Ramachandran plot - denaturation of proteins**.**

L	T	P
6	12	0

(18 Hrs.)

UNIT – III

Lipids - Classification, structure and properties - Fatty acids - saturated and unsaturated fatty acids - Structure of fatty acids and glycerol -phospholipids, glycolipids, steroids. Biosynthesis and Oxidation of fatty acid - Gluconeogenesis.

L	T	P
5	10	0

(15 Hrs.)

UNIT - IV

Enzymes - Properties - Cofactors, metallic activators, coenzymes. Nomenclature and Classification - Enzyme kinetics - Concept of active sites Michaelis-Menton constant - mechanism of enzyme action - enzyme inhibitors - competitive and non-competitive, allosteric control of enzymes. Enzyme regulation**.**

L	T	P
5	14	0

(19 Hrs.)

UNIT – V

Properties of light - Different components of electromagnetic radiation. Emission - Excitation - Fluorescence and Phosphorescence - Bioluminescence. Laws of Thermodynamics-free energy, Redox potential, activation energy. High energy compounds in biology and their significance.

L	T	P
6	12	0

(18 Hrs.)

(Total : 90Hrs.)

Text books:

1. J.L. Jain, Fundamantals of Biochemistry. S. Chand and Company, New Delhi, 2005.
2. U. Satyanarayana, Biochemistry. Books and Allied (P) ltd, Kolkatta, 2005.

Reference Books

1. R.L.P. Adams, Burdon, R.H., Campbell, A.M., Leader, D.P. and Smile, R.M.S. The
2. Biochemistry of Nucleic acids. Chapman and Hall Ltd. New York,1981.
3. O.P. Agarwal, Chemistry of organic natural products. Goel Publishing House, New Delhi, 1989.
4. J. Bonner and J. E. Varner, Plant Biochemistry. Academic Press, NewYork, 1976.
5. A.C. Deb, Fundamentals of Biochemistry. New Central Book Agency (P) Ltd., Kolkatta, 2011.
6. E.E. Conn and P.K. Stumpf, Outlines of Biochemistry. John Wiley and Sons, NewYork, 1987.

7. J. Jayaraman, Laboratory Manual in Biochemistry, Wiley Eastern Limited, New Delhi,1895.
8. D.T. Plummer, An introduction to Practical Biochemistry. Tata Mc Graw Hill publishing
9. Company, New Delhi, 1990.
10. J. M. Berg, J. L. Tymoczko and L. Stryer Biochemistry, W.H. Freeman Company, New York, 2012.
11. S. Palanichamy and M. Shanmugavelu, Principles of Biophysics. Palani Paramount Publications. 1996.
12. P.Narayanan, Essentials of Biophysics. New Age International Publishers, New Delhi, 2008.

Practicals

1. Determination of neutralization point of acid-base mixture by titration method using pH meter.
2. Estimation of sugars by anthrone method - Colorimeter /Spectrophotometer.
3. Estimation of aminoacids by ninhydrin method - Colorimeter / Spectrophotometer.
4. Estimation of proteins (Lowry's method).
5. Extraction and separation of known and unknown amino acids - Paper Chromatography method.
6. Determination of saponification value of any two vegetable oils.
7. Determination of Km value of Nitrate Reductase enzyme.

Computer Application and Bioinformatics

L	T	P	C
3	2	0	4

Prerequisite:

Basic knowledge in Computer Operation

Objectives:

- To learn the basic applications of computer and internet
- To gain a working knowledge on computer and search strategies
- to understand the scope and application of bioinformatics

Outcome:

- Acquisition of working knowledge on computer and surfing the web
- Accumulation of knowledge in genomics and proteomics.
- Acquisition of skill in molecular docking and drug designing.
- Graduates will be able to use online databases

Computer Application and Bioinformatics

UNIT - I

Computer - Definition, Need for computers, Characteristics of computer- detail of input units, output units and storage devices. Classification of computers - Knowledge about windows and its scientific applications - MS Word, Power Point, Excel

L	T	P
10	4	0

(14 Hrs.)

UNIT - II

Internet - world wide web - Internet protocols - Internet Browsers - Search Engines - e-books e-journals and e-mail. Applications of internet.

L	T	P
8	5	0

(13 Hrs.)

UNIT - III

Introduction to Bioinformatics - Definition, Need and Potential of Bioinformatics - Genomics and Proteomics - Human Genome Project and medically relevant genes - Pharmacoinformatics.

L	T	P
9	6	0

(15 Hrs.)

UNIT - IV

Bioinformatics Databases: Nucleic acid sequence Databases - GenBank, EMBL, DDBJ. Protein Sequence Databases - SwissProt, TrEMBL. Structure Databases - PDB, CATH, CSD. Literature Databases - PubMed, Scopus**.**

L	T	P
10	9	0

(19 Hrs.)

UNIT - V

Techniques in Bioinformatics: FASTA - BLAST - Types. Pairwise and Multiple Sequence Alignment methods and significance. - Molecular Visualization - JS Mol / RasMol. Prediction of Activity Spectra - PASS**.**

L	T	P
8	6	0

(14 Hrs.)

(Total: 75Hrs.)

Text Books :

1. Alexis Leon and Mathews Leon, *Computer Applications in Business*, Vijay Nicole Imprints, Chennai, 2013.
2. S. Ignacimuthu, *Basic Bioinformatics*, Narosa Publishing House. New Delhi-3, 2012.
3. P. Narayanan, *Bioinformatics - A Primer*, New Age International Publishers, New Delhi, 2005.
4. K. Teresa, Attwood and David J. Parry-Smith, *Introduction to Bioinformatics* Dorling Kindersley Pvt. Ltd. India, 2006.

Reference Books:

1. Alexis Leon and Mathews Leon, 2013. *Computer Applications in Business*, Vijay Nicole Imprints, Chennai.
2. Bryan Bergeron, *Bioinformatics Computing*, Prentice Hall of India, New Delhi, 2006.
3. N.Gautham, "*Bioinformatics - Databases and Algorithms"* Narosa Publishing House, Chennai, 2006.
4. P. Mohan, *Fundamentals of Computers,* Himalaya Publishing House, New Delhi, 2009.
5. P.Narayanan, *Bioinformatics - A Primer*, New Age International Publishers, New Delhi, 2005.
6. Neeru Mundra Renu Vashisth, *Introduction to Information Technology*, Himalaya Publishing House, New Delhi, 2011.
7. S.C. Rastogi, Mandiratta Namita and Rastogi Parag, *Bioinformatics - Concepts, Skill Applications*, CBS Publications, 2003.
8. S. Ravishankar and P.V. Raphael *Computer Awareness and Applications*, Himalaya Publishing House, New Delhi, 2004.
9. Saxena Sanjay, *MS office for everyone,* Vikas Publishing House, New Delhi, 2002.
10. T.K. Attwood and D.J. Parry-Smith, *Introduction to Bioinformatics* Dorling Kindersley Pvt. Ltd. India, 2006.

Practicals:

1. Working knowledge with computer in preparing word document, construction of line and bar graphs in Excel for the **Botanical sample data** provided.
2. E-mail creation.
3. Searching data bases prescribed in the syllabus.
4. Sequence alignment technique – FASTA and BLAST
5. Molecular Modeling

MSU / 2017-18 / PG – Colleges / M.Sc.(Botany) / Semester-III / Ppr.no.17 / Core-17

Research Methodology, Bioinstrumentation and Biological Techniques

L	T	P	C
3	2	0	4

Prerequisite:

Basic knowledge in biological and related informations to be useful for research and development during undergraduate programme

Objectives:

- To understand the basic aspects in research
- To learn mathematical and statistical technique for research
- To acquire basic knowledge about various instruments and techniques in biological research

Outcome:

- Training and participating in active research activities for their academic and professional levels
- Creation of novel ideas and simple techniques useful to the society (R/D)
- Acquire background knowledge in research publication and thesis writing

Research Methodology, Bioinstrumentation and Biological Techniques

UNIT - I

Research Methodology: Choosing the problem for research - Review of Literature - Primary, Secondary and Tertiary sources - Bibliographs - Indexing and abstracting- Reference Collections- Planning and preparation of thesis: thesis format. Journal format - Editing & Proof correction, Abstract and keywords. Full paper, Short Communication, Monographs, Review Articles. Citation index, Impact Factor. Methods of Oral and Poster presentation.
(**22Hrs.)**

L	T	P
12	10	0

(22 Hrs.)

UNIT- II

Biostatistics: Designing of Plot. Scope, Collection and classification of data, Tabulation, Graphical and Diagrammatic representation,Histograms. Probability analysis, Mean, Median, Mode. Students - t - test, ANOVA - Application software - SPSS.

L	T	P
8	6	0

(14 Hrs.)

UNIT – III

Microscopy - Principles and application - Light - Dark field - Phase contrast - Fluorescence - Polarization - Scanning and Transmission Electron Microscopy, Photomicrography.

Cytochemical and histochemical methods- Types of Microtomes: rotary, wood and cryo types. Microtome techniques: Fixation, dehydration, clearing, embedding, sectioning, staining, mounting. Cytochemistry and detection of nucleic acids, carbohydrates, proteins and lipids in plant cells / tissue**.**

L	T	P
10	4	0

(14 Hrs.)

UNIT - IV

Centrifugation: High speed, and Ultra centrifuges, **Spectroscopy:** Flame photometer;UV-Vis Spectrophotometer, AAS, **Chromatography:** TLC and GC**.**

L	T	P
6	5	0

(11 Hrs.)

UNIT -V

Electrophoresis: Basic principles, theory and applications of starch gel, agarose, native and denaturing PAGE. **Radio labelling techniques:** Handling of Radioisotopes in labs, Dosimetry, Ionization chamber, GM counter, Solid and liquid scintillation counters, Autoradiography. Radio Immuno Assay. Introduction to **Nanobiotechnology** methods in Nanodrugs delivery.

L	T	P
9	5	0

(14 Hrs.)

(Total: 75Hrs.)

Text Books:

1. N. Gurumani, Research Methodology for Biological Sciences, 2011
2. N. Gurumani An introduction to Biostatistics. MJP Publishers New Delhi, 2009.

Suggested References

1) W.W. Daniel, 1995.Biostastistics.7th edition, John Wiley and Sons, Newyork, USA.
2) C.I. Bliss, 1970. Statistics in Biology.Vol I and II, Mc Graw-Hill Inc.USA.
3) M. R. Green, and J. Sambrook, 2012. *Molecular Cloning: A Laboratory Manual*. 4th Edition, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York.
4) I.A. Khan, and A. Khanum, 1994. *Biostatistics*. Vikas Publishing House Pvt. Ltd. New Delhi.
5) V.G. Panse, and P.V. Sukhatme, 1967. *Statistical Methods for Agricultural Workers*. ICAR, New Delhi.

6) D.T. Plummer, 1988. *An Introduction to Practical Biochemistry*. Tata McGraw Hill Publishing Company. New Delhi.

7) Raghuvanshi. 1995. *Practical Exercises in Cytology, Genetics, Plant Breeding and Bioststistics*. CBS Publishers & Distributors, New Delhi.

8) G.S. Sandhu, 1990. *Research Techniques in Biological Sciences.*1st Edition. Anmol Publications, New Delhi.

9) R.G.D. Steel, and J.H. Torrie, 1960. *Principles and Procedures of Statistics with special reference to Biological Sciences. McGraw-Hill.*

10) K. Wilson, and J. Walker, 2000. *Principles and Techniques of Practical Biochemistry*. Cambridge University Press, London.

11) E. Balagurusamy, 2009. Fundamentals of Computers. Tata McGraw-Hill Education Pvt. Ltd., New Delhi.

12) V. Rajaraman, Introduction to Information Technology. PHI. New Delhi.

Practicals

1. Demonstration of microscopes (Light and Dark field, phase-contrast, fluorescence, SEM, TEM).
2. Demonstration of centrifugation (Ultra, high speed).
3. Demonstration of TLC, UV-Vis Spectrophotometer, Flame photometer.
4. Separation of plant proteins using SDS-PAGE, and DNA by AGE.
5. Demonstration Microtomy: preparation of thin sections and permanent slides.
6. Histo-chemical localization of soluble components in plant cells- proteins, sugars, polysaccharides, lipids, nucleic acids, tannins, phenols, etc.
7. Study on Bioinstruments and Biological techniques
8. Problems from Biostatistics – SD & SE, T-test.

Taxonomy of Angiosperms and Economic Botany, Research Methodology, Bioinstrumentation and Biological Techniques (Total: 60 Hrs.)

Practicals

L	T	P	C
0	0	4	2

Taxonomy of Angiosperms and Economic Botany (30Hrs.)

1. Identification of plant species included in the syllabus.
2. Preparation of dichotomous key.
3. Identification of Binomial using flora (J.S. Gamble).
4. Dissection and technical description of plants from any locally available plants
5. A study tour of Taxonomic interest (any area) – Submission of an album with 10 photographs +10 herbarium plant specimens from the prescribed families and field note book.
6. Spotters for Economic Botany - to know the family, binomials of economically important plants, their parts and economic importance.

Research Methodology, Bioinstrumentation and Biological Techniques (30Hrs.)

1. Demonstration of microscopes (Light and Dark field, phase-contrast, fluorescence, SEM, TEM).
2. Demonstration of centrifugation (Ultra, high speed).
3. Demonstration of TLC, UV-Vis Spectrophotometer, Flame photometer.
4. Separation of plant proteins using SDS-PAGE, and DNA by AGE.
5. Demonstration Microtomy: preparation of thin sections and permanent slides.
6. Histochemical localisation of soluble components in plant cells- proteins, sugars, polysaccharides, lipids, nucleic acids, tannins, phenols, etc.
7. Study on Bioinstruments and Biological techniques.
8. Problems from Biostatics – SD & SE, T-test

Biochemistry and Biophysics, Computer applications and Bioinformatics (Total: 60Hrs.)

Biochemistry and Biophysics (30Hrs.)

L	T	P	C
0	0	4	2

Practicals

1. Determination of neutralization point of acid- base mixture by titration method using pH meter.
2. Estimation of sugars by anthrone method - Colorimeter/Spectrophotometer.
3. Estimation of amino acids by ninhydrin method Colorimeter / Spectrophotometer.
4. Estimation of proteins (Lowry's method).
5. Extraction and separation of known and unknown amino acids - Paper Chromatography method.
6. Determination of saponification value of any two vegetable oils.
7. Determination of Km value of Nitrate Reductase enzyme.

Computer applications and Bioinformatics (30Hrs.)

Practicals:

1. Working knowledge with computer in preparing word document, construction of line and bar graphs in Excel for the botanical sample data provided.
2. E-mail creation.
3. Searching data bases prescribed in the syllabus.
4. Sequence alignment technique – FASTA and BLAST
5. Molecular Modeling

Plant Physiology

L	T	P	C
4	0	0	4

Prerequisite: Basic knowledge gained in undergraduate programme

Objectives:

- To develop understanding in the mechanisms of functioning of plant cells.
- To acquire basic knowledge in physiological processes
- To acquire knowledge on impact of environmental factors on physiological process

Outcome:

- Gain knowledge in functioning of cells
- Gain knowledge in crossroads of cell metabolisms
- Acquire knowledge in stress factors and their role in physiological processes

Plant Physiology

UNIT –I

Water and Plant relations: Cell water relations, mechanism of water uptake - Concept of Apoplast and Symplast. Absorption and transport of solutes (Passive and Active).Translocation of organic solutes. Phloem loading and unloading. Importance of macro and micronutrients. Transpiration - Mechanism of stomatal movement - starch-sugar interconversion theory and K+ ion transport and stomatal regulation.

L	T	P
15	0	0

(15 Hrs.)

UNIT - II

Photosynthesis - Photosynthetic pigments - Light harvesting complexes PS I and PS II.Photo oxidation of water. Mechanisms of electron and proton flow through photosynthetic transport chain - Z Scheme. Photo phosphorylation and mechanism of ATP synthesis. C_3, C_4 and CAM pathways. Photorespiration and its significance**.**

L	T	P
14	0	0

(14 Hrs.)

UNIT - III

Plant Respiration: Glycolysis, Citric acid cycle and Mitochondrial electron transport - Oxidative phosphorylation and terminal oxidation - Beta oxidation - Glyoxylate Cycle. Nitrogen metabolism - Biological nitrogen - Mechanisms of Nitrate uptake and reduction - ammonia assimilation.

L	T	P
10	0	0

(10 Hrs.)

UNIT - IV

Physiological role and mechanism of action of cytokinins, ethylene and abscissic acid. Growth retardants - Morphactins and Brassinosteroids. Photoperiodism and Vernalizations - flower induction and development. Phytochrome - structure, properties and physiological role.Senescence and Abscission - physiological and biochemical changes.

L	T	P
12	0	0

(12 Hrs.)

UNIT - V

Stress physiology - classification of stress - biotic and abiotic stress factors. Stress effects - morphological, biochemical, physiological changes associated with stress due to salinity, water, radiation, heavy metals, drought. Heat shock proteins - Stress resistance mechanisms.

L	T	P
9	0	0

(9 Hrs.)

(Total: 60Hrs.)

Text Books.

1. R.G.S. Bidwell, Plant physiology Academic Press, New York, 1980.
2. S.C. Datt, Plant physiology central Book Depot. Allahabad – 48, 1989.
3. R.M. Devlin, Plant physiology Reinhold Publishers corp. Newyork, 1990.
4. Govindji, Photosynthesis. A.P. Newyork, 1982.
5. F.B Salisbury, and C. Ross, "Plant Physiology", John Wiley & sons New Delhi, 2000.
6. R.K. Sinha, Modern Plant physiology. Narosa publishing House New Delhi, 2004.
7. V.Verma, A text Book of plant physiology. Ane Books, New Delhi, 2007.
8. G.R. Noggle, and G.J. Fritz, Introductory plant physiology. PHI learning Pvt. Ltd New Delhi, 2010.
9. W.P. Jacob, Plant Hormones and plant Development, 1979.

Practicals

1. Determination of water potential by gravimetric method.
2. Measurement of photosynthesis - Hill activity (Time course).
3. Estimation of photosynthetic pigments with reference to age (Two stages).
4. To determine the Chl a / Chl b ratio in C_3 and C_4 plants.
5. Estimation of Proline in normal and stressed leaves.
6. Effect of pH, temperature and detergents on membrane permeability.
7. Extraction and separation of seed proteins.
8. Estimation of anthocyanins using colorimeter/Spectrophotometer.

Plant Ecology and Conservation Biology

L	T	P	C
4	0	0	4

Prerequisite:

Basic knowledge in Environmental science gained from undergraduate programme

Objectives:

1) To gain advanced knowledge about plants and their environment
2) To acquire knowledge about environmental issues
3) To understand and implement effective measures in biodiversity conservation programmes

Outcome:

1) Acquisition of knowledge about environmental science
2) Acquisition knowledge about the role of man in protecting the environment
3) Acquisition knowledge about biodiversity conservation and participation in conservation activities.

Plant Ecology and Conservation Biology

UNIT- I Aim and scope of Ecology - Methods of studying plant community. Ecosystem: Types of ecosystem: Terrestrial - Cropland and Aquatic ecosystems - fresh water, marine, estuarine and mangroves with special reference to trophic structures.

L	T	P
12	0	0

(12 Hrs.)

UNIT – II. Succession - causes, patterns of succession - xeroseres and hydroseres. Energy resources: utilization - Renewable and Non-renewable energy resources. Environmental Laws and Education.

L	T	P
8	0	0

(8 Hrs.)

UNIT - III Environmental pollution - Causes, consequences and control of pollution on Global environment. Global Warming. Soil erosion, conservation and Disaster management - Floods, Earth quake, Cyclones, Tsunami and Landslides.

L	T	P
10	0	0

(10 Hrs.)

UNIT - IV Biodiversity - definition, scope and constraints, Levels of biodiversity (genetic, species and ecosystem), measures of biodiversity, values and use of biodiversity, loss of biodiversity, threats to biodiversity. Endemism and Red Data Book. Phytogeography: Dispersal and migration barriers hypothesis, Continental drift hypothesis, Land - Bridges hypothesis, Age and Area hypothesis.

L	T	P
14	0	0

(14 Hrs.)

UNIT - V Conservation Biology: current practices in conservation - Ecosystem approaches - Species based approaches–Social approaches - Chipko Movement. *In situ* conservation (Protected area, Biosphere Reserves, National Parks, Sanctuaries) and *ex situ* conservation (Botanical Gardens, Cryopreservation, Gene Banks, Seed Banks, DNA Banks. Role of organizations in Biodiversity management – IUCN and BSI.

L	T	P
16	0	0

(16 Hrs.)

(Total: 60Hrs.)

Text Books

1. S. Ignacimuthu, Environmental studies. MJP Publishers, India. 2013.
2. K.C. Agrawal, Environmental Biology. Agro-botanical Publications, India, 1987.

References

3. R. S. Ambasht, A Textbook of Plant Ecology. 3rd ed. Students' Friends Co. Varanasi, India,1974.
4. W. B. Billings, Plants and the Ecosystem. Wardsworth Publishing Co. Inc., Belmont, 1965.
5. K. A. Kershaw, "Quantitative and Dynamic Plant Ecology", Edward Arnold Publishers Ltd., London, 1973.
6. E. J. Kormandy, Concepts of Ecology. 2nd ed. Prentice Hall of India Pvt. Ltd., New Delhi, 1978.
7. Krishnan Kannan, "Fundamentals of Environmental Pollution". S. Chand and Co. Ltd., New Delhi, 1997.
8. J. Levitt, Responses of Plants to Environmental Stresses. Acad. Press, New York. 1980.
9. E. P. Odum, Ecology. 2nd ed. Oxford & IBH Publications, New Delhi, 1975.
10. P. C. Vashista, A Textbook of Plant Ecology. Vishal Publications, Jullunder, 1974.
11. O. H.Frankel, Brown, A. H. D. and Burdon, J. J. The Conservation of Plant Diversity. Cambridge University Press, London, 1995.
12. V. H. Heywood, Global Biodiversity Assessment. UNEP, Cambridge University Press, London. 1995.

Practicals

1. Vegetation Analysis (Quadrats and line transects) - Raunkaier's frequency diagram dominance and density in a given area and Shannon-Weaver's measures of species diversity index.

2. Water analysis - Dissolved oxygen - salinity and Alkalinity - Carbonate and bicarbonate. 3. Chemical Oxygen Demand (COD) of given water samples.

4. Estimation of oxidized organic matter in the soil by Walkley- Black method.
5. Study of the following:
   I. Interpretations of the following:
      1. Ecosystem types.
      2. Different seric stages.
      3. Environmental pollution impact study.
      4. Endemism.
      5. Conservation of Biodiversity

Applied Biotechnology

L	T	P	C
4	0	0	4

Prerequisite:

Basic knowledge on biotechnology and its applications gained during undergraduate programme.

Objectives:

- To train the students in advanced level of biotechnological principles and techniques.
- To understand the process, development of tissue culture through micropropagation and impact of transgenic plants.
- To develop the skill in pollution abatement through Biofuel production

Outcome:

- Gain knowledge in tissue culture and micropropagation in crop improvement programme.
- Acquire knowledge in the transgenic molecular pharming.
- Acquire knowledge in bioremedial measures in pollution control and biofuel production.

Applied Biotechnology

UNIT-I Biotechnology - scope and potentialities. Tissue Culture: Single cell and suspension culture, Production of haploids, detection and identification, and uses of haploids. Micropropagation - virus elimination, secondary metabolite production, encapsulated seeds - Application of plant tissue culture in agriculture and crop improvement**.**

L	T	P
14	0	0

(14 Hrs.)

UNIT – II

Outline of Genetic engineering - transposons as vectors - gene cloning - cloning in eukaryotes. Promoters and terminators - *Agrobacterium* derived promoters - 35S promoters of CaMV, inducible and tissue specific promoters. Importance of promoters. Amplification of genes by PCR. Gene transfer methods in plants - vectors - Ti and Ri plasmids of *Agrobacterium*.

L	T	P
14	0	0

(14 Hrs.)

UNIT - III

Transgenic plants resistant to Pest, Insects and Herbicides - Transgenic plants with improved quality traits - Flavr Savr tomato, Golden rice. Improved varieties in Floriculture. Transgenic plants for molecular pharming. Biodegradable plastics.

L	T	P
12	0	0

(12 Hrs.)

UNIT - IV

Biomining – Bioleaching, Biorecovery of metals. Biosensors - Bioremediation methods - *In situ* and *ex situ* bioremediation - Enzyme technology - large scale production of fungal enzymes -extraction and purification methods involved - application of fungal enzymes in different industries.

L	T	P
10	0	0

(10 Hrs.)

UNIT – V

Bio-fuels from all kinds of plants. Biotechnology and healthcare - Gene therapy - types, methods and applications. Genetically engineered Humulin. Production of antibodies, vaccines and monoclonal antibodies - applications.

L	T	P
10	0	0

(10 Hrs.)

(Total: 60Hrs.)

Text books:

1. R.C. Dubey, Text Book of Biotechnology. S. Chand and Company Ltd., 2006.
2. U.Satyanarayana, Biotechnology. Books and Allied (P) Ltd, Kolkata, 2008.

Reference Books

1. H.S. Chawla, Introduction to Biotechnology. Oxford and IBH Publishing Company Pvt. Ltd., New Delhi, 2002.
2. M.K. Razdan, An Introduction to Plant Tissue Culture. Oxford and IBH Publishing Company Pvt. Ltd., New Delhi, 2003.
3. H.K. Das, Text book of Biotechnology. Wiley Dream tech India Pvt. Ltd., Delhi, 2005.
4. A. Slater, N.W. Scott and M.R. Flower, Plant Biotechnology: The genetic manipulation of plants. Second edition, Oxford University Press, 2010.
5. V. Kumar "Biodiesel from Algae" LAP Lambert Academic Publishing, 2012
6. R. Henrikson, Algae Microfarms: for home, school, community and urban gardens, rooftop, mobile and vertical farms and living buildings, CreateSpace Independent Publishing Platform, ISBN-13: 978-1483968261, 2013.
7. B.D. Singh , A.K. Singh, "Marker Assisted Plant Breeding" , Springer; First edition, ISBN-13: 978-8132237259, 2015.
8. B.D.Singh, Biotechnology: Expanding Horizons, Kalyani publishers; 4th edition, ISBN-13: 978-93272229822014.
9. M. J. Korenberg, Microarray Data Analysis: Methods and Applications (Methods in Molecular Biology) Humana Press; ISBN-13: 978-1627039093, 2014

Practicals

1. Preparation of MS medium.
2. Demonstration of *in vitro* sterilization and inoculation methods using leaf and nodal explants of Tobacco, *Datura*, *Brassica*.
4. Study of Anther, Embryo and Endosperm culture, Micropropagation, Somatic embryogenesis and artificial seeds
5. Study of methods of gene transfer. Isolation of Plasmid DNA, Restriction digestion and gel electrophoresis of plasmid DNA, *Agrobacterium* - mediated, direct gene transfer by electroporation, microinjection, microprojectile bombardment.
7. Study of steps of genetic engineering for production of Bt cotton, Golden rice.
8. Production of biofuels from algae, Mass cultivation of algae, *Spirulina*- SCP production.
9. Compulsory visit to institution(s) related in the field of Biotechnology

Plant Physiology and Applied Biotechnology (Total: 60Hrs.)

L	T	P
0	0	4

Plant Physiology Practicals: (30Hrs.)

1. Determination of water potential by gravimetric method.
2. Measurement of photosynthesis - Hill activity (Time course).
3. Estimation of photosynthetic pigments with reference to age (Two stages).
4. To determine the Chl a / Chl b ratio in C_3 and C_4 plants.
5. Estimation of Proline in normal and stressed leaves.
6. Effect of pH, temperature and detergents on membrane permeability.
7. Extraction and separation of seed proteins.
8. Estimation of anthocyanins - Colorimeter/Spectrophotometer.

Applied Biotechnology Practicals: (30Hrs.)

1. Preparation of MS medium.
2. Demonstration of *in vitro* sterilization and inoculation methods using leaf and nodal explants of Tobacco, *Datura*, *Brassica*.
4. Study of Anther, Embryo and Endosperm culture, Micropropagation, Somatic embryogenesis and artificial seeds
5. Study of methods of gene transfer. Isolation of Plasmid DNA, Restriction digestion and gel electrophoresis of plasmid DNA, *Agrobacterium* - mediated, direct gene transfer by electroporation, microinjection, microprojectile bombardment.
6. Study of steps of genetic engineering for production of Bt cotton, Golden rice
7. Production of biofuels from algae, Mass cultivation of algae, *Spirulina*- SCP production.
8. Compulsory visit to institution(s) related in the field of Biotechnology

Plant Ecology and Conservation Biology Practicals (Total: 60Hrs.)

L	T	P
0	0	4

1. Vegetation Analysis (Quadrats and Line transects) - Raunkaier's frequency diagram dominance and density in a given area and Shannon-Weaver's measures of species diversity index.
2. Water analysis - Dissolved oxygen - salinity and Alkalinity - Carbonate and bicarbonate.
3. Chemical Oxygen Demand (COD) of given water samples.
4. Estimation of oxidized organic matter in the soil by Walkley- Black method.
5. Study of the following:

   I. Interpretations of the following:

   1. Ecosystem types.
   2. Different seric stages.
   3. Environmental pollution impact study.
   4. Endemism.
   5. Conservation of Biodiversity

Medicinal Botany and Dietetics

L	T	P	C
3	0	0	3

Prerequisite:

Basic knowledge on Medicinal plants and its applications gained during undergraduate course.

Objectives:

- To promote good health by teaching the students about diet and nutrition.
- To educate the science of nutrition in preventing development of disease.
- To educate on the nutritional standards and specifications for the healthy person and patient to ensure and prevent mortality due to malnourishment.

Outcome:

- Gain knowledge about nutritive diet for different age groups
- Acquire knowledge about healthy food for normal person and patient
- Acquire knowledge in dietetics to prevent mortality due to malnourishment.

Medicinal Botany and Dietetics

Medicinal Botany:-

Unit –I

Study of the following plants with reference to their Habitat, Habit, Systematic position, Morphology of their useful parts and uses of: *Tinospora cordifolia* (Root), *Acorus calamus* (Rhizome), *Tylophora asthmatica* (leaf), *Terminalia chebula* (fruit), *Plantago ovata* (seed) and *Holarrhena antidysenterica* (bark).

L	T	P
14	0	0

(14 Hrs.)

Unit - II

Source, properties and medicinal uses of some phyto oils resources -Olive oil, Castor oil, Neem oil, Mentha oil and Lavender oil.

L	T	P
7	0	0

(7 Hrs.)

Unit - III

Dietetics- Therapeutic value of Indian plant foods- a) rice b) wheat; c) green gram, black gram, soya bean d) lemon, banana, Guava, e) Ginger, Turmeric, Coriander, Garlic, Cumin and Clove.

L	T	P
6	0	0

(6 Hrs.)

Unit – IV

Plant nutraceuticals- definition and sources. Study of plant foods (food as medicine) in the treatment of some selected diseases – anorexia, arthritis, constipation, diarrhoea, diabetes, psoriasis, hypertension and memory loss.

L	T	P
10	0	0

(10 Hrs.)

Unit- V

Plant foods as Antioxidants - Definition - types, PUFA, Probiotics, Prebiotics, Dietary fibers, Omega-3 fatty acids. Cosmeceuticals – Definition, Retinoic acid.

L	T	P
8	0	0

(8 Hrs.)

(Total 45Hrs.)

Text books:

1. S.G. Joshi, "Medicinal plants", Oxford and IBH Company Private Ltd.,New Delhi, 2000.
2. J.L. Raymond,"Krause's Food, Nutrition and Diet therapy"Saunders publishers, 2003.

References

1. K. K. Purohit and Gokhale, "Pharmacognacy",Nirali Publications, 1999.
2. A.K. Srivatsava, "Medicinal plants", International Book Distributors, Dehradun,2006.
3. S.N. Yoganarashimman, "Medicinal Plants India", Vol.2 TamilNadu, Inderline Publishing Private Ltd., Bangalore,DehraDun and Michigan, 2000.
4. S.K. Bhattachariya, Handbook on medicinal plants, pointer publishers Jaipur, 2004.
5. A.Farooqi and B.S. Sreeramu, Cultivation of medicinal and aromatic Crops, Universities Press, 2001.
6. R. T.Lagua and V.S.Claudio, "Nutrition and diet therapy Reference dictionary"4th edition,Jones &Barlett Learning, 1995.
7. B.Thomas and J.Bishop, "Manual of Dietetic Practice"Edited by Jone Gandy, 4th edition, Wiley Blackwell Publishing,Oxford, UK, 2007.
8. B.Srilakshmi, "Dietetics", New Age International publishers, 2007.
9. D.A.Vattem and V. Maitin, "Functional foods, Nutraceuticals and Natural Products DEStech Publications, INC, 2016.
10. John Shi "Functional Food Ingredients and Nutraceuticals Processing Technology", CRC Taylor and Francis Publishers, 2006

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M.Sc. Botany Project (Contact Hours)

C.Hrs	C
7+	8

Prerequisite:

The students should be able to understand and interpret the literature in their areas of research.

Objectives:

- To provide training in scientific skills.
- To prepare students for professional training programmes or entry level jobs in any area of Botany

Outcome:

- At the end of the project, students should have increased:
  - their capacity to think critically;
  - their ability to design, analyse and execute an experiment;
  - their confidence and ability in communication skills (in writing and oral).
  - in acquiring the literature collection methods, and interpreting the data of their scientific experiments etc.

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI
PG - COURSES – AFFILIATED COLLEGES
Course Structure for M.Sc. Chemistry
(Choice Based Credit System)
(with effect from the academic year 2017- 2018 onwards)

Sem. (1)	Sub. No. (2)	Subject Status (3)	Subject Status (3)	Hrs/ week Contact (5)	Credits (6)
III	15	Core - 13	Organic Chemistry – III	5	4
	16	Core - 14	Inorganic Chemistry – III	5	4
	17	Core - 15	Physical Chemistry – III	4	4
	18	Core - 16	Scientific - Research Methodology	4	4
	19	Core - 17 Practical - 7	Organic Chemistry Practical – III	4	2
	20	Core - 18 Practical - 8	Inorganic Chemistry Practical – III	4	2
	21	Core - 19 Practical - 9	Physical Chemistry Practical – III	4	2
IV	22	Core - 20	Organic Chemistry – IV	4	4
	23	Core - 21	Inorganic Chemistry – IV	4	4
	24	Core - 22	Physical Chemistry – IV	4	4
	25	Core - 23 Practical - 10	Organic Chemistry Practical – IV	4	2
	26	Core - 24 Practical - 11	Inorganic Chemistry Practical – IV	4	2
	27	Core - 25 Practical - 12	Physical Chemistry Practical – IV	4	2
	28	Core - 26	Project	6+6*	6

SECOND YEAR

(2017- 2018 onwards)

THIRD SEMESTER THEORY

Components	Sub.Code	Contact Hrs / Week	Credits	Internal Marks	External Marks	Total Marks	Passing Minimum	
							External	Total
Core – 13 Organic Chemistry - III	PCHM31	5	4	25	75	100	38	50
Core – 14 Inorganic Chemistry -III	PCHM32	5	4	25	75	100	38	50
Core – 15 Physical Chemistry- III	PCHM33	4	4	25	75	100	38	50
Core – 16 Scientific- Research Methodology	PCHM34	4	4	25	75	100	38	50

THIRD SEMESTER PRACTICAL

Components	Sub.Code	Contact Hrs / Week	Credits	Internal Marks	External Marks	Total Marks	Passing Minimum	
							External	Total
Core – 17 Organic Chemistry practical –III	PCHL31	4	2	50	50	100	25	50
Core – 18 Inorganic Chemistry practical-III	PCHL32	4	2	50	50	100	25	50
Core – 19 Physical Chemistry practical- III	PCHL33	4	2	50	50	100	25	50

FOURTH SEMESTER THEORY

Components	Sub.Code	Cont. Hrs / Week	Credits	Internal Marks	External Marks	Total Marks	Passing Minimum	
							External	Total
Core – 20 Organic Chemistry -IV	PCHM41	4	4	25	75	100	38	50
Core – 21 Inorganic Chemistry-IV	PCHM42	4	4	25	75	100	38	50
Core – 22 Physical Chemistry-IV	PCHM43	4	4	25	75	100	38	50

FOURTH SEMESTER PRACTICAL

Components	Sub.Code	Contact Hrs / Week	Credits	Internal Marks	External Marks	Total Marks	Passing Minimum	
							External	Total
Core – 23 Organic Chemistry practical –IV	PCHL41	4	2	50	50	100	25	50
Core – 24 Inorganic Chemistry practical-IV	PCHL42	4	2	50	50	100	25	50
Core – 25 Physical Chemistry practical- IV	PCHL43	4	2	50	50	100	25	50
Core-26 Project & viva- voce	PCHP41	6+6*	6	50	50	100	25	50

*Extra hours for the project

For the project, flexible credits are b/w 5-8 & Hours per week are b/w 10-16.

Total number of credits ≥ 90 : 90

Total number of Core Courses : 26 (13T+12P+1Project)

Total number of Elective Courses : 02

Total number of Courses : 28

Total hours : 120

Evaluation

The evaluation for each course consists of two components that are internal and external.

Theory

External : Internal = 75:25

Practical

External : Internal = 50:50

INTERNAL

The internal component consists of following:

THEORY

Regarding the internal assessment, the maximum 25 marks is allocated in the following manner.

Components	Marks
The average of the best two tests From three compulsory tests	15
Assignment	4
Seminar	6
Total	25

Note : Re internal assessment test for the student will not be allowed

PRACTICAL

The break-up for the internal component for the practicals will be as follows.

Number of experiments	=	30
Record	=	10
Mid-term test and Model test average	=	10
Total		50

EXTERNAL

Theory

The external evaluation will be based on the examinations to be conducted by the university at the end of each semester.

Question Pattern

Section – A (10 x 1= 10 Marks)
Answer **ALL** the Questions(Multiple choice questions)

Section – B (5 x 5 = 25 Marks)
Answer **ALL** the questions Choosing either (a) or (b)

Section – C (5 x 8 = 40 Marks)
Answer **ALL** questions choosing either (a) or (b)

Total = 75

Practical

Practical examinations will be conducted at the end of the each semester. The scheme of valuation is to be decided by the respective board of questions setters.

Project and Viva – Voce

Project report evaluation and Viva-Voce will be conducted by the external examiner and the guide. The break up for the project work is:

Components	**Marks**
Project Report	30
Viva – Voce	20
Total =	50

Note :

Scheme of valuation of thesis included, choosing a universal problem, novelty of the title, purpose and importance of research for future development and sustainable, methodology of writing thesis and journal articles etc.

MSU / 2017-18 / PG-Colleges / M.Sc. (Chemistry) / Semester-III / Ppr. No.15 / Core-13

ORGANIC CHEMISTRY – III

Objectives:

L T P C
5 0 0 4

1. To understand the Aliphatic Nucleophilic substitutions, concept of NMR, Mass Spectroscopy.
2. To understand the photochemistry, pericyclic and Hetero cyclic reactions.

Unit-I : Aliphatic nucleophilic substitution and Elimination Reactions: (15 Hours)

Aliphatic nucleophilic substitution : Mechanism of S_N1, S_N2, S_Ni, S_N1', S_N2' and S_Ni' reactions- Effect of substrate, nucleophile, leaving group and solvent on the rate of substitution- Ambident nucleophile- NGP- Mechanism of esterifications and ester hydrolysis ($B_{AC}2$ and $A_{AC}2$ mechanisms only)

Elimination reaction: E_1, E_2 and E_1CB mechanisms- Factors influencing elimination reactions- Hofmann and Satyzeff rules- Pyrolytic elimination- Chugaev and cope reactions- competition between substitution and elimination reactions.

Unit – II: NMR SPECTROSCOPY (15 Hours)

^{1}H-NMR spectroscopy: Basic Principle – number of signals – chemical shift – Factors influencing chemical shift - spin–spin splitting–Proton exchange reactions - classification of spin systems – analysis of AX, AMX and ABX systems – Geminal, Vicinal and long range couplings–NOE in stereochemistry – FTNMR.

C-13 spectroscopy: Principle of proton decoupled and OFF- resonance decoupled C-13 spectroscopy - comparison with H^1NMR - chemical shifts (aliphatic, olefinic, alkynic, aromatic and carbonyl compounds)

2D NMR spectroscopy: H^1–H^1COSY, H^1–C^{13} COSY, NOESY, DEPT and INADEQUATE spectra.

Unit – III: MASS SPECTROSCOPY (15 Hours)

Basic Principles– Base peak – molecular ion – nitrogen rule – metastable ions – isotopic peak - daughter ions – Mc–Lafferty rearrangement – RDA – General rules for fragmentation pattern – Fragmentation pattern of simple compounds of hydrocarbons, alcohols, amines, aldehyde, ketone, ether, acids, phenols ,nitro compounds, alicyclic compounds .

Alternative electron impact ionization technique– CI, FAB, ESI – MS, MALDI –MS, MALDI-TOF , ICP- MS.

One conjunction problem based on UV, IR, H^1 NMR, ^{13}C NMR and Mass spectroscopic techniques is compulsory under section – c. Problems shall be based on the reference books.

Unit-IV : Organic photochemistry and pericyclic reactions (15 Hours)

Organic photochemistry: Jablonskii diagrams-intersystem crossing-energy transfer process-Photosensitization- alpha cleavages or Norrish type-I and Norrish Type II cleavages - Paterno-Buchi reactions- Barton reaction, cis-trans isomerisation. - Di-π methane rearrangement.

pericyclic reactions:

Atomic and molecular orbitals-Woodward-Hoffmann rules, FMO and correlation diagram approaches:

Electrocyclic reaction: con and dis rotatory motions for 4n and 4n+2system (butadiene and 1,3,5-hexatrienes)- Stereochemical course of electro cyclic reaction in terms of conservation of orbital symmetry.

Cycloaddiation: suprafacial and antarafacial, [2+2] and [4+2] cyclo addition reactions (ethylene and butadiene)

Sigmatropic rearrangements - [i,j] shift of C-H and C-C bonds (1,3) and (1,5) carbon migration.

Unit-V : Heterocyclic and biomolecules (15 Hours)

Synthesis and reactions of indole, oxazole, imidazole, thiazole, Reserpine and quinine chromans, pyrimidine, pyridazine, pyrazine, coumarins, benzopyrones and anthocyanins-synthesis of flavones, isoflavones, flavonol, and quercetin -Biosynthesis of flavonoids. Synthesis

Pyranose and furanose forms of aldohexose and ketohexose-methods used for the determination of ring size-A Detailed study on the structure of maltose, lactose and starch.

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Winston Inc., 1959

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INORGANIC CHEMISTRY - III

Objectives:

L T P C
5 0 0 4

- *To introduce organometallic compounds and to study their catalytic applications in homogeneous and heterogeneous systems.*
- *To study the applications of NMR and EPR techniques in inorganic systems.*
- *To understand the basic principles and applications of thermo and spectro analytical techniques.*
- *To introduce inorganic photochemistry and to study applications in various systems.*

Unit I – ORGANOMETALLIC CHEMISTRY – I (15 Hours)

The 18 e^- and 16 e^- rules and its correlation to stability – Synthesis and structures of metal carbonyls, metal nitrosyls and dinitrogen complexes – Substitution reactions of metal carbonyls - IR spectralapplications – identifications of bridging and terminal CO groups – Stretching mode analysis of metal carbonyls – evidence for M-M bonds. Synthesis, properties and structural features of metal complexes with alkene, alkyne, allyl andarene systems. Metallocenes – synthesis, properties, structure and bonding with particular reference to ferrocene and berryllocene – covalent versus ionic bonding in beryllocene. Template synthesis of macrocyclic ligands.

Unit II – ORGANOMETALLIC CHEMISTRY – II (15 Hours)

Organometallic compounds as catalysts and the requirements: Agostic interaction – Oxidative addition and reductive elimination - insertion and elimination reactions – nucleophilic and electrophilic attack of coordinating ligands - cyclometallation reactions. **Homogeneous catalysis:** Wilkinson's catalyst and hydrogenation reactions, Tolman catalytic loop; hydroformylation (oxo) reaction, Wacker and Monsanto acetic acid processes. Cluster compounds, polymer-supported and phase-transfer catalysis. **Heterogeneous catalysis:** synthesis gas and water gas shift reactions; Fischer Tropsch process and synthetic gasoline, Ziegler-Natta polymerization and mechanism of stereoregular polymer synthesis. Cyclooligomerisation of acetylenes (Reppe's or Wilke's catalyst) – Olefin isomerisation using Ni catalyst – olefin metathesis catalysed by Schröck type carbene.

UNIT-III: SPECTRAL METHODS TO THE STUDY OF INORGANIC COMPOUNDS – I (15 Hours)

NMR SPECTROSCOPY: ^{31}P, ^{19}F and ^{15}N – NMR – applications in structural problems based on number of signals, multiplicity, anisotropy (like H_3PO_3, H_3PO_2, $[HNi(PPh_3)_4]^+$, SF_4, TiF_4, PF_5, HPF_2, H_2PF_3, $PF_3(NH_2)_2$, P_4S_3, $P_4N_4Cl_6(NHC_6H_5)_2$, $P_3N_3(CH_3)_2Cl_4$, NF_3, NH_3 – mer- and fac-$Rh(PPh_3)_3Cl_3$, fluxional molecules (including organometallic compounds) and study of fluxionality by NMR technique - NMR of paramagnetic molecules - contact shifts. Evaluation of rate constants - monitoring the course of reaction using NMR.

EPR spectroscopy: Factors affecting magnitude of g-values - Zero field splitting and Kramers' degeneracy - Application of EPR in the study of transition metal complexes based on number of signals, multiplicity, anisotropy (bis(salicylaldimine)copper(II), $[Cu(bpy)_3]^{2+}$, $[Cu(Phen)Cl_2]$, $[(NH_3)_5Co\text{-}O_2\text{-}Co(NH_3)_5]^{5+}$, $Co_3(CO)_9Se$, $Co_3(CO)_9Rh$, $[CoF_6]^{4-}$, $[CrF_6]^{3-}$, $VO(acac)_2$, $[VO(H_2O)_6]^{2+}$, $[Fe(CN)_5NO]^{2-}$). Applications in predicting the covalent character of M-L bond and Jahn-Teller distortion in Cu(II) complexes. EPR spectroscopy of metallobiomolecules: copper and iron proteins.

UNIT – IV: THERMOANALYTICAL AND SPECTROANALYTICAL METHODS (15 Hours)

Theory and principles of thermogravimetric analysis, differential thermal analysis and differential scanning colorimetry – characteristic features of TGA and DTA curves – factors affecting TGA and DTA curves – complementary nature of TGA and DTA – applications of thermal methods in analytical chemistry – thermometric titrations – the study of minerals and metal compounds. Principle and applications of spectrophotometry, spectrofluorimetry, atomic absorption spectroscopy and atomic emission spectroscopy based on plasma sources.

UNIT -V : PHOTOCHEMISTRY OF METAL COMPLEXES (15 Hours)

Frank Condon and thermally equilibrated excited (THEXI) states – properties of excited states of metal complexes – types of excited states, photophysical processes: bimolecular deactivation and energy transfer, photochemical processes: electron transfer reactions, isomerisation and substitutional processes – Photochemistry of Cr(III) and Co(III) complexes – Photophysical and photochemical properties of $[Ru(bpy)_3]^{2+}$. Applications of inorganic photochemistry: photochemical conversion and storage of solar energy – inorganic

photochemistry at semi-conductor electrodes - Catalyzed photoreduction of CO_2 and CO – TiO_2 as a green photocatalyst in removing air and water pollutants.

REFERENCES

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13. Robert A. Scott and Charles M. Lukehart, *Applications of Physical Methods to Inorganic and Bioinorganic chemistr*y, John Wiley & Sons Ltd, 2007.

14. Philip H Rieger, *Electron Spin Resonance Analysis and Interpretation*, The Royal Society of Chemistry, 2007.
15. John A. Weil, James R. Bolton, *Electron Paramagnetic Resonance Elementary Theory and Practical Applications*, 2nd Edition, John Wiley & Sons, 2007.
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PHYSICAL CHEMISTRY- III

Objective: L T P C
4 0 0 4

Learning the concepts of Group Theory

To understand the Principles and applications of various spectroscopy

UNIT-I: Group Theory-I (12 Hours)

Symmetry elements and operations. Group Postulates and types of groups. Identification of Point groups of molecules and Schoenflies symbols. Construction of multiplication table for C_{2v}, C_{3v} and C_{2h}. Sub-groups and classes of symmetry operations. Rule of similarity transformations. Matrix representations of symmetry operations. Use of atomic wave functions as bases for point group representations. Reducible and irreducible representations. The Great Orthogonality theorem. Properties of Reducible and irreducible representations. Construction of character tables for C_{2V}, C_{3V}, C_{4V}, C_{2h}, and D_2 point groups by using The Great Orthogonality theorem.

UNIT-II : Group Theory -II : (12 Hours)

Standard Reduction Formula, Vibrational modes as bases for group representations-Normal mode analysis for non linear molecules H_2O, $POCl_3$, trans-N_2F_2 and $PtCl_4$. Symmetry selection rules for infrared and Raman spectra. Mutual exclusion principle. Determination of Hybridisation of atomic orbitals in non-linear molecules (CH_4, XeF_4, and PF_5). Electronic spectra of ethylene and formaldehyde molecules. Construction of Projection operators and Molecular orbitals by Symmetry Adapted Linear Combinations. Simplification of HMO calculations using group theory. Calculation of delocalization energy for ethylene, trans-1,3 – butadiene, and benzene systems.

UNIT – III: Nuclear Magnetic Resonance Spectroscopy (12 Hours)

Theory of Proton NMR spectroscopy, Chemical shift and its measurement, Factors influencing chemical shift, Solvents used in NMR, solvents shift-concentration and temperature effects-hydrogen bonding. Theory of Spin-spin splitting-Magnitude of coupling-coupling constants, J, First-order spectra of complex systems, chemical and magnetic equivalence in NMR, Proton exchange reactions, Factors influencing coupling constant, J. Theory and Principle of ^{13}C, ^{19}F, ^{31}P NMR-Range of chemical shift values, spectra of typical

examples. FT NMR-FIDs. Theory of Spin-spin splitting and double irradiation, InterNuclear Double Resonance (INDOR) and Selective Population Inversion (SPI), Nuclear Overhauser Effect (NOE), 2D NMR-shift correlation spectra-COSY, Magnetic Resonance Imaging (MRI).

UNIT-IV: NQR and EPR spectroscopy (12 Hours)

Electron paramagnetic resonance spectroscopy: theory of EPR spectroscopy, presentation of the spectrum, nuclear hyperfine splitting in isotropic systems. EPR spectra of anisotropic systems: anisotropy in g-value, causes of an isotropy, anisotropy in hyperfine coupling. Double resonance in ESR, Zero field splitting and Kramers' degeneracy.

Theory and Principle of NQR spectroscopy-Nature of electric field gradient, Energy levels and selection rules, Interaction of electric quadrupole with electromagnetic radiation, nuclear orientations, the asymmetry parameter, quadrupole transitions in spherical, axially symmetric fields and not axially symmetric fields. Applications of NQR spectra.

UNIT-V: Electronic Spectroscopy, Mossbauer Spectroscopy and Mass Spectrometry (12 Hours)

Electronic Spectroscopy-Electronic Spectrum of diatomic molecules-Born-Oppenheimer approximation, Progressions, Franck-Condon Principle, Dissociation Energy and dissociation products, Rotational Fine structure of Electronic-Vibration Transitions, The Fortrat diagram, Predissociation, Electronic states of atoms, Electron orbitals in diatomic molecules, Electronic states of diatomic molecules, Potential energy curves for Electronic states of diatomic molecules.

Photoelectron Spectroscopy-Basic Principles, Ultra-Violet Photoelectron Spectroscopy, X-ray Photoelectron Spectroscopy, Chemical information from Photoelectron Spectroscopy.

Mössbauer spectra: Theory and Principle of Mössbauer spectra, isomer shift, quadrupole interactions, magnetic hyperfine interaction, Doppler shift, recoil energy, experimental technique-sources, absorber, calibration, Chemical applications.

Mass spectrometry: Operation and representation of spectra. Effect of combination of high energy electron with a molecule. Finger print application and the interaction of mass spectra, Effect of isotopes on the appearance of a mass spectrum, Molecular weight determinations.

REFERENCE BOOKS

1. Introductory Group Theory For Chemists- George Davidson

2. F. Albert Cotton, Chemical Applications of Group Theory, Third Edition John Wiley & Sons, Singapore 2003.
3. V. Ramakrishnan and M. S. Gopinathan: Group Theory in chemistry, Vishal Publication, 1986.
4. Robert L. Carter, Molecular Symmetry and Group Theory John Wiley and Sons, Inc., New York, 1998.
5. R.L. Flurry, Jr, Symmetry Groups – Prentice Hall, New Jersy 1980.
6. Group Theory and its applications to Chemistry by K. V. Raman
7. Group Theory and Spectroscopy by K. Veera Reddy
8. Group Theory and its Chemical applications by B.K. Battacharya
9. C.N. Banwell and E. M. McCash, Fundamentals of Molecular Spectroscopy, 4th ed., Tata McGraw Hill, New Delhi, 2000.
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SCIENTIFIC - RESEARCH METHODOLOGY

L T P C

Objectives: 4 0 0 4

- *How to learn the survey for literature, chemical abstract, choosing a research problem and scientific writing, characterization and data analysis, computer searches and literature.*
- *How to apply for the various finding agencies.*

Unit – I: LITERATURE SURVEY (12 Hours)

Source of chemical information – primary, secondary, tertiary sources-literature survey-Indexes and abstracts in science and technology – Applied science and technology index, chemical abstracts, chemical titles, current chemical reactions, current contents and science citation index.

Classical and comprehensive reference works in chemistry-synthetic methods and techniques, treatises, reviews, patents and monographs.

UNIT - II : CHEMICAL ABSTRACTS: (12 Hours)

Current awareness searching: CA weekly issues, CA issue indexes. Retrospective searching: CA volume indexes-general subject index, chemical substance index-formula index, index of ring systems, author index, patent index. CA collective indexes: collective index (CI), decennial index (DI). Access points for searching CA indexes- Index guide, general subject, terms, chemical substance names, molecular formulas, ring systems, author names, patent numbers. Locating the reference: finding the abstract, finding the original document chemical abstract - service source index.

UNIT –III: CHOOSING A RESEARCH PROBLEM AND SCIENTIFIC WRITING (12 Hours)

Identification of research problem – assessing the status of the problem - guidance from the supervisor – actual investigation and analysis of experimental results – conclusions.

Scientific writing-research reports, thesis, journal articles and books.

Steps to publishing a scientific article in a journal – types of publications-communications, articles, reviews, when to publish, where to publish ,specific format required for submission.

Documenting- Abstracts-indicative (or) descriptive abstracts, informative abstract, footnotes, end notes, referencing styles-bibliography-journal abbreviations (CASSI), abbreviation used in scientific writing.

Unit –IV: INSTRUMENTAL CHARACTERIZATION AND DATA ANALYSIS (12 Hours)

Principle and Sample preparation of UV, FT-IR, TEM, SEM, EDAX, AFM and XRD characterization of observed results – Data analysis - Report.

Errors in chemical analysis – classification of errors – determination of accuracy of methods – improving accuracy of analysis – significant figures – mean, standard deviation – comparison of results : "t" test, "f" test, Q test and "chi" square test – rejection of results – presentation of data.

UNIT –V: COMPUTER SEARCHES AND LITERATURE. (12 Hours)

ASAP – Alerts, CA Alerts, scifinder, chemport, science direct, STN international, journal home pages. Online browsing of research articles – online submission of research papers in various Journals (ACS, RSC, Elsevier, Springer etc.) –Instructions to the authors – Impact factors. Writing project proposal to funding agencies (UGC, DST etc.).

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15. D.L.Pavia, G.M.Lampman and G.S.Kniz Jr., Introduction to spectroscopy – A guide for students of organic chemistry.
16. H.Willard, L.MerritJr.andA.Dean, Instrumental methods of analysis.
17. D.A.Skoog and M.West, Principles of instrumental analysis.
18. B.K.Sharma, Instrumental methods of chemical analysis.

19. D.A. Skoog and M.West, Fundamentals of analytical chemistry.
20. J.D.Dick, Analytical chemistry.
21. S.M.Khopkar, Basic concepts of analytical chemistry.

Organic Chemistry Practical – III

L T P C

0 0 4 2

Estimations, two stage preparations and Spectral interpretation have been included as the practical components.

Microscale preparations are recommended for the simple reason, they are both economic-friendly and eco-friendly

A.List of Estimations

1.Ethylmethylketone

2.Acetone

3. Saponification value of an oil

4.Determination of Percentage purity in an unsaturated acid.

5. Estimation of hydroxyl group

B. List of Two stage preparations

1.Benzaldehyde Benzoic acid m-nitro benzoic acid

2. Acetanilide p-acetanilide p-Bromoaniline

3.Methyl benzoate m-nitro methyl benzoate m-nitro benzoic acid

4. Acetanilide p-nitroacetanilide p - nitroaniline

5. Benzophenone Benzo phenone oxime Benzanilide

Students are expected to submit the recrystallised samples of the final products, at the time of practical examination, for evaluation by the examiners.

C. For Class work Only :

1. Download the following spectra from **internet** and give interpretation.
   Differentiate the following pair by H^1NMR spectra
   (a) Maleic acid and Fumaric acid.
   (b) Aqueous ethyl alcohol and Pure ethyl alcohol.

(c) Dimethyl Ether and Aqueous ethyl alcohol.

Interprete the following C-13 NMR Spectra.

(a)OFF- Resonance decoupled C-13 spectrum of menthol.

(b) DEPT spectrum of isopentyl acetate.

(c) INADEQUATE spectrum of 2- butanone.

Interprete the mass spectrum of anisole and benzoic acid.

N.B: 1.Section -C is course work only.

2. It is for the purpose of internal assessment only.

REFERENCES

1.F.C.Mann and B.C.Saunders, Practical organic chemistry, Fourth edition, ELBS,1970

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8.V.K.Srivastava and K.K.Srivastava, Introduction to Chromatography-Theory and Practice, S.Chand & Co., 1987.

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INORGANIC CHEMISTRY PRACTICAL – III

L T P C
0 0 4 2

I. Quantitative estimation of a mixture containing two metal ions (Volumetric and Gravimetric Estimations).

1. Estimation of mixture of Cu^{2+} and Ni^{2+} ions.
2. Estimation of mixture of $Cu^{2+}$and Zn^{2+} ions.
3. Estimation of mixture of $Fe^{2+}$and Cu^{2+} ions.
4. Estimation of mixture of Fe^{2+} and Ni^{2+} ions.
5. Estimation of mixture of Ca^{2+} and Mg^{2+}ions.
6. Estimation of mixture of Ca^{2+} and Ba^{2+} ions.

II. Analysis of ores and alloys (course work).

III. One day visit to Industry/Research Institution and submission of a minor report.

REFERENCES

1. G.H. Jeffery, J. Bassett, J. Mendham and R.C. Denney, Vogel's *Textbook of Quantitative Chemical Analysis*, Revised 5th edition, ELBS, 1989.
2. Mounir A. Malati, *Experimental Inorganic/Physical Chemistry - An Investigative, Integrated Approach to Practical Project Work*, Woodhead Publishing Limited, Reprint 2010.

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PHYSICAL CHEMISTRY PRACTICAL-III

Objective: L T P C

0 0 4 2

To learn and apply the Principles of Potentiometric Titrations.

To understand the Principles and applications of Adsorption

I. POTENTIOMETRIC TITRATIONS

(a) Acid alkali titrations.

(b) Redox titrations (i) Fe^{2+} vs $Cr_2O_7^{2-}$

(d) Determination of dissociation constant of weak acids.

(e) Determination of activity and activity coefficient of ions.

(f) Determination of pH of a buffer solution using a quinhydrone electrode.

II. TITRATION USING PH METER

(a) Determination of dissociation constant of Weak acid.

III. ADSORPTION

Freundlich Adsorption isotherm

Adsorption of oxalic acid on charcoal.

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1. J.B.Yadav, " Advanced Practical Physical chemistry", 20th Edn., GOEL publishing House, Krishna Pakashan Media Ltd., (2001).
2. Findlay's "Practical Physical Chemistry" Revised and edited by B.P. Levitt 9th Edn., Longman, London, 1985.
3. J.N. Gurtur and R.Kapoor, "Advanced Experimental chemistry", Vol.I. Chand & Co., Ltd., New Delhi.
4. W. J. Popiel, Laboratory Manual of Physical Chemistry, ELBS, London, 1970.
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ORGANIC CHEMISTRY – IV

Objectives:

L T P C
4 0 0 4

To study the intermediate reactions, conformational, synthetic analysis, important Reagents in organic synthesis and the Steroid compounds.

Unit-I : Reaction under Intermediate chemistry (12 Hours)

Reaction Under Carbanion Intermediate: Stobbe, Darzen, acyloin condensation Shapiro reaction and Julia olefination.

Reaction through carbene intermediate: Bamford – Stevens , Reimer- Tiemann reactions.

Reaction Under Carbocation intermediate: Oxymercuration, halolactonisation, Baeyer-villiger oxidation

Reaction following Radical intermediate: Mc Murray coupling, Gomberg-Pechmann and Pschorr reactions.

Reaction involving Ylide intermediate: Wittig reaction and Peterson olefination.

Unit-II : Conformational analysis (12 Hours)

Conformation and configuration-conformational free energy-conformational analysis of mono substituted (alkyl, halogens) and 1,1-disubstituted (alkyl) and 1,2-1,3-and 1,4-dimethyl substituted cyclohexanes -compounds existing in boat form-conformation of cyclohexanone, decalin and perhydrophenanthrene-Curtin-Hammett principle- conformation and reactivity of acyclic and cyclic compounds (6membered).

Unit-III : Reterosynthetic analysis (12 Hours)

Synthon-synthetic equivalent-Functional group interconversions -use of protecting groups for alcohols, amines, acids, carbonyl compounds- use of activating and blocking groups-Robinson annulations reaction-carbon skeletal complexity-Role of key intermediates in organic synthesis. Reterosynthetic analysis of the following compounds: Twistane, cis - Jasmone, Baclofen, Trihexyl phenydyl, S-propanediol, Isonootkatone, cascarillic acid, camphor and 2,4-dimethyl-2-hydroxy pentanoic acid.

Unit-IV : Reagents in organic synthesis (12 Hours)

2,3-Dichloro-5,6-dicyano-1,4-benzoquinone (DDQ), DMSO, Super hydrides- Dess-martin-periodinane-Osmium tetra oxide.

Modern Reagents: Introductory treatment of the application of silicon (Tri alkyl silyl halides, organo silanes), Boron (9 – BBN, borane, and alkyl borane), phosphorus (phosphoranes),

palladium(Still coupling, Suzuki Coupling, Heck and Negishi reactions) samarium(SmI_2), ruthenium(RuO_2,Ru-Binap Complex), platinum(PtO_2, Adam's Catalyst) reagents in organic synthesis.

Unit-V : Steroid (12 Hours)

Classification- structural elucidation of cholesterol, irradiated products of ergosterol. Conversion of cholesterol to androsterone, progesterone, testosterone, 5α- and 5 β-cholanic acid. Conversion of Oestrone to Oestriol, Oestrodiol and vice-versa. Conformational structure of cholestane and Coprostane. General study of Bile acids and Prostoglandins.

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INORGANIC CHEMISTRY- IV

Objectives: L T P C

4 0 0 4

- *To study the applications of Mossbauer, photoelectron and nuclear quadrupole resonance spectroscopic techniques in inorganic systems.*
- *To study the applications of ORD and CD to determine absolute configuration of chelate complexes.*
- *To introduce bioinorganic chemistry and to study role of metalloporphrins and metalloenzymes in various biological processes.*
- *To give an insight into material science.*

UNIT - I : SPECTRAL METHODS TO THE STUDY OF INORGANIC COMPOUNDS – II (12 Hours)

Mossbauer spectroscopy : Principle – isomer shift (IS) – splitting of resonance lines: quadrupole splitting and magnetic hyperfine splitting. Applications: MB spectra of iron compounds/complexes – structural elucidation, π- bonding effect, determination of high spin and low spin, spin state crossover and cis–trans isomers – nature of the complexes – mixed valence complexes. Tin compounds: MB spectra of Sn(II) and Sn(IV) compounds, oxidation states of Sn in its different compounds. Applications in bioinorganic chemistry: oxy and deoxy- hemerythrin - catalase, peroxidases, Fe-S protein systems.

ORD AND CD - Optical isomerism in octahedral complexes – absolute configuration of chelate complexes from ORD and CD.

UNIT - II: SPECTRAL METHODS TO THE STUDY OF INORGANIC COMPOUNDS – III (12 Hours)

Photo electron spectroscopy: Theory – types of PES –origin of fine structures – adiabatic and vertical transitions – PE spectra of homonuclear diatomic molecules (N_2, O_2) – hetero nuclear diatomic molecule (CO) – polyatomic molecules (H_2O, CO_2, CH_4, NH_3). Evaluation of vibrational constant – Koopman's theorem – application and limitation of the theorem. XPS (ESCA): structure of N_3^- ion, CCl_3CH_3, N (1s) spectrum of $[Co(en)_2(NO)_2]NO_3$, C(1s) spectrum of $C_2H_5COOCF_3$. Shake-up and shake-off processes – Structural and bonding information in metal carbonyls – Auger electron spectroscopy.

NQR spectroscopy: Applications – fingerprint technique. Investigating the electronic structure of molecules – information about EFG of nuclei – ionic character and hybridization of the bonds – structure of charge transfer complexes – Phase transition – hydrogen bonding.

Unit - III: BIOINORGANIC CHEMISTRY – I (12 Hours)

Non-metals and metals in biological systems, essential and trace elements; classification of metallo-biomolecules, coordination environment and entatic state. Metalloporphyrins – chlorophyll and photosynthesis; cytochromes, hemoglobin, myoglobin and dioxygen binding, vitamin B_{12} and co-enzyme – *in vivo* and *in vitro* nitrogen fixation. Iron storage and transport: ferritin, transferrins and siderophores, iron proteins: hemerythrin, cytochrome P450 enzyme, ferredoxin and rubredoxin.

Unit - IV: BIOINORGANIC CHEMISTRY – II (12 Hours)

Copper proteins and Enzymes : plastocyanin, azurin, hemocyanin and ascorbic oxidase – different types of Cu present in proteins and enzymes. Zinc enzymes: carboxypeptidase A, carbonic anhydrase and superoxide dismutase. Inhibition and poisoning of enzymes illustrated by xanthine oxidase and aldehyde oxidase. Toxicity of metals and the role of metallothionins – excess and deficient levels of Cu and Fe and the consequent diseases – chelate therapy – metal complexes as drugs, anticancer and antiarthritic agents. Metal complexes as probes of nucleic acids.

UNIT – V : CHEMISTRY OF INORGANIC MATERIALS (12 Hours)

Synthesis of inorganic materials – High temperature ceramic methods – Co-Precipitation and Precursor Methods – Combustion synthesis – High temperature reactions – precipitation, gel, solution and hydrothermal methods – Synthesis in sealed tubes and special atmospheres – Low temperature methods – Chemical Vapour Deposition (CVD) – Preparing single crystals -Epitaxy methods – Chemical Vapour Transport - Solution Methods. Insertion compounds of metal oxides – Intercalation compounds of graphite and transition metal disulphides. Zeolites: structures and properties – pillared clays – fullerenes and fullerides.

REFERENCES

1. Russell S. Drago, *Physical Methods in Inorganic Chemistry*, Chapman and Hall Ltd., London, 1965.
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PHYSICAL CHEMISTRY- IV

Objective:

L T P C
4 0 0 4

- *To understand the Principles and applications of Vibrational and Raman spectroscopy*
- *To obtain Knowledge Fast reaction study*
- *To learn the Theories and applications of Kinetics*
- *To Know the Principles of Surface Chemistry and Catalysis*

UNIT - I: Vibrational Spectroscopy (12 Hours)

Vibrating diatomic molecule: Energy of diatomic molecules as simple harmonic oscillator-energy levels, vibrational transitions, selection rules; anharmonic oscillator-energy levels, selection rules, vibrational transitions. Diatomic vibrating rotator: Born-Oppenheimer approximation, vibration-rotation spectra, selection rules, P, Q, R branches. Vibrations of polyatomic molecules: symmetry and fundamental vibrations, normal modes of vibration, overtones, combination, difference bands; influence of rotations on the spectra of polyatomic molecules-parallel and perpendicular vibrations in linear and symmetric top molecules.

UNIT-II: Raman Spectroscopy (12 Hours)

Lasers: Nature of stimulated emission-coherence and monochromaticity, population inversion, cavity and mode characteristics, Q-switching, mode locking; types of lasers-solid-state, gas, chemical, and dye lasers.

Raman Effect: Quantum theory of Raman effect, Classical theory of Raman effect, Pure rotational Raman spectra- linear molecules, symmetric top and spherical top molecules, Vibrational Raman spectra-symmetry and Raman active vibrations, rule of mutual exclusion; Overtone and combination vibrations, Vibrational Raman spectra, Rotational Fine structure. Polarisation of light and Raman effect-The nature of Polarized effect, Vibrations of spherical top molecules and other types of molecules. Structure determination from Raman and Infra-red spectroscopy, Applications of IR and Raman spectroscopy: skeletal and group vibrations, finger printing and absorption frequencies of functional groups for inorganic and organic compounds. Techniques and instrumentation, Near-Infra-red FT-Raman spectroscopy.

UNIT-III: Chemical Kinetics I (12 Hours)

Reactions in Flow systems-Techniques for very fast reactions-Stopped-Flow method, Relaxation methods, Shock-Tube methods, Temperature, Pressure, electric field and magnetic field jump methods, Flash photolysis and pulse radiolysis. NMR and ESR methods of studying fast reactions.

Collision theory. Potential Energy surfaces-energy of activation. Statistical mechanics and chemical equilibrium- Derivations of rate equations Symmetry numbers and statistical factors. Application of ARRT to Reaction between atoms and reaction between molecules. Thermodynamic Formulation of conventional transition state theory, Limitations of transition state theory. Vibrational transition state theory, Quantum mechanical transition state theory , Microscopic reversibility. Unimolecular reactions- Lindemann-Christiansen hypothesis, Hinshelwood, RRK, RRKM and Slater theories.

UNIT-IV: Chemical Kinetics II (12 Hours)

Elementary reactions in solution-Solvent effects on reaction rates, Factors determining reaction rates in solution- collisions in solution, Transition State Theory, Influence of internal pressure, influence of salvation. Reaction between ions- Influence of solvent dielectric constant, Pre-exponential Factors, Single-Sphere Activated Complex, Influence of ionic strength. Influence of Hydrostatic Pressure-Van't Hoff's equation and volumes of activation. Substituent and correlation effects-Hammett equation, Compensation effect.

Composite reactions-Types of composite mechanism, Rate equations for composite mechanisms, Simultaneous and consecutive reactions, Steady –State Treatment, Kinetics of H_2-Cl_2 and H_2-Br_2 reactions, Formation of Phosgene-decomposition of O_3 and N_2O_5. Rice-Herzfeld mechanism, Explosive reactions: H_2-O_2 reaction.

UNIT-V: Surface Chemistry & Catalysis (12 Hours)

Introduction: Adsorption- Physisorption and chemisorptions. Adsorption isotherms: Freundlich, Langmuir, BET and Gibbs adsorption isotherms. Surface area dertermination. ARRT to surface reactions. Micelles: Micelles and reverse micelles- microemulsion-solubilisation.

Catalysis: Homogeneous catalysis- acid-base catalysis- Van't Hoff and Arrehenius complexes for Protropic and Protolytic mechanisms. Bronsted catalysis law- Hammett acidity function. Heterogeneous catalysis. Chemical reactions on solid surfaces. Enzyme catalysis: Michaelis-Menton Kinetics- Rate of enzyme catalyzed reaction- effect of substrate concentration, pH and temperature on enzyme catalyzed reactions.

REFERENCE BOOKS

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3. Spectroscopy, Volume-3, B.P. Straughan and S.Walker.
4. I.N. Levine, Molecular Spectroscopy, John Wiley & Sons, New York, 1974.
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6. Spectroscopy (Atomic and Molecular) Gurdeep R. Chatwal and Sham K. Anand, Himalaya Publishing House
7. R. S. Drago, PhysicaI Methods in Chemistry; Saunders: Philadelphia, 1977.
8. Introduction to Molecular spectroscopy, G.M. Barrow, McGraw-Hill international editions.
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17. G. D. Billing & K. V. Mikkelson, Molecular Dynamics and Chemical Kinetics, John Wiley, 1996.
18. A.W. Adamson, A.P. Gast, Physical chemistry of surfaces, Wiley, 1997.
19. H.-J. Butt, K. Graf, M. Kappl, Physics and Chemistry of Interfaces, Wiley-VCH, 2006.
20. D.K. Chakrabarty and B. Viswanathan, Heterogeneous Catalysis, New Age, 2008.
21. H. Kuhn, H.-D. Forsterling, D.H. Waldeck, Principles of Physical Chemistry, Wiley, 2009.
22. G.A. Somorjai, Y. Li , Introduction to Surface Chemistry and Catalysis (2n ed.), 2010. Surface Chemistry: Theory and Applications by J.J Bikertman, Academic Press, New York (1972).
23. Physics at surfaces, A Zangwill, Cambridge university Press (1988). 12. Surface crystallography, L J Clarke, Wiley-Interscience (1985).

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Organic Chemistry Practical – IV

L T P C
0 0 4 2

Estimation, two stage preparations and chromatographic techniques have been included as the practical components.

Microscale preparations are recommended for the simple reason, they are both economic-friendly and eco-friendly

A.List of Estimation

1.Glucose-Lane Eynon and method

2.Glucose-Bertrand's method

3.Iodine value of an oil

4. Estimation of acetyl group

5. Purity of Glucose.

B. List of Two stage preparations

1. Benzophenone Benzpinacol Benzpinacolone

2. Phthalic acid Phthalic anhydride Phthalimide

3. Thiourea s-benzyl isothiuronium chloride s- Benzyl-isothiuronium benzoate

4. Aniline Tri-bromoaniline Sym- Tribromobenzene

5.Phthalic anhydride ⟶ Phthalimide ⟶ Anthranilic acid

Students are expected to submit the recrystallised samples of the final products, at the time of practical examination, for evaluation by the examiners.

For Class work Only .

1. Isolation of carotene from carrot.
2.

REFERENCES

1.F.C.Mann and B.C.Saunders, Practical organic chemistry, Fourth edition, ELBS,1970

2.A.I. Vogel, A Text book of Practical organic chemistry.

3. A.I. Vogel, A Text book of Quantitative Organic Analysis,1989.

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7.Roberts, Gilbert, Reidwald-Wingrove An Introduction to Experimental Organic Chemistry, 1969.

8.V.K.Srivastava and K.K.Srivastava, Introduction to Chromatography-Theory and Practice, S.Chand & Co., 1987.

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INORGANIC CHEMISTRY – IV

L T P C
0 0 4 2

I. Preparation of inorganic complexes and quantitative estimation by volumetric or instrumental methods.

1. Preparation, and analysis of potassium trisoxalatochromate(III) trihydrate $K_3[Cr(C_2O_4)_3].3H_2O$
2. Preparation and analysis of potassium hexathiocyanatochromate(III) tetrahydrate $K_3[Cr(SCN)_6].4H_2O$
3. Preparation and analysispotassium trisoxalatomanganate(III) trihydrate $K_3[Mn(C_2O_4)_3].3H_2O$
4. Preparationand analysis of potassium trisoxalatoferrate(III) trihydrate $K_3[Fe(C_2O_4)_3].3H_2O$
5. Preparation and analysis of potassium trisoxalatocobaltate(III) trihydrate, $K_3[Co(C_2O_4)_3].3H_2O$
6. Preparation and analysis of Durrant's salt, $K_4[C_2O_4)_2Co(OH)_2Co(C_2O_4)_2].3H_2O$
7. Preparation and analysishexamminecobalt(III) Chloride, $[Co(NH_3)_6]Cl_3$
8. Preparation and analysis of chloropentaamminecobalt(III) chloride, $[Co(NH_3)_5Cl]Cl_2$
9. Preparation and analysis of trinitrotriamminecobalt(III), $[Co(NH_3)_3(NO_2)_3]$
10. Preparation and analysis of trans-dichlorobis(diaminoethane)cobalt(III) chloride, trans-$[Co(en)_2Cl_2]Cl$
11. Preparation and analysis of $(NH_4)_2[VO(C_2O_4)_2].2H_2O$
12. Preparation and analysis of tris(thiourea)copper(I) sulphate dihydrate, $[Cu(tu)_3]_2SO_4.2H_2O$

II. Characterisation of metal complexes prepared during the practicals by UV and IR spectral techniques (Course work).

III. Study of linkage isomerism in pentaamminenitritocobalt(III) chloride, and pentaamminenitrocobalt(III) chloride using IR (Course work).

REFERENCES

1. Mounir A. Malati, *Experimental Inorganic/Physical Chemistry - An Investigative, Integrated Approach to Practical Project Work*, Woodhead Publishing Limited, Reprint 2010.
2. W. G. Palmer, *Experimental Inorganic Chemistry*, Cambridge University Press, Reprint 1970.
3. George Brauer, *Handbook of preparative inorganic chemistry*, 2nd Edition, Academic Press, 1963.
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5. Geoffrey Pass, Haydn Sutcliffe, *Practical Inorganic Chemistry - Preparations, reactions and instrumental methods*, Springer 1974.

PHYSICAL CHEMISTRY PRACTICAL-IV

Objective: L T P C

0 0 4 2

To obtain and improve the Knowledge of Potentiometric Titrations.

To understand the Principles and applications of Adsorption

POTENTIOMETRIC TITRATIONS

I. **Precipitation titrations**

Mixture of Cl^- and I^- vs Ag^+

II. **Redox titrations**

(i) Fe^{2+} vs Ce^{4+}

(ii) I^- vs $KMnO_4$

III. **Solubility Product** Determination of solubility product of sparingly soluble silver salts.

ADSORPTION

Freundlich Adsorption isotherm:

Adsorption of acetic acid on charcoal.

REFERENCE BOOKS (Practical I to IV)

1. J.B.Yadav, " Advanced Practical Physical chemistry", 20th Edn., GOEL publishing House, Krishna Pakashan Media Ltd., (2001).
2. Findlay's "Practical Physical Chemistry" Revised and edited by B.P. Levitt 9th Edn., Longman, London, 1985.
3. J.N. Gurtur and R.Kapoor, "Advanced Experimental chemistry", Vol.I. Chand & Co., Ltd., New Delhi
4. W. J. Popiel, Laboratory Manual of Physical Chemistry, ELBS, London, 1970.
5. D.P.Shoemaker, C.W.Garland, Experiments in Physical Chemistry, McGraw-Hill, New York, 1967.

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Project

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI
PG - COURSES – AFFILIATED COLLEGES
Course Structure for M.Sc Computer Science
(Choice Based Credit System)
(with effect from the academic year 2017- 2018 onwards)

Sem. (1)	Sub. No. (2)	Subject Status (3)	Subject Title (4)	Contact Hrs./ Week (5)	Credits (6)
III	**15**	**Core - 14**	**Digital Image Processing**	**4**	**4**
	16	**Core - 15**	**Soft Computing**	**4**	**4**
	17	**Core - 16**	**Software Testing**	**4**	**4**
	18	**Core - 17**	**Research Methodology**	**4**	**4**
	19	**Elective - 2**	**Principles of Compiler Design, Big Data Analytics, Mobile Computing**	**4**	**3**
	20	**Core - 18 Practical - 5**	**Image Processing Using MATLAB**	**4**	**2**
	21	**Core - 19**	**Mini Project**	**6+6***	**6**
			Subtotal	30	27
IV	**22**	**Core - 20**	**Major Project**	**30+2***	**16**
			Subtotal	30	16
			Total	120	90

DIGITAL IMAGE PROCESSING

L	T	P	C
4	0	0	4

OBJECTIVES

- To understand the broad base of theoretical concepts of image
- To implement the concepts with the state of art of image processing using MATLAB

UNIT - I MATLAB & IMAGE PROCESSING FUNDAMENTALS

Introduction : Fundamentals - The MATLAB Desktop - Using Mat lab Editor /Debugger-getting help-saving and Retrieving work session data - Digital Image Representation - Image I/O and Display – Classes and Image Types - M-Function Programming. Intensity Transformation and Spatial Filtering : Background - Intensity transformation - histogram Processing and function Plotting - Spatial filtering - Image processing toolbox standard spatial filters. **(12L)**

UNIT - II FILTERING TECHNIQUES

Filtering in Frequency Domain : The 2-D Discrete Fourier transform - Computing and Visualizing the 2-D DFT in MATLAB – Filtering in the Frequency domain - Obtaining frequency domain filters from spatial filters - High pass (sharpening) frequency domain filters. Image Restoration and Reconstruction : A model of the image degradation / restoration process - Noise models - Restoration in the presence of Noise only – Periodic Noise reduction using Frequency Domain Filtering – Modeling the Degradation Function - Direct Inverse Filtering - Wiener filtering. **(14L)**

UNIT - III COLOR IMAGE PROCESSUNG

Color Image Processing : Colour image representation in MATLAB - converting to other color spaces - The basics of color image processing - Color transformation - Spatial Filtering of colour images.Working directly in a RGB vector space Wavelets : Background - The fast wavelet transform -Working with wavelet decomposition structures - The inverse wavelet transform- Wavelets in image processing. **(10L)**

UNIT - IV IMAGE COMPRESSION & MORPHOLOGY

Image Compression : Background - Coding Redundancy - Spatial Redundancy - Irrelevant information- JPEG Compression. Morphological image Processor : Preliminaries - Dialation and Erosion - Combining Dialation and erosion - Labelling connected components – Morphological reconstruction - Gray scale morphology. **(12L)**

UNIT - V SEGMENTATION, REPRESENTATION AND DESCRIPTION

Image Segmentation : Image segmentation - Point, line and edge detection - Line detection using the Hough transform – Thresholding – Region - Based segmentation using the Watershed transform. Representation and Description : Background – Representation - Boundary Descriptors. **(12L)**

(TOTAL : 60L)

OUTCOMES

- Able to understand basic concepts of image processing
- Knows how to use built-in image processing functions in MATLAB
- Able to implement various operations on images

REFERENCES

1. Rafael C.Gonzalez, Richard E.Woods and Steven L.Eddins , "Image Processing Using MATLAB" ,Second edition, Tata McGraw Hill Education Private Limited, 2011.
2.Anil.K.Jain, Fundamentals of Digital Image Processing, Prentice-Hall, 1989.
3.Chanda & Majumdar, Digital Image Processing and Analysis, Prentice Hall ,3rd Edition
4.S.Sridhar, Digital Image Processing,Oxford University Press 2011

SOFT COMPUTING

L T P C
4 0 0 4

OBJECTIVES

- To explore the benefits computing methodologies like neural netwoks, fuzzy logic and genetic algorithms.
- To enable the students to develop hybrid systems for the industrial problems.

UNIT - I NEURAL NETWORKS FUNDAMENTALS

Artificial Neural Network : Basic Concepts of Neural networks - Evolution of Neural networks - Basic Models of Artificial neural network - Terminologies of ANN- McCulloch - Pitts Neuron - Linear separability - Hebb Network - Applications of Neural networks.

Supervised learning Network : Introduction – Perceptron Networks – Adaptive Linear Neuron – Multiple Adaptive Linear Neurons – Back propagation Network. **(11L)**

UNIT – II CATEGORIES OF NEURAL NETWORKS

Associative Memory Networks : Introduction – Training algorithms for pattern association – Auto associative Memory Network – Bidirectional Associative Memory – Hopfield Networks.

Unsupervised Learning networks: Introduction – Fixed Weight Competitive Nets - Kohonen Self-Organizing Maps – Learning Vector Quantization – Adaptive Resonance Theory Network. **(13L)**

UNIT – III BASIC CONCEPTS OF FUZZY SET

Introduction to Classical Sets and Fuzzy Sets : Introduction - Classical sets - Fuzzy Sets. Classical Relation and Fuzzy Relations :- Introduction - Cartesian product of a relation - Classical Relation - Fuzzy Relations. Membership Functions : Introduction - Features of Membership Functions – Fuzzification - Methods of Membership Value Assignments. Defuzzification : Introduction - Lambda-Cuts for Fuzzy Sets - Lambda-Cuts for Fuzzy Relations - Defuzzification Methods. **(11L)**

UNIT - IV FUZZY ARITHMETIC AND DECISION MAKING

Fuzzy Arithmetic and Fuzzy Measures : Introduction - Fuzzy Arithmetic - Extension principles – Fuzzy measures. Fuzzy Rule Base and Approximate Reasoning : Introduction- Truth values and Tables in fuzzy logic - Fuzzy properties - Formation of rules- Decomposition of rules - Aggregation of Fuzzy rules - Fuzzy reasoning - Fuzzy Inference Systems. Fuzzy Decision Making : Individual Decision Making - Multiperson Decision Making - Multiobjective Decision Making - Multiattribute Decision Making. Fuzzy Logic

Control Systems : Introduction - Control System Design - Architecture and Operation of FLC System. **(13L)**

UNIT - V GENETIC ALGORITHMS

Genetic Algorithms : Introduction - Basic Operators and Terminologies in GAs - Traditional Algorithm vs. Genetic Algorithm - Simple GA - General Genetic algorithm - The Schema Theorem - Classification of Genetic Algorithm - Applications of Genetic Algorithm.

Applications of Soft Computing : Introduction - A Fusion approach of Multispectral Images with SAR Image for Flood area Analysis - Optimization of TSP using Genetic Algorithm Approach. **(12L)**

(TOTAL : 60L)

OUTCOMES

- Implement machine learning through neural networks
- Able to write genetic algorithms to solve optimization problem
- Understand fuzzy concepts and develop a fuzzy expert system to derive decisions

REFERENCES

1. S.N Sivanandam and S.N Deepa, “Principles of Soft Computing”, Wiley –India, 2007.

2. S.Rajasekaran and G.A.V.Pai, “Neural Networks, Fuzzy Logic and Genetic Algorithms”, PHI, 2004.

3. J.S.R.Jang, C.T.Sun and E.Mizutani, “Neuro-Fuzzy and Soft Computing”, PHI,Pearson Education 2004.

4. S.N.Sivanandam, S.N.Deepa, “Introduction to Genetic Algorithms”, Springer, 2007.

5. Timothy J.Ross, “Fuzzy Logic with Engineering Application”, McGraw Hill, 2000.

6. Davis E.Goldberg, “Genetic Algorithms: Search, Optimization and Machine Learning”, Addison Wesley, N.Y., 2003.

SOFTWARE TESTING

L T P C
4 0 0 4

OBJECTIVES

- To enable a clear understanding about software tester
- To apply software testing knowledge and engineering concepts to detect errors in the software
- To practice software oriented testing projects
- To prepare software testing techniques and tools for industry standards.

UNIT – I SOFTWARE QUALITY ASSURANCE

Introduction to Software Quality Engineering : What is software quality – Benefits of software quality – Software development life cycle model – Types of defects – Definitions used in software quality engineering - Software Quality Assurance and Quality Control - Software Configuration Management (SCM).

Software Quality Assurance : Benefits of SQA – Role of SQA – SQA people – SQA plan – What is process – Process frame works.

Reviews, Inspections and walkthroughs : Management and Technical reviews - Inspections and walkthroughs – Inspection forms and check lists – Rate of Inspection – Inspection metrics- Estimating total number of defects in the software. **(12L)**

UNIT – II TESTING TECHNIQUES

Introduction to Testing : Guiding Principles of testing – Composition of testing team – Essential skills of a tester – Types of Testing – Evaluating the quality of test cases – Techniques for reducing number of test cases – Requirements for effective testing – Test Oracle – Economics of Software testing – Handling defects – Risk in software testing – Requirements traceability matrix.

White box (Structural) Testing : Introduction to control flow graph – Control flow testing – Basis path testing – Linear Code Sequence And Jump (LCSAJ) coverage or JJ –path coverage – Loop testing – Data flow testing – Slice-based testing – Pitfalls of white box testing – Tools for white box testing.

Integration Testing : Types of Integration testing – Functional Decomposition based Integration – Call graph-based Integration – Path-based Integration – Smoke testing.

(14L)

UNIT – III FUNCTIONAL & NON-FUNCTIONAL TESTING

Functional Testing : Logic-based Testing – State Transition Testing – Use Case-based Testing – Syntax Testing – Domain Testing – Petry Net-based testing – Tools used in Functional testing.

Non-functional, Acceptance and Regression Testing : Non-functional Testing – Acceptance Testing - Regression Testing. **(10L)**

UNIT – IV INCORPORATING SPECIALIZED TESTING TECHNIQUES

Testing of OO Software and Agile Testing : Basics of OO system – Overview of UML diagram – OO Testing – Quality Metrics for OO Software – Agile Testing.

Test Management: Activities in Test Management – Evaluation of Test Effectiveness – Release Management – Tools used in Test management.

Cloud Testing : Introduction to Cloud computing – Cloud testing – Testing as a Service(TaaS). **(12L)**

UNIT – V TEST AUTOMATION & QUALITY METRICS

Test Automation : Advantages and disadvantages of test automation – Activities in test Automation - Test Automation Frame work – Tools for Test Automation – Script languages in Test Automation.

Metrics for Software Quality : Categories of Software metrics – Metrics program – Types of Metrics – Some Commonly used Software Metrics.

Tools for Quality Improvement: Basic Quality Control Tool – Check sheet – Cause and effect Diagram – Pareto Diagram – Histogram – Scatter Plot – Run chart – Control Chart – Orthogonal defect Classification. **(12L)**

(TOTAL : 60L)

OUTCOMES

- Get an insight into the process of various software testing techniques
- Able to measure the performance of the using various metrics
- Able to evaluate the system with various testing techniques and strategies

REFERENCES

1) Anirban Basu, “Software Quality Assurance, Testing and Metrics”, PHI, 2015.

2) Sandeep Desai, Abhishek Srivastava, “Software Testing A Practical Approach”, PHI , 2016.

3) Srinivasan Desikan, Gopalaswamy Ramesh, “Software Testing Principles and practices”, Pearson, 2012.

4) Aditya P Mathur, “Foundations of Software Testing”, Pearson, 2011

RESEARCH METHODOLOGY

L T P C
4 0 0 4

OBJECTIVES

- To enable the students to know about the information needs of the research domain
- To introduce the concept of scientific research and the methods of conducting scientific enquiry

UNIT – I INTRODUCTION TO RESEARCH

Research Methodology : Introduction -– Objectives of Research – Types of Research –– Research approaches – Significance of Research – Research Methods versus Methodology – Research and Scientific method – Research process – Criteria of good Research – Problems encountered by Researchers in India. Defining the Research problem : What is a Research problem - Selecting the Problem – Techniques involved in defining a problem. **(13L)**

UNIT – II RESEARCH AND SAMPLE DESIGN

Research design : Meaning of research design – Need for Research Design – Features of Good Design – Important concepts relating to Research design – Different Research designs – Basic Principles of Experimental Designs – Important Experimental designs – Informal Experimental designs – Formal Experimental designs. Design of sample surveys : Introduction - Sample design - Types of sampling designs – Non probability sampling – Probability sampling. **(11L)**

UNIT – III SCALING, DATA COLLECTION

Measurements and scaling: Quantitative and qualitative data – Classifications of measurement scales **–** Goodness of measurement scales –Sources of error in measurement – Scaling – Scale classification bases – Scaling techniques – Comparative Scaling Techniques – Non- Comparative Scaling Techniques.

Data Collection : Collection of Primary Data –– Observation Method – Interview method – Collection of data through Questionnaires – Collection of data through Schedules – Difference between Questionnaire and schedule – Guidelines for constructing Questionnaire/schedule – Some other methods of data collection – Collection of secondary data – Selection of Appropriate method for data collection **(13L)**

UNIT – IV ANOVA

Data Preparation : Data preparation process – Questionnaire checking – Editing – coding – classification – tabulation – Graphical representation – Data cleaning – Data adjusting – Some problems in preparation process – Types of analysis – Statistics in research.

Analysis of variance: The ANOVA technique – One way ANOVA – Two way ANOVA **(12L)**

UNIT – V REPORT WRITING, ALGORITHMIC RESEARCH

Interpretation and Report Writing : Meaning of interpretation –Technique of interpretation – Precaution in Interpretation – Significance of Report Writing – Different Steps in Writing Report – Layout of the Research Report – Types of Reports – Mechanics of Writing a Research Report.

Algorithmic Research : Algorithmic Research Problems – Types of Solution Procedure/ Algorithm – Steps of Development of Algorithm – Comparison of Algorithms - Computer and Researchers. **(11L)**

(TOTAL : 60L)

OUTCOMES

- Get a view of how to choose research problem
- Able to design the research and samples
- Explore the features of data collection and data preparation
- Aware about report writing

REFERENCES

1. C.R.Kothari, “Research Methodology, Methods and Techniques”, Third edition, New Age International Publishers, 2010.
2. R.Panneerselvam, “Research Methodology”, PHI, 2009.
3. D.K.Bhattacharyya, “Research Methodology”, First Edition, EBP, 2003.

1. PRINCIPLES OF COMPILER DESIGN

L T P C
4 0 0 3

OBJECTIVES

- To discover principles and techniques that can be used to construct various phases of compiler.
- To explore knowledge about parsers, optimization technique

UNIT – I LEXICAL ANALYSIS

Introduction to Compiling : Language Processors, The Structure of a Compiler.
Lexical Analysis : The role of the lexical analyzer - Input buffering - Specification of tokens - Recognition of tokens – The Lexical Analyzer Generator Lex - Finite automata - Regular expression to finite automata – Design of Lexical Analyzer Generator - Optimization of DFA - based pattern matchers. **(12L)**

UNIT – II SYNTAX ANALYSIS

Syntax Analysis : The role of the parser - Context-free grammars - Writing a grammar - Top down Parsing - Bottom-up Parsing - LR parsers- Parser Generators. Run time environment : Storage Organization – Static Allocation of space. **(10L)**

UNIT – III INTERMEDIATE CODE GENERATION

Intermediate Code Generation : Variants of Syntax trees – Three Address code – Types and Declarations - Translation of Expressions – Type checking - Control flow - Back patching - Switch Statements - Procedure calls. **(12L)**

UNIT – IV CODE GENERATION

Code Generation : Issues in the design of a code generator - The target language – Address in the Target Code – Basic Block and Flow graphs – Optimization of Basic Blocks - A simple code generator – Peephole Optimization. **(13L)**

UNIT – V OPTIMIZATION TECHNIQUES

Machine Independent Optimizations: Introduction to Optimization Techniques - Introduction to Data Flow analysis – Foundations of data flow analysis – Partial Redundancy Elimination - Loops in flow graph **(13L)**

(TOTAL : 60L)

OUTCOMES

- Able to understand various phases of a compiler
- Explore the features of code generation and optimization techniques
- Able to design a compiler

REFERENCES

1. Alfred V. Aho, Monica S.Lam, Ravi Sethi and Jeffrey D. Ullman, “Compilers- Principles, Techniques,and Tools”, Pearson Education Asia, 2011.

2. Fischer Leblanc, Crafting Compiler, Benjamin Cummings, Menlo Park, 1988.

3. Kennath C.Louden, Compiler Construction Principles and Practice, Vikas publishing House, 2004.

4. Allen I. Holub, Compiler Design in C, Prentice Hall of India, 2001.

BIG DATA ANALYTICS

L T P C
4 0 0 3

OBJECTIVES

- To understand the fundamental concepts of big data analytics
- To explore the knowledge about big data computing and data mining, Data integration and extraction
- To develop state-of-the-art Big Data platform in research, education and industrial applications

UNIT – I INTRODUCTION TO BIG DATA

A new paradigm for big data: Scaling with a traditional database – Desired properties of a Big Data System-The problems with fully incremental architectures-Lambda Architecture-Recent Trends in Technology.

Batch Layer: DATA model for Big DATA - The properties of data- the fact-based model for representing data- Graph schemas.Data Model for Big Data: Why serialization framework? - Apache thrift – Limitations of serialization frameworks. **(13L)**

UNIT – II MINING DATA SET

Data Storage on the batch layer: Storage requirements for the master dataset – Choosing a storage solution for the batch layer – How distributed file systems work – Storing a master dataset with distributed file system – Vertical partitioning – Low-level nature of distributed file systems – Storing the SuperWebAnalytics.com master dataset on a distributed file system. **(11L)**

UNIT – III HADOOP, MAPREDUCE

Data storage on the batch layer : Illustration - Using the Hadoop Distributed File System – Data storage in the batch layer with Pail – Storing the master dataset for SuperWebAnalytics.com.

Batch layer : Motivating examples – Computing on the batch layer – Recomputation algorithms vs. incremental algorithms –Scalability in the batch layer – MapReduce: a paradigm for Big Data computing – Low-level nature of MapReduce-Pipe diagrams: a higher-level way of thinking about batch computation **(12L)**

UNIT – IV SERVING LAYER

Serving layer: Performance metrics for the serving layer- The serving layer solution to the normalization/denormalization problem- Requirements for a serving layer database-

Designing a serving layer for Super WebAnalytics.com – Contrasting with a fully incremental solution.

Serving layer: Illustration: Basics of ElephantDB – Building the serving layer for SuperWebAnalytics.com **(11L)**

UNIT - V SPEED LAYER

Speed Layer Realtime views: Computing realtime views – Storing realtime views – Challenges of incremental computation – Asynchronous versus Synchronous updates – Expiring realtime views. Queuing and stream processing: Illustration: Defining topologies with Apache Storm – Apache Storm clusters and deployment –Guaranteeing message processing – Implementing the SuperWebAnalytics.com unique-over-time speed layer. Lambda Architecture in depth: Defining data systems – batch and serving layers – Speed layer – Query layer. **(13L)**

(TOTAL : 60L)

OUTCOMES

- Able to work with big data platform
- Explore design efficient algorithms for mining data for large volumes
- Able to analyze HADOOP and MapReduce technologies
- Get an insight into the issues in Serving layer and Speed layer

REFERENCES

1. Nathan Marz and James Warren, “Big Data Principles and best practices of scalable real-time data systems”, Manning publications co., Dreamtech Press, Edition 2016.

2. Viktor Mayer-Schonberger and Kenneth Cukier, “Big Data: A Revolution That Will Transform How We Live, Work, and Think”, Houghton Mifflin Harcourt, 2013

3.Zikopoulos, Paul and Chris Eaton, “Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, TMH, 2011.

4. Glenn J.Myatt, “Making Sense of Data”, John Wiley&Sons, 2007.

MOBILE COMPUTING

L T P C
4 0 0 3

OBJECTIVES

- To understand fundamental concepts of mobile computing
- To impart knowledge about PALM OS & Symbian OS
- To provide a computer, system perspective on the converging areas of wireless networking

UNIT – I WIRELESS COMMUNICATION FUNDAMENTALS, ARCHITECTURE

Introduction : Mobility of bits and bytes – Wireless the beginning – Mobile Computing – Dialogue control – Networks – Middleware and gateways – Applications and services – Developing mobile computing applications.

Mobile Computing Architecture : Architecture of Mobile Computing – Three Tire Architecture.

Mobile Computing Through Telephony : Multiple Access procedure – Satellite Communication System - Mobile Computing Through Telephone – Developing an IVR Application. **(11L)**

UNIT – II GSM, SMS

Emerging Technologies : Introduction – Bluetooth – Radio Frequency Identification(RFID) – Wireless Broadband(WIMAX) – Mobile IP .

Global System for Mobile Communication : Introduction – GSM Architecture –Network Aspects in GSM – Mobility Management – GSM frequency allocation – Personal Communication service – Authentication and Security.

Short Message Service : Mobile Computing over SMS - Short Message Service(SMS) – Value added Services through SMS – Accessing the SMS bearer. **(13L)**

UNIT – III GPRS, WAP

General Packet Radio Service (GPRS) : Introduction – GPRS and Packet data Networking – GPRS Network Architecture - GPRS Network Operations – Data Services in GPRS – Applications for GPRS – Limitations of GPRS.

Wireless Application Protocol : Introduction – WAP – MMS-GPRS applications.

(11L)

UNIT – IV WIRELESS LAN, INTELLIGENT NETWORKS

Wireless LAN : Wireless LAN Architecture – Mobility in Wireless LAN – Deploying Wireless LAN – Mobile Adhoc Networks and Sensor Networks – Wireless LAN security.

Intelligent Networks and Interworking : Fundamentals of Call Processing – Intelligence in the

Networks — IN Conceptual Model (INCM) – Softswitch –Technologies and Interfaces for IN.

Client Programming : Mobile Phones – Features of Mobile phones – PDA – Design constraints in Applications for Handheld devices **(13L)**

UNIT – V MOBILE APPLICATION DEVELOPMENT

Programming for the PALM OS : History of PALM OS – PALM OS architecture – Application Development.

Wireless Devices with Symbian OS : Introduction to Symbian OS - Symbian OS Architecture – Security on Symbian OS.

Security Issues in Mobile Computing : Information Security – Security Techniques and Algorithms. **(12L)**

(TOTAL : 60L)

OUTCOMES

- Gain knowledge about various types of wireless communication networks
- Understand the architectures, challenges and solutions of wireless communication network
- Able to develop simple mobile application

REFERENCES

1. Asoke K Talukder , Hasan Ahmed and Roopa R Yavagal, “Mobile Computing : Technology, Applications and Service Creation”, Second Edition , TMH, 2010

2.T.G. Palanivelu, R. Nakkeeran, Wireless and Mobile Communication, PHI Learning Private Limited, 2009

3.Raj Kamal, “Mobile Computing” ,Second Edition, Oxford University Press, 2012

4.Jochen Schiller, “Mobile Communications”, Second Edition, Pearson Education, 2007

5. William Stallings, “Wireless Communication and Networks”, Pearson Education Asia, 2002

IMAGE PROCESSING USING MATLAB

L T P C
0 0 4 2

OBJECTIVES

To understand the basic structure of MATLAB and to implement the image processing concepts

PROGRAMS SHOULD INCLUDE BUT NOT LIMITED TO

1. Read and display digital Images.
2. Image Arithmetic Operations
3. Image Logical Operations
4. Geometric transformation of Image
5. Histogram Equalization.
6. Non-linear Filtering.
7. Edge detection using Operators.
8. 2-D DFT and DCT.
9. Filtering in frequency domain.
10. Conversion between color spaces.
11. DWT of images.
12. Segmentation.

Core - 19
MINI PROJECT

L	T	P	C
0	0	6	6

It is mandatory that the student should submit a report based on the software (Mini Project) developed on any one of the below mentioned topics:

- Android Applications
- Image Processing Applications
- Web Applications Using ASP.NET with C#

The internal mark shall be distributed as given below:

Internal Assessment Component	**Marks**
System Study	20
Execution	20
Report	10
Total	50

The external mark shall be distributed as given below:

External Assessment Component	**Marks**
Execution	20
Report	15
Viva-voce	15
Total	50

MAJOR PROJECT

L	T	P	C
0	0	0	16

The objective of the project is to enable the students to work in a project of latest topic / research area / industrial applications. Each student shall have a guide from the Department.

During this semester the students are expected to do literature survey, formulate the problem and form a methodology of arriving at the solution of the problem. Also during this semester, the students are expected to complete the project and submit a full-fledged report comprising of the complete system developed along with implementation and test results. The departmental committee shall examine the students for 50 marks and the evaluation is based on continuous internal assessment comprising of two reviews.

Internal Assessment Component	**Marks**
I Review on 50% Completion	20
Final Review	20
Report	10
Total	50

A Viva-voce will be conducted by two External Examiners and the marks shall be contributed as per the under mentioned components.

External Assessment Component	**Marks**
Report	15
Presentation	20
Viva-voce	15
Total	50

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI
PG - COURSES – AFFILIATED COLLEGES
Course Structure for M.Sc Mathematics
(Choice Based Credit System)
(with effect from the academic year 2017- 2018 onwards)

Sem. **(1)**	**Sub. No.** **(2)**	**Subject Status** **(3)**	**Subject Title** **(4)**	**Contact Hrs./ Week** **(5)**	**Credits** **(6)**
III	12	Core - 11	Measure and Integration	6	4
	13	Core - 12	Topology – I	6	4
	14	Core - 13	Advanced Algebra - I	5	4
	15	Core - 14	Operations Research	5	4
	16	Core - 15	Research Methodology	4	4
		Elective – 2 (Any one)	1) Algebraic Number Theory 2) Calculus of Variation and Integral Equations 3) Formal Languages and Automata Theory	4	3
			Subtotal	**30**	**23**
IV	18	Core - 16	Functional Analysis	6	4
	19	Core - 17	Complex Analysis	6	4
	20	Core - 18	Advanced Algebra – II	5	4
	21	Core - 19	Topology - II	5	4
	22	Core - 20	Project	8	**8**
			Subtotal	**30**	**24**
			Total	**120**	**90**

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Measure and Integration (90 Hours)

L	T	P	C
2	4	0	4

Objective:

- Gain the knowledge of measure spaces and measure interruption
- Understanding the concept of lesbeague measure ,lesbeague integration and signed measure
- To provide the understanding of general measure spaces

Prerequisite:

- Basic knowledge of differentiation, integration and continuity of real functions

Outcome:

Knowledge gained about lesbeague theory and general measure spaces and their properties and construction.

Unit I: **LebesgueMeasure:**Lebesgue Measure – Lebesgue Outer Measure – The σ - Algebra of Lebesgue Measurable sets – Outer and Inner Approximation of Lebesgue Measurable sets – Countable Additivity, Continuity and the Borel – Cantelli Lemma.

Chapter 2 : Sec 2.1 – 2.5

Problems : Chapter 2 : 1 – 12 and 17

L 16

Unit II: **Lebesgue Measurable functions&Sequential pointwise Limits and related Theorems**: Lebesgue Measurable functions – Sums, Products and Compositions. Sequential pointwise Limits and Simple Approximation – Littlewood's Three Principles, Egoroff's Theorem and Lusin's Theorem

Chapter 3 : Sec 3.1 - 3.3 and

Problems :Chapter 3 : 1 – 3

L 19

Unit III: **LebesgueIntegration :**Lebesgue Integration – The Riemann Integral – The Lebesgue Integral of a bounded Measurable function over a set of finite Measure – The Lebesgue Integral of a Measurable non – negative function.

Chapter 4 : Sec 4.1 – 4.3

L 16

Unit IV: **Lebesgue Integral &Differentiablility**:The general Lebesgue Integral – Countable Additivity and Continuity of Integration. Differentiation and Integration – Continuity of monotone functions – Differentiability of monotone function: Lebesgue's theorem – Functions of bounded variations: Jordan's theorem.

Chapter 4 : Sec 4.4 & 4.5
Chapter 6 : Sec 6.1 - 6.3

L 19

Unit V: **Absolutely continuous functions &Signed Measures:** Absolutely continuous functions – Integrating Derivatives : Differentiating Indefinite Integrals. Measure and Integration – Measures and Measurable sets – Signed Measures : The Hahn and Jordan Decompositions – The Caratheodory measure induced by an outer measure – The construction of outer measure

Chapter 6 : Sec 6.4 & 6.5
Chapter 17 : Sec : 17.1 - 17.4

L 20

Text Book: **Real Analysis**, Fourth Edition, **H.L.Royden**, P.M.Fitzpatrick, PHI Learning Private Ltd.

Book for Reference:

Real Analysis Third Edition (PHI)-H.L.Royden Prentice hall of ofindia private limited –New Delhi (2006).

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Topology I (90 Hours)

L	T	P	C
2	4	0	4

Objectives:

- To distinguish space by means of Simple Topological invariants
- Gain the knowledge of constructing spaces by giving and to prove that in certain case, that the result is homeomorphic to standard spaces.

Prerequisite:

- Basic knowledge in Set Theory and Analysis at Undergraduate level.

Outcome:

Knowledge gained about Topological Spaces and the theories based on these spaces.

Unit I: **Topological spaces :**Topological spaces – Basis for a topology – The order topology – The subspace topology- Closed sets and limit points.
Chapter 2: Sections: 12-14 and 16,17.
Problems: Section 13: 1, 4 and Section 16: 4, 6. Section 17: 1,11-13 L 16

Unit II: **Product topology :**The product topology on $X \times Y$ – Continuous functions – Product topology
Chapter 2: Section 15, 18,19.
Problems: Section 18: 2,3 and Section 19: 1-3. L 18

Unit III: **Metric Topology :**Metric Topology
Chapter 2: Section 20, 21
Problems: Section 20:1-3 and section 21:1, 2. L 19

Unit IV: **Some spaces in topological spaces:**Connected spaces – Compact spaces.
Chapter 3: Sections: 23,26
Problems: Section 23: 2-4 and Section 26: 3, 6. L 20

Unit V: **Compactness :**Limit point compactness – Local compactness.
Chapter 3: Section 28, 29.
Problems: Section 29: 2,3. L 17

Text Book: **Topology** (Second edition), **James R. Munkres**, Printice – Hall of India

Books for Reference:

1. Introduction to general Topology – K.D Joshi Willey Eastern Limited (1986)
2. Topology – K.ChandrasekaraRaoNarosa Publishing House New Delhi (2009)

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Advanced Algebra I (75 Hours)

L	T	P	C
3	2	0	4

Objective:

The aim of the paper is to introduce some of the most fundamental algebraic structures like inner product space, Determinants, etc.

Prerequisites:

Basic knowledge in set theory and Matrix theory

Outcome:

After learning this paper the student can understand,

- The notion of Dual Spaces.
- The algebra of Linear transformations.

Unit I: **Vector spaces:**Dual spaces – Inner product spaces.
Sections: 4.3 and 4.4. L 14

Unit II: **Linear transformations:**The Algebra of linear transformations – Characteristic roots – Matrices.
Sections: 6.1 – 6.3. L 17

Unit III: **Canonical Forms:**Triangular form – Nilpotent form – Jordan form.
Sections: 6.4 - 6.6. L 16

Unit IV: **Matrices:**Trace and transpose – Determinants.
Sections: 6.8-6.9 L 14

Unit V: **Transformations:** Hermitian, unitary and normal transformations.
Sections: 6.10(Up to Lemma 6.10.11) L 14

Text Book: **Topics in Algebra**(Second edition) Wiley Eastern Limited – **I.N. Herstein**

Book for Reference:

- A course in Abstract algebra (3rd edition)-Vijay.K.Khanna,S.K.Bhambri – Vikas Publishing House –Newdelhi.
- Fields and Rings –Kaplemsky ,Irving (Second edition)-University of Chicago- Chicago -(1972).

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Operations Research(75 Hours)

L	T	P	C
3	2	0	4

Objectives:

- To modify rual life into Standard Mathematical Models
- To learn different optimization techniques.
- To know classification of different structured problems.

Prerequisite:

Basic computing knowledge and techniques at undergraduate level.

Outcome:

- Identification of actual problems and its equivalent mathematical models.
- Application to different optimization techniques in real life situations.
- Knowledge gained in utilization of Optimum Resources.

Unit I: **Transportation Models And Its Variants:** Definition Of The Transportation Model – Nontraditional Transportation Model – Transportation Algorithm – The Assignment Model.

Chapter 5 – Sections 5.1, 5.2, 5.3, 5.4 and Exercise problems. L 16

Unit II: **Network Analysis:** Network Definitions – Minimal Spanning Tree Algorithm – Shortest Route Problem – Maximum Flow Model – CPM – PERT.

Chapter 6 – Sections 6.2, 6.3, 6.4, 6.5, 6.7 and Exercise problems. L 15

Unit III: **Integer Linear Programming**: Introduction – Applications – Integer Programming Solutions – Algorithms.

Chapter 9 – Sections 9.1, 9.2, 9.3 and Exercise problems. L 17

Unit IV: **Inventory Theory:** Basic Elements Of An Inventory Model – Deterministic Models: Single Item Stock Model With And Without Price Breaks – Multiple Items Stock Model With Storage Limitations – Probabilistic Models : Continuous Review Model.

Chapter 11 – Sections 11.1, 11.2, 11.3, Chapter 16 – Sections 16.1, 16.2 and Exercise problems. L 12

Unit V: **Queuing Theory:** Basic Elements Of Queuing Model – Role Of Poisson And Exponential Distributions – Pure Birth And Death Models – Specialised Poisson Queues

Chapter 17 – Sections 17.2, 17.3, 17.4, 17.6(upto 17.6.3) and Exercise problems. L 15

Text Book: **Operations Research**(Sixth Edition) , **Hamdy A. Taha**, Prentice Hall Of India Private Limited, New Delhi.

Books for Reference:

1. Introduction to Operations Research – Fredrick, Shiller, GenraldJ.Literman – MC Graw Hill (2017)
2. Operations Research – KantiSwarup, P.K. Gupta, Man Mohan – Sultan Chand and sons. (2016)
3. Operations Research (Fifth edition) J.N Sharma, McMillian Publications (2013)

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Research Methodology: (60 Hours)

L	T	P	C
4	0	0	4

Objectives:

- To understand the Basic aspects in research
- To learn Mathematical and Statistical technique for research
- To acquire basic knowledge about various instruments and techniques in Mathematical research.

Prerequisite:

Basic knowledge in Statistics and related information to be useful for research.

Outcome:

- Training and participating in active research activities for their academic and professional levels.
- Creation of novel ideas and simple technique useful to society(R/D)
- Acquire background knowledge in research publication and thesis writing.

Unit I : **Research Project :**Research Project – Difference between a dissertation and a thesis– Basic requirements of a research degree –Writing a proposal –Ethical considerations

Chapter 5 : Sec: 5.1, 5.2, 5.3,5.6,5.13 in Text Book 1. L10

Unit II : **Components of a Research Project:**Different components of a research project– Literature review – Methodology – Results / data – Conclusions – Bibliography - Appendices.

Chapter 6 : Sec: 6.1-6.6,6.7,6.8.1, 6.9.1,6.11, 6.12, 6.13 in Text Book 1. L10

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Unit III : **Some Special Distributions :** The Gamma and Chi – Square distribution – The normal distribution.

Chapter 3: Sec: 3.3, 3.4 in Text Book 2.

Exercise Problems:Chapter 3: 3.28 – 3.33, 3.40 – 3.46. L13

Unit IV : **Sampling Theory :** Transformation of variables – t & F distributions.

Chapter 4: Sec : 4.1 – 4.4 in Text Book 2.

Exercise Problems:Chapter 4: 4.1 – 4.8, 4.14 – 4.17, 4.20 – 4.25, 4.34 – 4.41. L14

Unit V : **Random variables:**The MGF technique – Distributions of $\overline{X}$ and $\frac{ns^2}{\sigma^2}$ - Expectations of functions of random variables-The Central Limit Theorem.

Chapter 4: Sec : 4.7 – 4.9 in Book 2. **Chapter 5:** Sec 5.4 in Text Book 2

Exercise Problems: Chapter 4 :4.68 – 4.74, 4.83 – 4.93.

Exercise Problems:Chapter 5:, 5.20 – 5.22, 5.25 – 5.27. L13

Text Book: **1. Writing up your University Assignments and Research Projects – A Practical handbook,** Neil Murray and Geraldine Hughes, McGraw Hill Open University Press.

2.Introduction to Mathematical Statistics, Fourth Edition, Robert V. Hogg and Allen T.Craig, Pearson Education Asia.

Books for Reference:

1. Research Methodology(2nd revised methods and techniques edition)-C.R.Kothari, New Age International Publications, New Delhi.
2. Fundamentals of Mathematics statistics-S.C.Gupta, V.K.Kapoor, Eleventh edition 2002,Sultanchand& sons Publishers, New Delhi.

MSU / 2017-18 / PG –Colleges / M.Sc.(Mathematics) / Semester -III / Ppr.no.17 / Elective - 2 (a)

Algebraic Number Theory (60 Hours)

L	T	P	C
2	2	0	3

Objective:

- To acquire knowledge about recent developments in Algebra have its impact on Number Theory and Number Theory too has its own contribution to the development of algebra.
- To understand and appreciate the role played by Algebra in Number Theory.

Prerequisite:

Basic knowledge in Distribution of primes, Mathematical Induction and Congruence..

Outcome:

Knowledge gained about various types of numbers such as algebraic Numbers, Pythagorean triples and representation of number as sum of positive squares.

Unit I: **Diophantine equations :**Diophantine equations – The equation ax+by=c – Positive solutions – Other linear equations. L 12

Unit II: **Some special equations:**The equation $x^2+y^2=z^2$ – The equation $x^4+y^4=z^2$.The equation $4x^2+y^2=n$ L 12

Unit III: **Infinite continued functions :**The equation $ax^2+by^2+cz^2=0$- Infinite continued functions – Irrational numbers. L 13

Unit IV: **Approximation to irrational numbers :**Approximation to irrational numbers- Algebraic integers . L 11

Unit V: **Quadratic Fields :**Quadratic Fields – Units in quadratic fields. L 12

Text book: **An introduction to the theory of Numbers – Ivan Nivan and Herbert S. Zukerman** – II edition, Wiley Eastern Ltd.

Book for Reference:

Elements of Number Theory – Kumaravelu and SuseelaKumaravelu (2002), Raja Shankar Printers,Sivakasi(V Edition).

MSU / 2017-18 / PG –Colleges / M.Sc.(Mathematics) / Semester -III / Ppr.no.17 / Elective - 2 (b)

CALCULUS OF VARIATIONS AND INTEGRAL EQUATIONS

(60 Hours)

L	T	P	C
2	2	0	3

Objective:

The objective of this paper is to place at the disposal of the student, the basis of an intelligent working knowledge of a number of facts and techniques which are useful in varied fields of application.

Prerequisite:

Basic knowledge in Elementary Matrix Theory, Quadratic forms, Coordinate Transformations.

Outcome:

Gain knowledge in maxima minima techniques and solution of certain types of Integral equations.

Unit I: **Maxima and Minima :**Calculus of Variations and Applications – Maxima and Minima – The simplest case – Illustrative examples.
Exercises problems: Chapter 2(2, 6, 8 and 18)
Sections: 2.1-2.4 L 11

Unit II: **Lagrange's Multipliers**:Thevariational notations – The more general case – Constraints and Lagrange'sMultipliers – Variable end points.
Exercises problems: Chapter 2(19, 20 and 21)
Sections: 2.5-2.8 L 12

Unit III: **Integral Equations:**Integral Equations – Introduction –Relation between differential and integral equations – The Green's function.
Exercises problems: Chapter 3(1,9, 11)
Sections: 3.1-3.3 L 12

Unit IV: **Fredholm equations:** Linear Equations in cause and effect- The influence function -Fredholm equations with separable kernels – Illustrative Examples.
Exercises problems: Chapter 3(40 and 43)
Sections: 3.5-3.7 L 11

Unit V: **Hilbert Schmidt theory:**Hilbert Schmidt theory – Iterative methods for solving equations of second kind.
Exercises problems: Chapter 3(52 and 53)
Sections: 3.8-3.9 L 14

Text Book: **Methods of Applied Mathematics, Francis B. Hilde brand**, Prentice Hall of India, New Delhi.**Sections:** 2.1 to 2.8 and 3.1 to 3.3, 3.5-3.9

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Book for Reference:

Problems and Exercises in integral equations – M.Krarnov, A.Kiselev and G.Makarenko – Mir Publishers, Moscow (1971).

MSU / 2017-18 / PG –Colleges / M.Sc.(Mathematics) / Semester -III / Ppr.no.17 / Elective - 2 (c)

Formal Languages and Automata Theory(60 Hours)

L	T	P	C
2	2	0	3

Objectives:

This course provides a formal connection between algorithmic problems solving and union of languages and automata and develop them into a mathematical view towards algorithmic design and computation.

Prerequisite:

Basic knowledge in computer operations and languages.

Outcome:

- Be able to understand the basic properties of formal languages
- Be able to understand the basic properties of deterministic and non-deterministic finite automata.

Unit I: **Finite automata, regular expressions :**Finite state Systems – Basic definitions – Non deterministic finite automata – Finite automata with ε moves – Regular expressions.

Chapter 2 : Sec : 2.1 – 2.5. L 11

Unit II: **Properties of regular sets :**The pumping lemma for regular sets – Closure properties of regular sets – Decision algorithms for regular sets – The Myhill-Nerode Theorem and minimization of finite automata.

Chapter 3 : Sec : 3.1 – 3.4 L 12

Unit III: **Context – free grammars :** Motivation and introduction – Context-free grammars – Derivation trees – Simplification of context-free grammars – Chomsky normal form – Greibach normal form.

Chapter 4 : Sec : 4.1 – 4.6 L 13

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Unit IV: **Pushdown automata :** Informal description – Definitions-Pushdown automata and context-free languages.

Chapter 5 : Sec : 5.1 – 5.3 L 11

Unit V: **Properties of context-free languages :** The pumping lemma for CFL's – Closure properties for CFL's – Decision algorithms for CFL's.

Chapter 5: Sec: 6.1 – 6.3 L 13

Text Book : **Introduction to Automata Theory, Languages and Computation,** Jhon E. Hopcraft and Jeffrey D. Ullman, Narosa Publishing House, New Delhi,- 198.

Book for Reference:

1. Introduction to languages & theory of computation – John.C.Martin- Tata Mcgraw hill- 2003.
2. Introduction to Automata theory ,languages and computation- Hopcraft ,Motwan and Ullman-Pearson publisher- Third edition -2006.
3. Elements of the theory of computation-H.R.lewis and C.H.Papadimitrious - Tata Mcgraw hill-2003.

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Functional Analysis (90 hours)

L	T	P	C
2	4	0	4

Objective:

- To gain knowledge about Banach Spaces, Hilbert Spaces and Banach Algebra.
- To use algebraic structure in Analysis.

Prerequisite:

Basic knowledge of Metric Spaces, Topology and Sequences.

Outcome:

Graduates will have a strong foundations and in depth understanding of the current topics related with functional Analysis, Spectral Theory, Approximation Theory.

UNIT 1: **BanachSpaces:**Banach Spaces- The definition and some examples-Continuous linear transformations- The Hahn Banach Theorem
Chapter 9 Sections 46, 47, 48 .
Problems: Section 46 (1-4), 47 (1-3) 48 (1). L 17

UNIT 2: **Imbedding :**The Natural Imbedding of N in N**- The open mapping theorem
Chapter 9 Sections 49, 50
Problems: Section 49 (1-3), 50 (2,3) L 18

UNIT 3: **Hilbert Spaces:**Conjugate of an operator -Hilbert Spaces-The Definition and some simple properties- Orthogonal compliments
Chapter 9 Section 51, Chapter 10 Sections 52, 53
Problems: Section 51 (1-3) 52 (4,6), 53 (1-4). L 18

UNIT 4: **The Conjugate space and adjoint**: Orthonormal sets-The conjugate space H*-The Adjoint of an operator- Self adjoint operators
Chapter 10 Sections 54, 55, 56, 57
Problems: Section 54 (1,5) 55 (1-3), 56 (1-4), 57 (1,2) L 18

UNIT 5: **Spectral Theory:**Normal and Unitary operators- projections, Finite dimensional spectral theory- Determinants and the spectrum of an operator- The spectral theorem
Chapter 10 Sections 58, 59, Chapter 11 Sections 61, 62
Problems: Section 58, 59, 61, 62 (1-5) . L 19

Text Book: **Introduction to Topology and Modern Analysis- G.F. SIMMONS**-McGraw-Hill International Editions

Books for Reference:

1. Functional Analysis - Second edition (2011), Tata MC Graw Hill Education Private Ltd. (New Delhi) – Walter Rudin.
2. Functional Analysis – K.ChandrasekaraRao, Narosa Publishing House (2009) New Delhi.

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Complex Analysis(90 hours)

L	T	P	C
2	4	0	4

Objectives:

- To gain advanced knowledge about Complex functions and Analytic functions as mappings.
- To understand the concept of Analyticity Conformality, Linear Transformation and Complex Integration.

Prerequisite:

Basic knowledge of concepts of Differentiation and Integration for functions of real variables further in UG level they level the fundamental Ideas and theorems about Complex plane power series residues.

Outcome:

- Acquistation of solving problems in Complex Integration and boundary value problems.

Unit I: **Analytic functions :**Analytic functions – Polynomials – Power series- Abel's limit theorem.

Chapter 2: Sec 1.1 – 1.4, Sec 2 .4 &2.5 .

Problems: Chapter 2: 1.2 (1,4,5,7) 2.4 (2- 6) .

L 20

Unit II: **Conformal mappings :**Conformal mappings - Linear transformations –the linear group – the cross ratio- Symmetry – line integrable – line integrable as functions of arc.

Chapter 3: Sec 2.3, 3.1 – 3.3, **Chapter 4 :** Sec 1.1 – 1.3(1,3,4,5).

Problems:Chapter 3: 3.1 (4); 3.2 (1,4) 3.3 (1,2,4);

L 17

Unit III: **Cauchy's theorem for Rectangle :**Cauchy's theorem for Rectangle – Cauchy's theorem in a disc, Cauchy's Integral formula, Index of a point – The integral formula.

Chapter 4: Sec 1.4 & 1.5, 2.1& 2.2

Problems:Chapter 4 : 2.2 (1-3)

L 16

Unit IV: **Higher derivatives** -Taylor's Theorem :Higher derivatives -Taylor's Theorem – Zeros and Poles – The local mapping – The maximum principle and the general statement of Cauchy's Theorem (Statement only) .

Chapter 4: Sec 2.3, 3.1 – 3.4 and 4.4.

Problems:Chapter 4 : 2.3 (1) , 3.2(2 – 4) L 18

Unit V: **Calculus of Residues:**Calculus of Residues –The Residue theorem - The Argument Principle – Evaluation of definite integrals.

Chapter 4: Sec 5.1 – 5.3 L 19

Problems:Chapter 4: 5.2(1-3) ,5.3 (1, 3(a- g))

Text : Complex Analysis – Lars V.Ahlfors – Tata McGraw Hill (Third Edition)

Book for Reference:

Foundations of Complex Analysis – S.Ponnusamy – Narosa Publishing House 2015 (Second Edition).

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Advanced Algebra II (75 hours)

L	T	P	C
3	2	0	4

Objectives:

Gain knowledge in fields in the theory of numbers,the theory of equations and Galois theory .

Prerequisite:

Knowledge of Groups , Rings and Elementary properties of fields.

Outcome:

Understand the application of Galois theory in theory of equations and Geometry.

Unit I: **Extension fields.:**Extension fields.
Sections: 5.1
Problems: 5.1(1-5, 8) L 15

Unit II: **Roots of polynomials :**Roots of polynomials – More about roots.
Sections: 5.3, 5.5
Problems: 5.5(1-3) L 16

Unit III: **Elements of Galois theory.:**Elements of Galois theory.
Sections: 5.6 L 16

Unit IV: **Finite fields :**Finite fields – Wedderburn's theorem(First proof only)
Sections: 7.1, 7.2(Theorem 7.2.1-First proof only) L 14

Unit V: **Some special theorems:**A theorem of Frobenius – Integral quaternions and the four square theorem.
Sections: 7.3, 7.4. L 14

Text Book: **Topics in Algebra**(Second edition) Wiley Eastern Limited – **I.N. Herstein**

Book for Reference:

- A course in Abstract algebra (3rd edition)-Vijay.K.Khanna,S.K.Bhambri – Vikas Publishing House –Newdelhi.
- Modern Algebra –Surjeetsingha and Qazizameerudin- Vikas Publishing House –Newdelhi.
- Fields and Rings –Kaplemsky ,Irving (Second edition)-University of Chicago- Chicago -(1972).

Topology II(75 hours)

L	T	P	C
3	2	0	4

Objective:

- Gain knowledge in separation axioms in Topological Spaces.
- Understanding the concepts of Normal and Regular Spaces.

Prerequisite:

- Basic Knowledge in Set theory and Analysis at Undergraduate level.
- Knowledge in first course topology and functions in Topological Spaces.

Outcome:

- Improves the standard of understanding Set theory, Analysis and Topology and pave the way to do Research in these areas.

Unit I: **Separation axioms.:** The countability axioms – Separation axioms.
Chapter 4: Sections 30, 31.
Problems: Section 30: 2,3 and Section 31: 1-3. L 16

Unit II: **The Urysohn lemma :**Normal spaces – The Urysohn lemma.
Chapter 4: Sections 32, 33.
Problems: Section 32: 1, 3, 4 and Section 33: 1-2. L 15

Unit III: **Urysohn and Tietz extension theorem :**The Urysohn metrization theorem – The Tietz extension theorem.
Chapter 4: Sections 34, 35.
Problems: Section 34: 1, 3 and Section 35: 1, 3. L 17

Unit IV: **The Tychonofftheorem :**TheTychonoff theorem – Local finiteness.
Chapter 5: Sections 37 and Chapter 6: Section 39
Problems: Section 37: 1,2 and Section 39: 3,5. L 15

Unit V: **Baire Spaces.:**Baire Spaces.
Chapter 8: Sections 48.
Problems: Section 48: 1, 3, 4, 6. L 12

Text Book: **Topology** (Second edition), **James R. Munkres**, Printice – Hall of India

Books for reference:

1. Introduction to General Topology – K.D. Joshi Wiley Eastern Limited (1986)
2. Topology – K.ChandrasekaraRaoNarosa Publishing House 2009 (New Delhi)

MSU / 2017-18 / PG –Colleges / M.Sc.(Mathematics) / Semester -IV / Ppr.no.22 / Project

Project C 8

Contact hours -8+

Objective:

- To provide training in scientific skills.
- To prepare students for professional training programme or entry level jobs in any area of Mathematics.

Prerequiste:

- Students should be able to understand and interpret the literature in their areas of research.

Outcome:

At the end of the project the students should have increased

- Their capacity to think critically
- Their ability to design analyse and execute an experiment.
- Their confidence and ability in communication skills(in writing and oral)
- To acquiring the literature collection methods and interpreting the date of their scientific equipment etc.

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI
PG - COURSES – AFFILIATED COLLEGES
Course Structure for M.Sc Networking and Information Technology
(Choice Based Credit System)
(with effect from the academic year 2017- 2018 onwards)

Semester	Title of the Subject	Status	Contact Hrs./ Week	Credits
III	**Web Designing**	**Core-10**	**4**	**4**
	Operating Systems	**Core-11**	**4**	**4**
	Network security and Cryptography	**Core-12**	**4**	**4**
	Research Methodology	**Core-13**	**4**	**4**
	Elective-2 (select any one from Elective – II group)	**Elective - 2**	**4**	**3**
	Web Designing and Network Lab	**Core Practical-5**	**4**	**2**
	Mini Project	**Core Project-1**	**6+6***	**6**
IV	**Main Project Lab**	**Core Project-2**	**30+2***	**16**

*Extra hours for Project

For the Project, flexible credits are b/w 5 – 8 & Hours per week are b/w 10 - 16.
Total number of credits ≥ 90 : 90
Total number of Core Courses : 20 (13 T + 5 P + 2 Prj.)
Total number of Elective Courses : 2
Total hours : 120

List of Electives offered:

Elective – I Group

(A) Management Information System
(B) Big Data analytics

Elective – II Group

(A) Data Warehousing and Mining
(B) Mobile Computing

REGULATIONS
(Effective from the academic year 2017-2018 onwards)

1. Eligibility for Admission:

Candidates for admission to the first year of two year M.Sc. Networking and Information Technology shall be required to have passed any degree from a recognized University accepted by the Syndicate of this University.

2. Duration of the Course:

The course shall be extended for a period of two academic years consisting of four semesters with two semesters per year.

3. **Passing Requirement:**

The candidate will be declared to have passed in any subject (including practical and project viva voce) of study if he/she secures not less than 50 marks in the University end semesters examinations of their subjects.

MSU / 2017-18 / PG –Colleges / M.Sc.(Networking and Information Technology) / Semester – III / Ppr.no.15 / Core-14

WEB DESIGNING **L-T-P-C**

4 - 0- 0- 4

Preamble : Understanding the concepts of PHP and MySQL

Prerequisite : Basic knowledge of programming and internet

Unit-1

Web programming Basics and Installations:

Web Publishing: A Quick look-HTML 4.0: the web Publishing Foundation- HTML basics-Putting your Server to work-Server side programming- XML Basics. **(12L)**

Unit-II

Installation and Configuration:

Getting up and running: Installation Quick Start Guide- Installing and configuring MySql-Installing and configuring Apache-Installing and configuring PHP. **(10L)**

Unit-III

PHP Language Structure:

The Building blocks of PHP- Flow Control Functions in PHP- Working with Functions-Working with Arrays- Working with Objects- Working with Strings, Dates and Time- Working with Forms- Working with Cookies and User Sessions- Working with Files and Directories Working with Images **(14L)**

Unit-IV

PHP and MySQL Integration:

Understanding the Database Design- Process Learning Basic SQL Commands Using Transactions and Stored Procedures in MySQL- Interacting with MySQL Using PHP. **(12L)**

Unit-V

Basic Projects:

Managing a Simple Mailing List- Creating an Online Address Book- Creating a Simple Discussion Forum- Creating an Online Storefront and shopping Cart Mechanism- Creating a Simple Calendar- Restricting Access to Your Applications- Logging and Monitoring Web

Server Activity- Application Localization- Working with XML- Connecting to Web Services Apache Performance Tuning and Virtual Hosting- Setting Up a Secure Web Server- Optimizing and Tuning MySQL. **(12L)**

REFERENCE BOOKS:

1. Sam Teach Yourself PHP, MySQL and Apache All in One, 5th Edition, Julie Meloni

2. Dynamic Web Publishing, Second Edition, Shelley Powers, Techmedia

3. Steve Suehring, Tim Converse and Joyce Park, "PHP 6 and MySQL 6 Bible", Wiley India reprint, 2009.

4. Robert Sheldon, Geoff Moes, "Beginning MySQL", Wrox, 2005.

5. BEN FORTA, "MySQL Crash course "SAMS, 2006.

OUTCOMES:

Upon Completion of the course, the students should be able to:

- Design and implementation of web forms and client side validation.
- XML authoring, Parsing, and related technologies.
- Create a basic website using HTML and Cascading Style Sheets.
- Design and implement dynamic web page with validation using JavaScript objects and by applying different event handling mechanisms.
- Design and implement simple web page in PHP, and to present data in XML format.

MSU / 2017-18 / PG –Colleges / M.Sc.(Networking and Information Technology) / Semester – III / Ppr.no.16 / Core-15

OPERATING SYSTEMS **L-T-P-C**
4 - 0- 0- 4

Preamble : Understanding the process, Memory and I/O management concepts of operating system
Prerequisite : Basic knowledge of operating system

Unit-I

Operating System Overview:
Objectives and Functions - Processes: Process Description and Control – UNIX SVR4 Process Management – Threads and Multithreading – Symmetric Multiprocesing - Windows Thread Management - Solaris Thread and SMP Management - Linux Thread Management - Android Thread Management **(13L)**

Unit-II

Mutual Exclusion and Synchronization:
Semaphores – Monitors - Message Passing – producer-consumer problem – readers writers problem - Principles of Deadlock – Deadlock prevention – Avoidance – Detection **(12L)**

Unit-III

Virtual Memory Management:
Paging – segmentation - Operating System Software policies - Windows Memory Management - Android Memory Management - Uniprocessor Scheduling: Types of Scheduling - Scheduling Algorithms - Real-Time Scheduling **(10L)**

Unit-IV

I/O Management and Disk Scheduling:
I/O Buffering - Disk Scheduling – RAID - File Management : File Organization and Access - Secondary Storage Management – File Allocation Methods – Free Space Management - Windows File System - Android File Management - Embedded Operating Systems: Characteristics – Ecos **(13L)**

Unit-V

Operating System Security:
Basic concepts - Intruders and Malicious Software - viruses - Distributed Processing, Client/Server, and Clusters: Client/Server Computing - Distributed Message Passing - Remote Procedure Calls – Clusters - Windows Cluster Server – Sun Cluster **(12L)**

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REFERENCE BOOKS:

1. Operating Systems-Internals and Design Principles, Williams Stallings, Pearson, 8th Edition, 2014.
2. Modern Operating Systems, Andrew S. Tanenbaum, Pearson,, 4th Edition, 2014.
3. Operating System Concepts, Abraham Silberschatz, Peter B. Galvin, Greg Gagne, John Wiley & Sons, 8th Edition, 2008.

OUTCOMES:

On successful completion of the course the students should have:

- Able to understand the operating system components and its services
- Implement the algorithms in process management and solving the issues of IPC
- Able to demonstrate the mapping between the physical memory and virtual memory
- Able to understand file handling concepts in OS perspective
- Able to understand the operating system components and services with the recent OS

NETWORK SECURITY AND CRYPTOGRAPHY **L-T-P-C**

4 - 0- 0- 4

Preamble : Understanding the concepts of security in internet

Prerequisite : Basic knowledge of computer networking and security

Unit-I

Introduction:

Attacks, services and Mechanisms - security attacks - security services - A model for internetwork security - Internet standards and RFCS. Classical Encryption Techniques: symmetric cipher Model - Substitution Techniques -Transportation Techniques Rotor Mechanism – Steganography. **(12L)**

Unit-II

Block ciphers and the data encryption standard simplified DES

Block Cipher Principles -The Data encryption standard -The strength of DES - Differentials and Linear Cryptanalysis -Block Cipher design principles -Block Cipher modes of operations. Public Key Cryptography and RSA: Principles of Public - Key Cryptosystems The RSA Algorithm. **(13L)**

Unit-III

Key Management:

Other Public-Key Cryptosystems: Key Managements- Diffie Hellman Key Exchange-Elliptic curve Arithmetic - Elliptic curve Cryptography Message Authentication & Hash functions: Authentication Requirements-Authentication functions-message Authentication Codes- Hash functions- Security of Hash functions & MACS. Digital Signatures -Authentication Protocols - Digital Signature Standard. **(13L)**

Unit-IV

Authentication applications:

Kerberos X 509 Authentication service. Electronic Mail security: Pretty good Privacy - S/MIME 445 IP Security: IP Security overview - IP Security Architecture -Authentication Header - Encapsulation security Payload. **(10L)**

Unit-V

Web Security:

Web Security Considerations - Secure Sockets Layer and Transport Layer Security - Secure Electronic Transactions System Security: Intruders - Intrusion detection -Password Management. Firewalls: Firewalls Design Principles - Trusted Systems **(12L)**

REFERENCE BOOKS:

1. William Stallings,"CRYPTOGRAPHY AND NETWORK SECURITY - PRINCIPLES AND PRACTICES", Pearson Education, Third Edition, 2003.
2. William Stallings,"NETWORK SECURITY ESSENTIAL - APPLICATIONS AND STANDARDS", Pearson Education, 2003.
3. Atul kahate,"CRYPTOGRAPHY AND NETWORK SECURITY", TMCH, 2003
4. Charlie Kanfman, Radio Pearlman, Mike Speciner, "NETWORK SECURITY", Second Edition, Pearson Education Asia.

OUTCOMES:
At the end of this course, the students should be able to:

- Analyze the vulnerabilities in any computing system and hence be able to design a security solution.
- Identify the security issues in the network and resolve it.
- Evaluate security mechanisms using rigorous approaches, including theoretical
- Compare and Contrast different IEEE standards and electronic mail security

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RESEARCH METHODOLOGY **L-T-P-C**

4 - 0- 0- 4

Preamble : Understanding how to do effective research and its measurement facilities

Prerequisite : Basic knowledge of research

Unit-I

Research Methodology:

An Introduction - Meaning of Research - Objectives of Research - Types of Research, Motivation in Research - Research Approaches, Significance of Research - Research Methods Verses Methodology - Research and Scientific Method - Research Process - Criteria of Good Research - Problems Encountered by Researchers in India. Defining the Research Problem: What is a Research Problem? - Selecting the Problem - Technique Involved in Defining a Problem - Research Design: Meaning - Need for research Design - Features of a Good Design - Important Concept relating to Research Design - Different Research Designs - Basic Principles of Experimental Designs. **(12L)**

Unit-II

Sampling Design:

Census and sample survey - Implications of a sample design - Steps in sample design - Criteria of selecting a sampling procedure - Characteristics of a good sample design - Different types of sample designs - How to select a random sample? - Random sample from an infinite Universe - Complex random sampling designs - Measurement and scaling Techniques: measurement in research - Measurement scales - Sources of error in measurement - Tests of sound measurements - Technique of developing measurement tools - Scaling, meaning of scaling - Scale classification bases - Important scaling techniques - Scale construction techniques. **(12L)**

Unit-III

Methods of Data Collection:

Collection of Primary Data - Observation Method - Interview method - Collection of Data through Questionnaires - Collection of Data through Schedules - Some Other Methods of Data Collection - Collection of Secondary Data - Selection of Appropriate Method for Data Collection - Interpretation and Report writing - Meaning of Interpretation, Why Interpretation? - Technique of Interpretation, Precaution in Interpretation - Significance of Report Writing –

Different Steps in Writing Report - Layout of the Research Report - Types of Reports - Mechanics of Writing a Research Report - Precautions for Writing Research Reports. **(12L)**

Unit-IV

Data Analysis Tools:

Chi-Square Test for large samples – Definition of Chi-Square – Limitations of Chi-Square test - Chi-Square test as a test of goodness of fit and as a test of independence – Yate's correction and its applications – Analysis of variance(ANOVA) : Concept – One way ANOVA – ANOVA in test in Latin Square Design **(12L)**

Unit - V

Algorithmic Research:

Introduction - Algorithmic Research Problems - Types of Solution procedure/Algorithm - Steps of Development of Algorithm - Steps of algorithmic Research - Design of Experiments and Comparison of Algorithms - Meta Heuristics for Combinatorial Problems - The Computer: Its Role in research - The computer and Computer Technology - The Computer System - Important Characteristics - Computer Applications- Computers and Researchers. **(12L)**

REFERENCE BOOKS

1. C.R.Kothari, "Research Methodology Methods and Techniques", (Second Revised Edition), New Age International Publishers, New Delhi, 2010.
2. R.Panneerselvam, "Research Methodology", PHI Learning Private Limited, New Delhi, 2009.

OUTCOMES:

At the end of this course, the students should be able to:

- understand some basic concepts of research and its methodologies
- identify appropriate research topics
- select and define appropriate research problem and parameters
- prepare a project proposal (to undertake a project)
- organize and conduct research (advanced project) in a more appropriate manner

MSU / 2017-18 / PG –Colleges / M.Sc.(Networking and Information Technology) / Semester – III / Ppr.no.19 / Elective -2 (a)

DATA WAREHOUSING AND MINING L-T-P-C

4 - 0- 0- 3

Preamble : Understanding data mining and warehousing concepts

Prerequisite : Basic knowledge of DBMS

Unit-I

Introduction:
Data Mining tasks Data Mining versus Knowledge Discovery in Data bases – Relational databases – Data warehouses – Transactional databases – Object oriented databases – Spatial databases – Temporal databases – Text and Multimedia databases – Heterogeneous databases - Mining Issues – Metrics – Social implications of Data mining **(12L)**

Unit-II

Data Preprocessing:
Why Preprocess the data – Data cleaning – Data Integration – Data Transformation – Data Reduction – Data Discretization. **(11L)**

Unit-III
Data Mining Techniques:
Association Rule Mining – The Apriori Algorithm – Multilevel Association Rules – Multidimensional Association Rules – Constraint Based Association Mining **(11L)**

Unit-IV

Classification and Prediction:
Issues regarding Classification and Prediction – Decision Tree induction – Bayesian Classification – Back Propagation – Classification Methods – Prediction – Classifiers accuracy **(13L)**

Unit-V

Clustering Techniques:
cluster Analysis – Clustering Methods – Hierarchical Methods – Density Based Methods – Outlier Analysis – Introduction to Advanced Topics: Web Mining, Spatial Mining and Temporal Mining **(13L)**

REFERENCE BOOKS

1. J. Han and M. Kamber , 2001, Data Mining: Concepts and Techniques, Morgan Kaufmann, .New Delhi-27
2. M. H.Dunham, 2003, Data Mining : Introductory and Advanced Topics , Pearson Education, Delhi.
3. Paulraj Ponnaiah, 2001, Data Warehousing Fundamentals, Wiley Publishers.
4. S.N. Sivananda and S. Sumathi, 2006, Data Mining, Thomsan Learning, Chennai.

OUTCOMES

Upon Completion of the course, the students will be able to

- Preprocess the data for mining applications.
- Apply the association rules for mining the data.
- Design and deploy appropriate classification techniques.
- Cluster the high dimensional data for better organization of the data.
- Evolve Multidimensional Intelligent model from typical system
- Discover the knowledge imbibed in the high dimensional system
- Evaluate various mining techniques on complex data objects

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MOBILE COMPUTING **L-T-P-C**

4 - 0- 0- 3

Preamble : Understanding concepts of mobile communication

Prerequisite : Basic knowledge of communication and Network

Unit-I

Introduction:

Wireless transmission, Frequencies for radio transmission, Signals, Antennas, Signal Propagation, Multiplexing, Modulations, Spread spectrum, MAC, SDMA, FDMA, TDMA, CDMA, Cellular Wireless Network. **(12L)**

Unit-II

Telecommunication systems:

GSM, GPRS, DECT, UMTS, IMT-2000, Satellite Networks, Basics, Parameters and Configurations, Capacity Allocation, FAMA and DAMA, Broadcast Systems, DAB, DVB. **(12L)**

Unit-III

Wireless LAN:

IEEE 802.11, Architecture, Services, MAC, Physical layer, IEEE802.11a-802.11b standards, HIPERLAN, BlueTooth. **(12L)**

Unit-IV

Mobile Communication Protocols:

Mobile IP, Dynamic Host Configuration Protocol, Routing, DSDV, DSR, Alternative Metrics **(12L)**

Unit-V

WAP and WML:

Traditional TCP, Classical TCP improvements, WAP, WAP 2.0, WML Basics, WML Cards. **(12L)**

REFERENCE BOOKS

Jochen Schiller, "Mobile Communications", 2/e, PHI/Pearson Education, 2003.

1. William Stallings, "Wireless Communication and Networks", PHI/Pearson Education, 2002

2. Kaveh Pahlaven, Prasanth Krishnamoorthy, "Principles of Wireless Networks", PHI/Pearson Education, 2003.

3. Hazysztof Wesolowshi, "Mobile Communication Systems", John Wiley and Sons Ltd, 2002.

OUTCOMES:

Upon Completion of the course, the students will be able to:

- Gain the knowledge about various types of Wireless Data Networks and Voice Networks.
- Understand the architectures, the challenges and the Solutions of Wireless Communication
- Realize the role of Wireless Protocols in shaping the future Internet.
- Able to develop simple Mobile Application using WML

MSU / 2017-18 / PG –Colleges / M.Sc.(Networking and Information Technology) / Semester – III / Ppr.no.20 / Practical -5

WEB DESIGNING AND NETWORK LAB **L-T-P-C**
0 - 0- 4- 2

Web Designing – Practical Lists

1. Write a HTML code to display information about your college use

   1)Bold Tag

   2)Centre Tag

   3)Heading & Font tags. Add background colour and picture

2. Create a HTML document to display a list of four flowers and link each one to another document displaying brief description of the flower. Add pictures wherever possible.

3. Create a table to display the marks obtained in the exam.

4. Write an HTML code to display a list of 5 cars in a frame. Link each one to a brief description in second frame The left frame should display the list and the right frame should display the paragraph about the frame.

5. Page hit counter
6. Input/output operations
7. Reading/writing files and Directories
8. Calendar application using PHP
9. MySQL Connectivity and Database manipulations
10. Session maintenance in PHP.

OUTCOMES:
Upon Completion of the course, the students should be able to:

- Design a system according to customer needs using the available Internet technologies
- Design and implementation of web forms with HTML
- Design and development of PHP pages with MySQL database connectivity.

MSU / 2017-18 / PG –Colleges / M.Sc.(Networking and Information Technology) / Semester –III / Ppr.no.20 / Practical -5

Network- Practical Lists

1. Write a socket program for Echo commands
2. Write a socket program for Ping commands
3. Write a socket program for Talk commands
4. Create a socket (TCP) between two computers and enable file transfer between them.
5. Write a socket for HTTP for Web page upload & download
6. Create a Socket (UDP)
7. Write a program for TCP Module implementation
8. Perform a case study for the shortest path routing algorithms to select the network and to select the network path.

OUTCOMES:

Upon Completion of the course, the students should be able to:

- Understand the architecture and underlying technologies of TCP/IP.
- Understand Socket Programming.
- Explain routing mechanism within an autonomous system

MSU / 2017-18 / PG –Colleges / M.Sc.(Networking and Information Technology) / Semester – III / Ppr.no.21 / Mini Project

Mini Project	**L-T-P- C**
	O-O-6+6* 6

MSU / 2017-18 / PG –Colleges / M.Sc.(Networking and Information Technology) / Semester – IV / Ppr.no.22 / Project

Project	**L-T-P-O**	**C**
	O-O-30+2*	**16**

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI
PG - COURSES – AFFILIATED COLLEGES

Course Structure for M.Sc. Physics

(Choice Based Credit System)

(With effect from the academic year 2017- 2018 onwards)

Sem. (1)	Sub. No. (2)	Subject Status (3)	Subject Title (4)	Contact Hrs./Week (5)	Credits (6)
III	14	Core - 14	Quantum Mechanics I	6	4
	15	Core - 15	Electromagnetic Theory	6	4
	16	Core - 16	Statistical Mechanics	5	4
	17	Core - 17	Research Methodology	5	4
	18	Core - 18 Practical - 5	Advanced Physics Experiments I	4	2
	19	Core - 19 Practical - 6	Microprocessor Experiments	4	2
			Physics **Subtotal**	**30**	**20**
IV	20	Core - 20	Quantum Mechanics II	4	4
	21	Core - 21	Spectroscopy	4	4
	22	Core - 22	Nuclear and Particle Physics	4	4
	23	Core - 23 Practical - 7	Advanced Physics Experiments II	4	2
	24	Core - 24 Practical - 8	C++ Programming	4	2
	25	Elective - 1	Elective / Field Work / Study Tour Elective 1A Renewable Energy Sources (Or) Elective 1B Optoelectronics and Lasers (Or) Elective 1C Materials Science (Or) Elective 1D Charecterization Techniques	3+1*	3
	26	Core - 25	Project	7+9*	8
			Subtotal	**30**	**27**
			Total	**120**	**90**

+ Extra hours for theField Work/Study Tour/ Project

For the Project, flexible credits are b/w 5 – 8 & Hours per week are b/w 10 - 16.

Total number of credits ≥ 90 : 90

Total number of Core Courses : 25 (15 T + 8 P + 1 Prj. + 1 FW.)

Total number of Elective Courses / F.W. / S.T. : 1 Total hours : 120

MSU / 2017-18 / PG –Colleges / M.Sc.(Physics) / Semester -III / Ppr.no.14 / Core-14

Quantum Mechanics I

L T P C
6 0 0 4

Preamble: This course imparts knowledge about wave functions and Schrodinger equations and matrix mechanics, Heisenberg uncertainity principle and different operators and certain solvable systems and various pictures involved in quantum mechanics. Basics of quantum mechanics are essential. Methods of solving some microscopic problems using quantum mechanical ideas are studied.

Unit I: Schrodinger equation and wave function

Introduction – Construction of Schrodinger equation – Solution of time dependent equation – Physical interpretation of $\psi * \psi$ – Conditions on allowed wave functions - Box normalization – Conservation of probability – Expectation value –Ehrenfest's theorem – Verification of Ehrenfest's theorem – Linear harmonic oscillator – particle in an infinite square well potential – Particle in a magnetic field. **(14 L)**

Unit II: Heisenberg Uncertainty Principle and Operators

Classical uncertainty relation –Heisenberg uncertainty relation – Implication of uncertainty relation –Illustration of uncertainty relation – Gamma-Ray microscope – Doppler effect.

Operators, Eigen values and Eigen functions: Linear operators, commuting and non-commuting operators – Self-ad joint and Hermitian operator – Discrete and continuous eigen values. **(13 L)**

Unit III: Exactly solvable systems

Bound states – Classical probability distribution – linear harmonic oscillator – Particle in a box – Poschl-Teller potentials – Quantum pendulum – Time dependent harmonic oscillator – Rigid rotator. **(11 L)**

Unit IV: Matrix Mechanics

Linear vector space – Matrix representation of operators and wave functions – Unitary transformation – Schrodinger equation and other quantities in matrix form – Application of matrix mechanics – Dirac's Bra and Ket notations – Properties of bra and ket vectors – Hilbert space. **(12 L)**

Unit V: Various Pictures and Density matrix

Schrodinger picture – Heisenberg picture – Interaction picture – Density matrix for a single system – Density matrix of an ensemble – Time evolution of density operator – A spin ½ system. **(10 L)**

Total (60 L)

MSU / 2017-18 / PG –Colleges / M.Sc.(Physics) / Semester -III / Ppr.no.14 / Core-14

Books for Study:

1. Quantum Mechanics I: Fundamentals- S. Rajasekar and R. Velusamy (CRC Press, Taylor and Francis group- Boca Raton, London)

Books for Reference:

1. Quantum Mechanics - L. Schiff- Third Edition (Tata Mc-Graw Hill, New Delhi)
2. A Text Book of Quantum Mechanics- P. M. Mathews and K. Venkatesan (Tata McGraw Hill, New Delhi, 1987)
3. Quantum Mechanics - S. Devanarayanan (Sci. Tech. Publications Pvt Ltd, Chennai, 2005)
4. Quantum Mechanics- G. Aruldhas (Prentice Hall of India, New Delhi, 2003)

MSU / 2017-18 / PG –Colleges / M.Sc.(Physics) / Semester -III / Ppr.no.15 / Core-15

Electromagnetic Theory

L T P C
6 0 0 4

Preamble: The scope of this course is to impart the knowledge of Maxwell's equation, propagation of electromagnetic waves through various media including waveguides.

Unit I Electrostatics

Coulomb's law – Gauss law – Poisson's equation and Laplace's equation – work done to move a point charge – energy of a point charge and continuous charge distribution – methods of images – electric field in dielectric materials – induced dipoles and polarizability – connection between polarizability and susceptibility – susceptibility, permittivity and dielectric constant of linear dielectric. **(14 L)**

Unit II Magnetostatics

Lorentz force law – Biot-savart's law and Ampere's law – magnetic vector potential multipole- Expansion of the vector potential – Effects of a magnetic field on atomic orbits – magnetic energy – Dia, Para, Ferro magnetism – magnetic susceptibility and permeability in linear and non linear media. **(11 L)**

Unit III Electrodynamics

Electromagnetic induction – Faraday's law – Maxwell's equation differential and integral form – Boundary conditions on field vectors D, E, Band H – Scalar and vector potentials – Gauge transformations – Lorentz and coulomb gauge – pointing vector and pointing theorem – Maxwell's stress tensor – Conservation of momentum. **(12L)**

Unit IV Electromagnetic waves

The wave equation for E and B – Monochromatic plane waves – energy and momentum in EM waves in linear media – Reflection and transmission at normal and Oblique incidence – EM waves in conductors wave guides – TE waves in rectangular wave guides – the coaxial transmission line. **(13 L)**

Unit V Electromagnetic radiation

Retarded potential – Lenard – Wiechart potential – Electric dipole radiation – magnetic dipole radiation – power radiated by a point charge – amour formula – Abraham Lorentz formula for the radiation reaction – physical origin of radiation reaction**.** **(10 L)**

Total (60 L)

MSU / 2017-18 / PG –Colleges / M.Sc.(Physics) / Semester -III / Ppr.no.15 / Core-15

Book for Study:

1. Introduction to Electrodynamics, David J Griffiths. Prentice Hall of India. II Edition, 1989.

Books for Reference:

1. Classical electrodynamics, J.D.Jackson., Wiley Eastern Publication. Second edition, 1975
2. Foundation of electromagnetic theory, J.R. Reitz, E.J Milford and R.W Christy
3. Electromagnetic fields and waves, P.Lorrain and D.Corson. CBS Publishers and distributors, 1986
4. Electrodynamics, B.P Laud, New Age International Pvt. Ltd. 1987

MSU / 2017-18 / PG –Colleges / M.Sc.(Physics) / Semester -III / Ppr.no.16 / Core-16

Statistical Mechanics

L T P C
5 0 0 4

Preamble: The basic concepts involved in statistical mechanics, classical and quantum statistics, applications of quantum statistics, phase transition in certain physical problems is expected to study. The theory of statistics and quantum ideas are prerequisites. Postulates of quantum mechanics, Maxwell-Boltzmann distribution law, theory and applications of quantum statistics are studied.

Unit I Basic concepts

Phase space-phase-space diagram of an oscillator-Volume in phase space-Ensembles-Microcanonical ensemble-Canonical ensemble-Grand canonical ensemble-Density of distribution in phase space-Liouvilles theorem-Postulate of equal a priori probability-statistical,mechanical and thermal equilibriums-connection between statistical and thermodynamical quantities. **(11 L)**

Unit II M-B Distribution law

Microstates and macro states-Stirling's approximation-Thermodynamic probability-General statistical distribution law-Classical Maxwell-Boltzmann distribution law-Evaluation of constants in the Maxwell Boltzmann distribution law-Maxwell's law of distribution of velocities-principle of equipartition of energy- Boltzmann entropy relation-Probability of magnetic moment distribution of independent atoms. **(13 L)**

Unit III Quantum statistics

Postulatory foundations of quantum mechanics-Transition from classical statistical mechanics to quantum statistical mechanics-Indistinguishability and quantum statistics-Exchange symmetry of wave functions-Bose-Einstein Statistics-Fermi-Dirac statistics-Maxwell-Boltzmann statistics-Results of three statistics-Thermodynamic interpretation of the parameters α and β-Black body radiation and the Planck radiation law. **(12 L)**

Unit IV Applications of quantum statistics

Specific heat of solids-Dulong and Petit law-Einstein theory of specific heat of solids-Debye theory of specific heat of solids-Criticism of Debye's theory-Ideal Bose Einstein Gas-Energy and pressure of the Gas-Gas degeneracy-Bose-Einstein Condensation-Thermal properties of Bose Einstein Gas-Ideal Fermi Dirac gas- Energy and pressure of the Gas-Thermodynamics functions of degenerate Fermi-Dirac gas-Electron Gas. **(14 L)**

Unit V Phase transitions

Phase transition-Phase transitions of first and second kind-critical exponent-Yang and Lee theory-Phase transitions of second kind: the Ising model-Braggs-Williams approximation-One dimensional Ising model. **(10 L)**

Total (60 L)

Book for Study:

1. Elementary statistical Mechanics Dr.S.L.Gupta & Dr. V.Kumar,Pragati Prakasan,Meerut 22nd Edition 2008

Books for Reference:

1. Fundamentals of statistical mechanics B B Laud New age international Publishers 2005
2. An Introductory course of Statistical Mechanics Palash B.Pal Narosa First reprint 2009
3.Statistical Mechanics by Kerson Huang
4.Statistical Mechnics by Sears and Salinger.

MSU / 2017-18 / PG –Colleges / M.Sc.(Physics) / Semester -III / Ppr.no.17 / Core-17

Research Methodology

L T P C
5 0 0 4

Preamble: Literature collection, activities involved in the research problem, method of writing the thesis, knowledge about Origin and Latex are expected to learn. Different methods of analysis and computer knowledge are prerequisites. The outcome of the course is how to collect literatures, write the research article and thesis.

Unit I : Introduction to Research: (BFS – 1)

Objectives of Research – Importance of research – research methods and research methodology – Types of research – Basic research – applied research – Quantitative and Qualitative methods – other types of research – explanatory, exploratory, comparative – various stages of research – Identification of research topic – Literature survey – Reference collection – Hypothesis. **(12 L)**

Unit II : Research Activity: (BFS – 1,2)

Mode of research – Research design – joy in doing research – crucial stage of Ph.D., - actual investigation – doing good research – results and conclusion – preparing the oral report – presenting the oral report in scientific seminar

Planning the assignment – Defining and limiting the problem – time schedule – preparing the working bibliography – taking notes – outline – first draft. **(11 L)**

Unit III: Writing the thesis: (BFS – 2)

Planning the thesis – Writing the thesis / assignment - General format – Page and chapter format – Tables and figures – Referencing – Appendixes. **(10 L)**

Unit IV: Plotting software: Origin: (BFS – 3)

Introduction - Importing your data - Designating Worksheet Columns as Error Bars - Plotting Data - Customizing the Data Plot - Customizing the Graph Axes -Adding Text to the Graph - Exploring Data: Transforming Column Values - Sorting Worksheet Data - Plotting a Range of the Worksheet Data - Masking Data in the Graph - Performing a Linear Fit - Creating Multiple Layer Graphs–Working with Excel in Origin. **(13 L)**

Unit : V : Typesetting Software : Latex (BFS – 4)

Introduction to LaTeX – TeX and LaTeX – A typical LaTeX input file – Characters and control sequences - Producing Simple Documents using LaTeX – LaTeX input file – producing ordinary text using LaTeX – Section headings in LaTeX – changing fonts in text mode – Active characters and special symbols in text - Producing Mathematical Formulae using LaTeX–

Mathematics mode – characters in mathematics mode – superscripts and subscripts – Greek letters – mathematical symbols – standard functions – fraction and roots –Ellipsis – accents in mathematics mode - Matrices and other arrays in LaTeX - Derivatives, Limits, Sums and Integrals – Lists – tables - Defining your own Control Sequences in LaTeX. **(14 L)**

Total (60 L)

Books for study (BFS):

1. Research methodology – Dr. S. Rajasekar, Dr. P. Philominathan, Dr. V. Chinnathambi https://arxiv.org/pdf/physics/0601009.pdf
2. Thesis and Assignment writing – Janathan Anderson, Berry H. Durston, Millicent Poole - Wiley Eastern University Edition, Wiley Eastern Ltd.
3. http://www.physics.rutgers.edu/~eandrei/389/Origin6_Tutorial.pdf
4. http://www.maths.tcd.ie/~dwilkins/LaTeXPrimer/

Books for further references:

1. Research Methodology – Methods and techniques (2nd edition) – C.R.Kothari – New Age International Publishers, NewDelhi (2005).
2.A Guide to LaTeX – Document preparation for beginners and advanced users – Helmut Kopka and Patrick W. Daly – Addison Wesley Publishing company.

MSU / 2017-18 / PG –Colleges / M.Sc.(Physics) / Semester -III / Ppr.no.18 / Practical - 5

Advanced Physics Experiments I

L T P C
0 0 4 2

Preamble: It is expected to provide hands on experience in understanding the advanced physics experiments Gouy's method, elliptical fringes, Hall probe into Gauss meter, and Phototransistor characteristics. Basic skills and knowledge about the experiments is required. Experiments in magnetism, electricity, and the theory behind the experiments are also studied.

Any FIVE Experiments

1. ***Gouy's Method***
   Determination of Magnetic Susceptibility (Volume and Mass) of the given sample.
   (use a specimen in the form of a long rod or tube filled with powder or liquid)

2. **Elliptical Fringes**
   Determination of Young's modulus, Bulk modulus, Rigidity modulus, Poisson's ratio and compressibility of the given material by forming Elliptical fringes.

3. **Equipotential lines**
   a) Formation of equipotential lines for a) parallel plates b) circular plates c) plates of irregular shape.
   b) Determination of Electric field between the equipotential lines.
   c) Mapping of Electric field vector between the plates.

4. **Temperature co-efficient of a forward biased diode**
   Measure the resistance of a forward biased diode at three different temperature and hence find the temperature co-efficient. Also plot variation of I with respect to T.

5. **Phototransistor Characteristics**
   Characteristic Study of Phototransistor using
   a) Light sources of different wave length b) light sources of different intensities
   Plots for a) Spectral response b) Sensitivity c) Linearity

6. **Calibration of Hall Probe into Gauss meter**
   a) Calibration of Hall probe into Gauss meter using a Search coil and
   b) Determination of calibration curve for a two axis Hall probe in radial mode

MSU / 2017-18 / PG –Colleges / M.Sc.(Physics) / Semester -III / Ppr.no.19 / Practical - 6

Microprocessor Experiments

L T P C
0 0 4 2

Preamble: Provide hands on experience on microprocessor experiments. Learners are expected to give a detailed knowledge of arithmetic operation, data manipulation, interfacing experiments, ADC & DAC conversion etc…

***Any FIVE programs* with Algorithm and Flow chart**

1. **Arithmetic Operations**
   a) Addition of two 8 bit and two 16 bit numbers
   b) Subtraction of two 8 bit and 16 bit numbers
   c) Multiplication of two 8 bit numbers – 16 bit result.
   d) Division of 16 bit by an 8 bit number.

2. **Data Manipulation**
   a) Arrange the given data items in Ascending or Descending order
   b) Finding the Minimum and Maximum value in the given data set.
   c) Search of a given character/number in the given data set.

3. **System Call and Counters**
   a) Display a character/number on the 7 segment display of the Kit using Monitor Call.
   b) Calculation of Time delay for a given interval.
   c) Up-Counter to count from 00 upto ‘nn’ with 1 sec time interval.
   d) Down counter to count from ‘nn’ to 00 with specified counting interval.

4. **Block Move and Series Generation**
   a) Moving a block of data from memory xxxx to yyyy.
   b) Fibonacci series generation
   c) Tribonacci series generation

5. **System Call and Rolling character**
   a) Calculation of time delay for a given interval.
   b) Display a Character on the 7 segment display of the Kit using Monitor Call.
   c) Roll a given character from Left to Right / Right to Left on the 7 segment displays with the specified time interval.

6. **ADC and DAC conversion**
   a) Interfacing ADC with 8085 – ADC chip Block diagram – 8085- ADC interfacing diagram
   b) Conversion of analog input to digital – Resolution – Graph between input and output.

c) Interfacing DAC with 8085 –DAC chip Block diagram – 8085 DAC interfacing diagram.
d) Conversion of digital input to analog – Resolution – Graph between input and output. Generation

7. DAC interfacing and Wave form generation.

Interfacing DAC with 8085 – DDC Chip Block diagram – 8085- DAC-8085 interfacing diagram and Wave Form using DAC

a) Square wave with the specified period
b) Rectangular wave with the specified period
c) Ramp Wave with the specified period
d) Triangular Wave

MSU / 2017-18 / PG –Colleges / M.Sc.(Physics) / Semester -IV / Ppr.no.20 / Core - 20

Quantum Mechanics II

L T P C
4 0 0 4

Preamble: The course provides knowledge on the theory of angular momentum, various approximation methods, and theory of scattering and relativistic quantum theory. The various aspects studied in the course quantum mechanics I is essential. This course is capable of solving many problems that cannot be exactly solved.

Unit I: Theory of angular momentum

Orbital angular momentum – Eigen pairs of L^2 and L_z – Properties of components of L and L^2 – Matrix representation of L^2, L_z and $L_{\pm}$ - spin state of an electron – spin orbit coupling – Addition of angular momenta. **(14 L)**

Unit II:Approximation Methods I

Time Independent Perturbation Theory: Introduction- Theory for non-degenerate case - Application to non-degenerate levels- Theory for degenerate levels- First order Stark effect in Hydrogen atom. **(12 L)**

Unit III:Approximation Methods II

Time Dependent Perturbation Theory:Introduction- Transition probability- constant perturbation-Harmonic perturbation- adiabatic perturbation- sudden approximation- Semi classical theory of radiation- calculation of Einstein coefficients. **(11 L)**

Unit IV: Scattering theory

Classical scattering cross section – Centre of mass and laboratory co-ordinate systems – Scattering amplitude – Green's function approach – Born approximation – Partial wave analysis – Scattering form a square well system. **(13 L)**

Unit V :Relativistic Quantum Theory

Klein – Gordon equation – Dirac equation for a free particle – Spin of a Dirac particle – Particle in a potential – Relativistic particle in a box – Relativistic hydrogen atom – Electron in a field – Spin orbit energy. **(10 L)**

Total (60 L)

Books for Study:

1. Quantum Mechanics I: Fundamentals- S. Rajasekar and R. Velusamy (CRC Press, Taylor and Francis group- Boca Raton, London)

MSU / 2017-18 / PG –Colleges / M.Sc.(Physics) / Semester -IV / Ppr.no.20 / Core - 20

Books for Reference:

1. Quantum Mechanics - L. Schiff- Third Edition (Tata Mc-Graw Hill, New Delhi)
2. A Text Book of Quantum Mechanics- P. M. Mathews and K. Venkatesan (Tata McGraw Hill, New Delhi, 1987)
3. Quantum Mechanics - S. Devanarayanan (Sci. Tech. Publications Pvt Ltd, Chennai, 2005)
4. Quantum Mechanics- G. Aruldhas (Prentice Hall of India, New Delhi, 2003)

MSU / 2017-18 / PG –Colleges / M.Sc.(Physics) / Semester -IV / Ppr.no.21 / Core - 21

Spectroscopy

L T P C
4 0 0 4

Preamble: This course gives detailed knowledge about various types of spectroscopy. The structure of different chemical compounds can be determined by studying these types.

Unit I Microwave Spectroscopy

Classification of molecules based on moment of inertia – rotational spectra of rigid and non-rigid diatomic molecules – Isotopic effect – linear polyatomic molecule - symmetric top molecule – chemical analysis –microwave spectrometer. **(13 L)**

Unit II Infrared Spectroscopy

Vibrating diatomic and poly-21atomic molecules – Simple harmonic oscillator – anhormonicity – Hydrogen bonding – Fermi resonance – rotation vibration spectra of polyatomic molecule – information from IR spectra – IR spectrometer – FTIR. **(14 L)**

Unit III Raman Spectroscopy

Theory of Raman scattering – rotation vibration Raman spectra – mutual exclusion principle – Raman spectrometer – polarization of Raman scattered light – structure determination using Raman spectrum – phase transition – resonance Raman scattering. **(12 L)**

Unit IV Resonance Spectroscopy

Magnetic properties of nuclei – resonance condition – relaxation time – Chemical shift – application to molecular structure – Bloch equation – NMR instrumentation – NMR imaging – ESR theory and hyperfine structure ESR spectra of hydrogen atom and anisotropic systems – crystal defects and biological studies – ESR spectrometer. **(11 L)**

Unit V Surface spectroscopy

Electron Energy Loss Spectroscopy EELS – Reflection – absorption IR spectroscopy RAIRS – Surface Enhanced Raman Scattering SERS – Inelastic Helium Scattering – X-Ray Photoelectron Spectroscopy XEPS. **(10 L)**

Total (60 L)

Book for Study:

1. N.Banwell and E.M.Mc Cash, Fundamentals of Molecular Spectroscopy, Tata McGraw Hill.
2. G.Aruldhas, Molecular Structure and Spectroscopy, Prentice Hall India.

MSU / 2017-18 / PG –Colleges / M.Sc.(Physics) / Semester -IV / Ppr.no.21 / Core - 21

Book for Reference:

1. B.P.Strughan and S.Walker, Spectroscopy, John Wiley.
2. Peter J.Larkin, IR and Raman Spectroscopy Principle and Spectral Interpretation, Elsevier.
3. Gordon M. Barrow, Introduction to Molecular Spectroscopy, McGraw-Hill .

MSU / 2017-18 / PG –Colleges / M.Sc.(Physics) / Semester -IV / Ppr.no.22 / Core - 22

Nuclear and Particle Physics

L T P C
4 0 0 4

Preamble: This course imparts knowledge about the elementary particles, nuclear structure, nuclear reactions with the help of various nuclear models.

UnitI Nuclear Forces

Ground and excited states of deuteron – magnetic dipole and electric quadrupole moments of deuteron – n-p scattering at low energies – shape independent effective range theory of np scattering – pp scattering at low energies – exchange forces –meson theory of nuclear force.**(14 L)**

Unit II NuclearDecays

Gamow'stheory of alpha decay – lineand Continuous spectrum of β decay-Fermi theory of beta decay – Fermi and Gamow-Teller selection rules – parity violation – Gamma decay – multipole transitions in nuclei – selection rules – internal conversion – nuclear isomerism. **(11 L)**

Unit III Nuclear Models

Liquid drop model – Weizsackers mass formula – nuclear stability – Bohr Wheeler theory of nuclear fission -magic numbers -evidence for magic numbers – shell model – spin orbit coupling – angular momenta and parities of nuclear ground states – magnetic moments - Schmidt line – collective model. **(12 L)**

Unit IV Nuclear Reactions

Types of nuclear reactions – Q-equation – solution of the equation – compound nuclear theory – reciprocity theorem – nuclear cross section – resonance scattering– Breit –Wigner dispersion formula – nuclear chain reaction – four factor formula. **(13 L)**

Unit V Elementary Particles

Classification of elementary particles- fundamental interactions conservations laws – CPT theorem - SU(3) multiplet – meson octet – baryon octet and baryon decouplet – Gellmann-Okubo mass formula - Quark theory. **(10 L)**

Total (60 L)

Books For Study:

1. Nuclear Physics, D. C. Tayal, Himalaya Publications.
2. Elements of Nuclear Physics, M. C. Pandia and R. P. S. Yadav Kedarnath.

Books For Reference:

1. Concepts of Nuclear Physics, Bernard L Cohen, Tata Mc Graw-Hill
2. Nuclear Physics an Introduction, S. B. Patel, Wiley Eastern Ltd.
3. Nuclear Physics, R. R. Roy and B. P. Nigam, New Age International Ltd.

MSU / 2017-18 / PG –Colleges / M.Sc.(Physics) / Semester -IV / Ppr.no.23 / Practical -7

Advanced Physics Experiments II

L T P C
0 0 4 2

Preamble: It is expected to provide hands on experience in understanding the advanced physics experiments Hall effect, Hysteresis, Ultrasonic diffraction etc… Basic skills and knowledge about the experiments is required. The theory behind the experiments is also studied.

Any FIVE Experiments

1. Temperature co-efficient and Band Gap

Determination of Temperature co-efficient and band gap of a given Semiconductor Thermistor using Carey-Foster Bridge.

2. Hall Effect

a. Definition of Hall effect and its application

Determination of

b. Hall voltage
c. Hall coefficient
d. Carrier density
e. Mobility of charge carriers
f. Resistivity

3. Four Probe

a) Four Probe principle
b) Measurement of Resistivity and Energy band gap of a given semiconductor material
c) Measurement of Resistivity of a large sample using Four Probe mapping.

4. Ultrasonic Diffraction

Formation of acoustic grating in a given liquid using a crystal to determine the velocity of ultrasonic wave in the liquid and compressibility of the liquid.

Repeat for another liquid and hence find the ratio of compressibility and velocity.

5. LCR circuit

a) Determination of dielectric constant of a liquid using LCR circuit
b) Determination of dielectric constant of a given crystal using LCR meter.

6. Hysteresis

Formation and tracing of magnetic hysteresis loop for the given specimen to determine

a) Coercivity
b) Retentivity and
c) Energy loss per unit volume per cycle of the specimen

7. Two Probe

Determination of resistivity of the given samples

MSU / 2017-18 / PG –Colleges / M.Sc.(Physics) / Semester -IV / Ppr.no.24 / Practical -8

L T P C
0 0 4 2

Preamble: The course provides knowledge about the C++ programming and the course is able to solve many tedious physical problems numerically.

Any FIVE programs Algorithm and Flow chart

1. Curve Fitting – Fitting a straight line.

a) Principle of least Square and fitting a straight line.
b) Principle of linear interpolation
c) C++ program to fit a straight line using the data obtained from Cauchy's Constant Experiment and Interpolation using the fitted equation

2. Solution of simultaneous equations - Gauss Elimination method.

a) Procedure to solve Simultaneous equations using Gauss Elimination Method
b) Solving unknown branch currents in Wheatstone's bridge using GE method manually.
c) C++ program to solve the equations.

3. Numerical Differentiation.

a) Derivation of Exponential law of Radioactive decay.
b) RK 4th order method of solving a given 1st order differential equation.
c) Analytical computation of the mass of the given radioactive sample after a specified period (Given: activity or half life period).
d) C++ program using RK method to solve radio-active problem – Compare output with the analytical result.

4. Area under the Curve

a) Numerical integration – derivation of Simpson's rule
b) C++ programs for Simpson $1/3^{rd}$ rule, Simpson 3/8 rule and Montecarlo integration.
c) Comparison of the program output with direct integration.

5. Eigen Value and Eigen Vector.

a) Explanation of Eigen Values and Eigen Vectors.
b) Calculation of Eigen Values and Eigen Vectors using analytical method.
c) C++ program to calculate Eigen values and Eigen vectors of a give matrix – Comparison with analytical result.

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6. Matrix Multiplication

a) Multiplication of given matrices
b) Rotation matrix definition.
c) C++ program to rotate the given point about the origin using rotation matrix by the given angle.

7. Numerical Differentiation

a) Numerical differentiation – related to any physical problem
b) Derivation of Newton's law of cooling – equation
c) C++ program to verify the Newton's law of cooling from the given experimental data.

8. Solution of Algebraic and Transcendental equations.

a) Solution of the given equations using Newton Raphson Method – manual calculation.
b) C++ program to find the solution using N-R method and verification.

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Renewable Energy Sources

L	T	P	C
3+1*	0	0	3

***Extra hours for the Elective**

Preamble: This course gives a brief knowledge about the types of various non-conventional energy sources. The societal application of these energy sources is studied.

Unit I Introduction

Primary and secondary energy – Commercial and non commercial energy – renewable and non – renewable resources and their importance – World energy use – reserves of energy resources – energy cycle of earth – Indian energy scenario – Long term energy scenario for India – environmental aspects of utilization. **(14 L)**

Unit II Solar Energy

Introduction – extra terrestrial solar radiation – radiation at ground level - collectors – Solar cells – application of solar energy – Biomass energy – bihomass conversion – bio gas production – ethanol production – pyrolysis and gasification – direct combustion – application. **(13 L)**

Unit III Geothermal and Tidal Energy

Introduction – basic theory – types of turbines – applications geothermal energy – Introduction – geothermal resources types – resource base – application for heating and electricity generation – Tidal energy – Introduction – origin of tides – Power generation scheme. **(12 L)**

Unit IV Other Renewable Energy Sources

Hydropower – introduction – basic concept – site selection – types of turbine – small scale hydropower – magneto hydrodynamics (MHD), Thermoelectric and Thermionic energy resources – basic principles – power generation – nuclear energy – basic principle – power generation (basic ideas only). **(11 L)**

Unit V Chemical Energy Sources

Introduction – fuel cells – design and principle – classification – types – advantages and disadvantages – applications – Batteries – Introduction – Theory – Different types of batteries arrangements – classification of batteries – advantages of batteries for bulk storage. **(10 L)**

Total (60 L)

MSU / 2017-18 / PG –Colleges / M.Sc.(Physics) / Semester -IV / Ppr.no.25 / Elective – 1(a)

Books for Study:

1. Non-Conventional Energy Sources, G.D.Rai, Khanna Publishers, New delhi, 1984

Books for Reference:

1. Solar Energies of thermal processe, A.Duffie and W.A. Beckmann, john – wiley, 1980.
2. Principle of Solar Engineering, F.Kreith and J.F.Kreider, McGraw-Hill,1978
3. Alternate Energy Sources, T.N. Veziroglu, Vol.5 and 6, Mc Graw - Hill, 1978.
4. Solar energy – principle of thermal collection and storage S P Sukhatme and j K Nayak, Tata Mc Graw Hill, Tata, 2008

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Optoelectronics and Lasers

L	T	P	C
3+1*	0	0	3

***Extra hours for the Elective**

Preamble: This course provides the fundamentals of light waves, integrated wave guides, optic fiber wave guides. The applications of Laser and Holography are also studied.

Unit I Light wave fundamentals

Electromagnetic waves – dispersion – Pulse distortion – and information rate – polarisation – resonant cavities at plane boundary – critical angle – reflections. **(10 L)**

Unit II Integrated wave guides

Dielectric slab guide – modes in the symmetric slab guide – modes in the asymmetric slab wave guide – coupling to the wave guide – integrated optical network. **(11 L)**

Unit III Optic fibre wave guides

Step index fibre – graded index fibre – attenuation in fibres – modes in step index fibre – modes in graded index fibre pulse distortion and information rate in optic fibres – construction of optical fibres. **(12 L)**

Unit IV Lasers

Population inversion – threshold conditions – Laser losses – line shape functions – population inversion and pumping threshold conditions– classes of laser – doped insulator laser – semiconductor laser – gas lasers – liquid gas lasers – single mode operation – frequency stabilization – mode locking – active mode – passive mode locking method. **(14 L)**

Unit V Holography

Image formation of holographic process – Gabor hologram – limitations –hologram – recording the hologram – minimum reference angle – holography of three dimension – types of holograms – Fresnel – Fraunhofer – transmission – reflection – rainbow multiplex – embossed and thick holograms. **(13 L)**

Total (60 L)

Books for Study:

1. Fibre optic communications, Joseph C. Palais, Prentice Hall Publications. IV Edition (Unit 1-3)
2. Optoelectronics, J.Wilson and J.F.B.Hawkes, Prentice Hall Publications, 1989

3. Intoduction to Fourier optics , Joseph W.Goodman , McGraw Hill, Person Education II Edition, 1996. (Unit 5)

Books for Reference:

1. Photonic Optical Electronics in modern communications, Amnn yariv and pochi yeh, Oxford University Press, VI Edition, 2006
2. Optical Fibres and fiber optic Communication system, Subir kumar sarkar, S. Chand & Co
3. Introduction to Fibre Optics, Ajoy Ghatak and K.Thyagarajan, TataMcGraw Hill

MSU / 2017-18 / PG –Colleges / M.Sc.(Physics) / Semester -IV / Ppr.no.25 / Elective – 1(c)

Materials Science

L T P C
3+1* 0 0 3
***Extra hours for the Elective**

Preamble: The course details about the temperature effect, elastic behavior of materials, solid structure, imperfections in the crystal, the various deformation of materials.

Unit I Phase diagram

Phase rule-Single component systems-Binary Phase diagrams-Micro structural changes during cooling-The lever rule-Some typical phase diagrams-other applications of phase diagrams-Phase transformations-Time scale for phase changes-Nucleation and growth-The growth and the overall Transformation kinetics-applications. **(14 L)**

Unit II Elastic behaviour

Atomic model for elastic behaviour-The Modulus as a parameter in Design-Rubber like elasticity-Anelastic behaviour-Relaxation behaviours-Viscoelastic behaviour-Spring-Dashpot models. **(11 L)**

Unit III Structure of solids

The crystalline and non-crystalline states-Covalent solids-Metals and alloys-Ionic solids-The structure of silica and silicate-polymers-classification of polymers-Structure of long chain polymers-Crystallinity of long chain polymers. **(13 L)**

Unit IV Imperfections

Crystal imperfections-Point imperfections-The geometry of dislocations-other properties of dislocations-Surface imperfections. **(10 L)**

Unit V Oxidation, corrosion and other deformation of materials

Mechanisms of Oxidation-Oxidation resistant materials-the principles of corrosion-protection against corrosion-Plastic deformation-The tensile stress-strain curve-Plastic deformation by slip-Creep-Mechanisms of creep-Creep resistant materials-Ductile fracture-brittle fracture-methods of protection against fracture. **(12 L)**

Total (60 L)

Book for Study:

1. Materials Science and Engineering-A First Course V.Raghavan Fifth Edition Prentice Hall of India,New Delhi,2011.

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Books for Reference:

1. A text book of Material Science and metallurgy O P Khanna Dhanpat Rai Publications 2013
2. Rudiments of Materials science S O Pillai Sivagami Pillai New age international Publishers 2005
3. Callister's Materials Science and Engineering Adapted by R.Balasubramaniam Wiley-India 2010
4. Materials Science P K Palanisamy

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Characterization Techniques

L	T	P	C
3+1*	0	0	3

***Extra hours for the Elective**

Preamble: The principle behind the characterizations such as structural, thermal, microscopy, electrical and spectroscopy are studied.

UNIT I: Structural characterization

X-ray powder diffraction: Bragg's law - x-ray diffractometer essentials - estimation of x-ray diffraction intensity - structure, polarization, multiplicity, Lorentz, absorption and temperature factors - intensity formula - crystal structure determination of cubic systems - determination of lattice parameter, crystallite size and lattice strain - problems. **(13 L)**

UNIT II: Thermal characterization

Heat, Energy and Temperature. Resistance temperature transducers - thermocouples - Furnace and its control - automatic control systems. Differential Thermal Analysis: instrument design - introduction to DTA applications - Thermodynamic data from DTA - calibration - melting, boiling, decomposition and phase equilibria. **(12 L)**

UNIT III: Microscopy characterization

Magnification - Resolution. Electron Microscopy: electrons - generation of electron beams - magnetic lense. Scanning Electron Microscope; working method - obtaining a signal – detection of secondary and backscattered electrons - optics of SEM - pixel - depth of field –ultimate resolution. Transmission Electron Microscope; electron gun -- condenser system – specimen hamber - objective and intermediate lenses - projection of image - specimen preparation - electro, chemical and mechanical polishing - FIB. **(14 L)**

UNIT IV: Electrical characteri/ation

Impedance spectroscopy: importance of interface - impedance related functions - physical models for equivalent circuit -single RC circuit -single impedance arcs -dielectric relaxation - conductivity and diffusion in electrolytes - mixed electronic-ionic conductors. Automated impedance analyzer: impedance measurement - audio frequency bridge - automated frequency response and impedance analyzer - measurements using 2, 3 or 4 terminals. **(11 L)**

UNIT V: Spectroscopy characterization

UV-Vis spectrophotometer: Introduction - principle - qualitative analysis - quantitative analysis - instrumentation - experimental parameters -application. Infrared spectroscopy: introduction -principle - instrumentation - sample preparation and accessories - qualitative analysis –

quantitative analysis - application. Raman spectroscopy: introduction - Raman Effect - experimental consideration -analysis of bulk materials. **(10 L)**

Total (60 L)

Books for_study_:

1. X-ray diffraction crystallography, Yoshio Waseda, Biichiro Matsubara and Kozo Shinoda, Spinger-Verlag, Berlin Heidelberg (201 1)
2. Thermal analysis of Materials, Robert F. Speyer, Marcel Dekker Inc., New York (1994). [Unit II]
3. Electron Microscopy and Analysis, Peter J. Goodhew, John Humphreys and Richard Beanland, Taylor & Francis, London (2001). [Unit- III]
4. Impedance Spectroscopy Theory, Experiment and Applications, Bvgenij Barsoukov and J. Ross Macdonald, John-Wiley & Sons, new'Jersey (2005). [Unit - IVJ
5. Materials Characterization, Ruth E. Whan, ASM Handbook Volume 10 (1998). [Unit VJ.

PROJECT

L	T	P	C
7+9*	0	0	8

***Extra hours for the Project**

GUIDELINES FOR PROJECT WORK

Format for Preparation of Project Report for M.Sc., Physics

1. **Arrangement of Contents:**

   The sequence in which the project report material should be arranged and bound should be as follows:

   Cover Page & Title Page
   Bonafide Certificate
   Abstract
   Table of Contents
   List of Tables
   List of Figures
   List of Symbols, Abbreviations and Nomenclature
   Chapters
   Appendices
   References

2. **Page Dimension and Binding Specifications:**

   The dimension of the project report should be in A4 size. The project report should be bound using flexible cover of the thick white art paper. The cover should be **printed in black letters** and the text for printing should be identical.

   Total number of Pages should not exceed 70.

3. **Preparation Format**

   Cover Page & Title Page – A specimen copy of the Cover page & Title page of the project report are given in **Appendix 1.**

Bonafide Certificate – The Bonafide Certificate shall be in double line spacing using Font Style Times New Roman and Font Size 14**.**

The Certificate shall carry the supervisor's signature and shall be followed by the supervisor's name, academic designation (not any other responsibilities of administrative nature), department and full address of the institution where the supervisor has guided the student. The term **'SUPERVISOR'** must be typed in capital letters between the supervisor's name and academic designation.

Preface – Preface should be one page synopsis of the project report typed double line spacing, Font Style Times New Roman and Font Size 14.

Table of Contents – The table of contents should list all material following it as well as any material which precedes it. The title page and Bonafide Certificate will not find a place among the items listed in the Table of Contents but the page numbers of which are in lower case Roman letters. One and a half spacing should be adopted for typing the matter under this head.

List of Tables – The list should use exactly the same captions as they appear above the tables in the text. One and a half spacing should be adopted for typing the matter under this head. The tables shall be introduced in the appropriate places in the text.

List of Figures – The list should use exactly the same captions as they appear below the figures in the text. One and a half spacing should be adopted for typing the matter under this head. The figures shall be introduced in the appropriate places in the text.

List of Symbols, Abbreviations and Nomenclature – One and a half spacing should be adopted or typing the matter under this head. Standard symbols, abbreviations etc., should be used.

Chapters – The Chapters may be broadly divided into 5 parts

1. Introduction to Project
2. Literature Survey
3. Methods and methodology/Working / Experimental Techniques
4. Result Analysis
5. Conclusion

1. The main text will be divided into several chapters and each chapter may be further divided into several divisions and sub-divisions.
2. Each chapter should be given an appropriate title.
3. Tables and figures in a chapter should be placed in the immediate vicinity of the reference where they are cited.
4. Footnotes should be used sparingly. They should be typed single space and placed directly underneath in the very same page, which refers to the material they annotate.

Appendices – Appendices are provided to give supplementary information, which is included in the main text may serve as a distraction and cloud the central theme.

1. Appendices should be numbered using numerals, e.g. Appendix 1, Appendix 2, etc.
2. Appendices, Tables and References appearing in appendices should be numbered and referred to at appropriate places just as in the case of chapters.

3. Appendices shall carry the title of the work reported and the same title shall be made in the contents page also.

List of References –The listing of references should be typed 4 spaces below the heading "REFERENCES" in alphabetical order in single spacing left – justified. The reference material should be listed in the alphabetical order of the first author. The name of the author/authors should be immediately followed by the year and other details.
A typical illustrative list given below relates to the citation example quoted above.

References

1. Ariponnammal, S. and Natarajan, S. (1994) „Transport Phonomena of Sm Sel – X Asx", Pramana – Journal of Physics Vol.42, No.1, pp.421-425.
2. Barnard, R.W. and Kellogg, C. (1980) „Applications of Convolution Operators to Problems in Univalent Function Theory", Michigan Mach, J., Vol.27, pp.81–94.
3. Shin, K.G. and Mckay, N.D. (1984) „Open Loop Minimum Time Control of Mechanical Manipulations and its Applications", Proc.Amer.Contr.Conf., San Diego, CA, pp. 12311236.

Table and figures - By the word Table, is meant tabulated numerical data in the body of the project report as well as in the appendices. All other non-verbal materials used in the body of the project work and appendices such as charts, graphs, maps, photographs and diagrams may be designated as figures.

4. **Typing Instructions**

The impression on the typed copies should be black in colour. One and a half spacing should be used for typing the general text. The general text shall be typed in the Font style „Times New Roman" and Font size 14.

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APPENDIX I
(A typical Specimen of Cover Page & Title Page)
<Font Style Times New Roman – Bold>
TITLE OF PROJECT REPORT
<Font Size 18><1.5 line spacing>

A PROJECT REPORT
<Font Size 14>

Submitted by
<Font Size 14><Italic>

NAME OF THE CANDIDATE(S)
<Font Size 16>

in partial fulfilment for the award of the degree
of
<Font Size 14><1.5 line spacing><Italic>

NAME OF THE DEGREE
<Font Size 16>

IN

BRANCH OF STUDY
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NAME OF THE COLLEGE
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MANONMANIAM SUNDARARANAR UNIVERSITY
TIRUNELVELI- 627 012
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MONTH & YEAR
<Font Size 14>

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI
PG - COURSES – AFFILIATED COLLEGES
Course Structure for M.Sc. Zoology
(Choice Based Credit System)
(with effect from the academic year 2017- 2018 onwards)

Course	Name of the course	Hrs/W		Credit
		T	P	
Core VII	3.1. Animal Physiology	6		4
Core VIII	3.2. Biotechnology	6		4
Core IX	3.3. Biostatistics & Bioinformatics	5		4
Core X	3.4. Research Methodology	5		4
Core Practical V	Practical V (3.1&3.2)		4	2
Core Practical VI	Practical VI (3.3&3.4)		4	2
	Total	**22**	**8**	**20**
	4.1. Immunology	4		4
Core XI	4.2. Genetics	4		4
Core XII	4.3. Aquaculture	4		4
Elective	Sericulture	3+		3
Core Practical VII	Practical VII (4.1, 4.2)		4	2
Core Practical VIII	Practical VIII (4.3& Elective)		4	2
	Project (compulsory)		7+	8
	Total	**15**	**15**	**27**

* Field work in any core subject

Course Component

Course Division	No. of courses	Total credits	Total marks
Core Subjects & Elective	16	63	1600
Practical	8	16	800
Field work	1	3	100
Project work	1	8	100
Total	**26**	**90**	**2600**

Duration of the course:

Two years (Four semesters)

Date of Effect:

For the students admitted during the academic year 2017-2018 batch and onwards.

Eligibility condition:

Those who have passed B.Sc. Zoology, B. Sc. Advanced Zoology, B.Sc. Applied Zoology, B.Sc. Animal Science and Biotechnology, B.Sc. Advanced Zoology and Biotechnology, B.Sc. Life Science and B.Sc. Biology (Hon.) from recognized university.

Theory Examination:

The M.Sc. Zoology Core theory Examination having the following marks.

Internal Marks – 25

Test	=	15 marks
Assignment	=	4 marks
Seminar	=	6 marks

Total	**=**	**25 marks**

External Marks - 75

Section A: 10x 1	=	10 marks
(Q.No. 1 to 10)		
Section B: 5 x 5	=	25 marks
(Q.No. 11 to 15)		
Section C: 5 x 8	=	40 marks
(Q.No. 16 to 20)		

Total	**=**	**75 marks**

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ANIMAL PHYSIOLOGY

L T P C
6 0 2 4

Preamble : This course develop the knowledge about the functions of organs and tissues in the Animal. This study also provide the students with the basic understanding of the fundamental processes and mechanisms that serve and control the various functions of the body. The basic idea of paper were learned earlier and the detailed course structure were dealt.

Unit I : **Nutrition and Digestion :** Importants of Carbohydrates, Protein, Lipids. Vitamins and Minerals with regard to human health. Balanced diet, Malnutrition and BMR. Human digestive tract and functions. Role of enzymes in digestion of carbohydrates, proteins and lipids. Gastrointestinal hormones .Intestinal villi and absorption.

(15L)

Unit II : **Blood and Circulation** : Structure of arteries and Veins. Blood Corpuscles. Haemopoiesis and formed elements. Plasma functions. Blood volume regulation. Blood groups Coagulation of blood. Structure and function of the human heart. Structure function of coronary arteries and vein. ECG, Cardiac cycle, Heart rate, Blood pressure. Neural and chemical regulation of heart. **(20L)**

Unit III : **Respiration and Excretion :** Respiration in air and water. Structure and function of human lung and the respiratory tract. Respiratory pigments. Gas transport between the lungs and tissues. Neural and chemical regulation of respiration .Human: Structure of the Kidney –Nephron Renal circulation –Urine formation. Renal disorders – Micturition and dialysis. Regulation of water and electrolytes. Hormonal control of osmo –iono regulation.

(20L)

Unit IV : **Nervous System and Sense Organs :** Neuron –Structure and function Neuro transmitters –Synapse, Conduction of nerve impulses. Structure and function of brain and Spinal cord, EEG. Muscles –Classification – Ultra structure of skeletal muscle -Mechanism of muscular contraction –Neural control of muscles tone and function. Sense organ of vision, hearing and tactile responses. **(20L)**

Unit V : **Endocrinology and Reproduction :** Structure and function of Endocrine glands. Hormones and diseases. Basics mechanism of hormone action. Estrus and endometrial reproductive cycle's. Neuro endocrine regulation of reproduction. **(15L)**

Reference books :

1. General and Comparative Physiology – William S. Hoar.
2. Chordate Zoology – E. L. Jordan and P. S. Verma, S. Chand and Co., New Delhi.
3. Comparative Animal Physiology – C. D. Prosser and F. A. Brown.
4. Textbook of Animal Physiology – R. Nagabhushanam, M. S. Kodarkar and R. Sarojini.
5. Kunt Schmidt – Nicolsen Animal Physiology – Adaptation and Environment, Cambridge University Press.
6. Gayton, A. C. and Hall, J. E., A Textbook of Medical Physiology, 9th Edn., Harcourt Brace and Company Asia Pvt. Ltd., W. B. Saunders Company.

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BIOTECHNOLOGY

L	T	P	C
6	0	2	4

Preamble : This course facilitates the method of natural raw materials into useful products by the application of living organism in the industrial process. The main objectives of biotechnology is the conservation of resources via the recycling of waste material and the recoveries of more valuable products. The basics were learned and the detailed course structure is dealt.

UNIT I : Genetic engineering

Gene cloning -the basic steps, types of restriction enzymes, ligases - linkers and adaptors, C DNA, selection of recombinants. Hybridization techniques, chemical synthesis of oligonucleotides, PCR and DNA sequencing techniques.

UNIT II : Gene cloning vectors

Cloning vector based on pBR322 and bacteriophage, cloning vector for yeast. Cloning vector for Agrobacterium tumefaciens, Simian virus 40. Gene transfer technology- Particle bombardment, micro injection techniques, electrophoresis, liposome fusion.

UNIT III : Animal Biotechnology

Cell culture : Organ culture, whole embryo culture, embryo transfer - in-vitro fertilization (IVF) technology. Dolly- in vitro fertilization and embryo transfer in human. Transgenic animals. Human gene therapy. Cryobiology.

UNIT IV : Microbial Biotechnology

Fermentation: Bioreactor. Microbial products: primary and secondary metabolites. Protein engineering. Bioremediation of hydrocarbons, industrial wastes and heavy metals. Single cell protein, biopolymers, bio pesticides and bio fertilizers. Xenobiotics , bio-leaching, bio-mining and bio-fuel.

UNIT V : Medical Biotechnology

Drug development : production of pharmaceuticals by genetically engineered cells (hormones, interferons), microbial transformation for production of important pharmaceutical (steroids and semi-synthetic antibiotics), drug design and targeting. Diagnostic kit development for micro analysis.

Reference books:

Satyanarayana, U.2007. Biotechnology. Uppala author-publisher interlinks,Vijayawada, Andhra Pradesh, India. Old,R.W and Primrose, S.B.1993.Principles of Gene manipulation:

An introdution to Genetic Engineering.Blackwell Science Publication. Ignacimuthu, S.2008. Biotechnology: An introduction, Narosa Publishing house, New Delhi.

Purohit, S.S.2008. Biotechnology. Student Edition, Jodhpur. Lee and Savage, L.M. Biological Molecules in Nanotechnology.

Biological Molecules in Nanotechnology – By Ratner M and Ratner D – Nerosha Publishing house, New Delhi.

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BIOSTATISTICS AND BIOINFORMATICS

L T P C
5 0 2 4

Preamble : The objectives of biostatistics is to advance statistical science and its application. The role of biostatistics is an important one in designing studies and analyzing data from research problems. Computer study operate a variety of advanced spread sheet, operating system and word processing function.

Unit 1 : **Collection of Data** : Primary and Secondary data –Methods of collecting primary data – sources of secondary data. **Sampling and Sample Designs** : Essentials of sampling – Methods of sampling –Random sampling methods –Non random sampling methods – Merits and Limitations of sampling. Classification and tabulation of data –Diagrammatic and graphic presentation of data. **(10L)**

Unit II : **Measures of Central Tendency** : Mean- Arithmetic mean –Weighted arithmetic mean – Median – Mode. **Measures of Dispersion** : Quartile deviation – Mean deviation – Standard deviation – Lorenz curve. **Skewness Moments and Kurtosis** : Measure of skewness –Absolute measure of skewness -Relative measure of skewness -Karl Pearson's coefficient of skewness- Bowley's coefficient of skewness. Moments. Measures of kurtosis. **Correlation analysis** : Types of Correlation –Methods of studying correlation Karl Pearson's coefficient of correlation –Regression Analysis –Regression line, Regression equations. **(20L)**

Unit III : **Probability and Expected Value** : Concepts of probability –Types of events - Theorems of probability - conditional probability –Bayes' Theorem. **Theoretical Distribution** : Binomial distribution -Poisson distribution - Normal distribution. **Statistical Inference** : Test of hypothesis -procedure of testing hypothesis. **Estimation :** Test of significance for large sample - Test of significance for small samples –Student's t- distribution. **(15L)**

Unit IV : Chi square test and a Goodness of fit –Yates correction F-Test and Analysis of Variance – one way classification and two way classification .Experimental design – Randomized block design –Latin squares – The Sign Test – A rank sum test (The Mann-Whitney U Test). **(10L)**

Unit V : **Bioinformatics** : Information Technology in Biology - Types of sequences used in bioinformatics – Application of Bioinformatics. **Biological Database :** Objectives – Properties of Database –database retrieval system –Symbols used in data base – Nomenclature of DNA sequences Nomenclature of protein sequences –NCBI .SWISS-PROT. **Data Base Similarity Search Tools** : BLAST –FASTA –Application of bioinformatics tools –Homology search tools –Protein functional analysis tools –Sequences analysis tools –Structural analysis tools - Molecular modeling and visualizing tools – Polygenetic analysis tools . **(20L)**

Text book

1. Gupta S.P. 2008 Statistical methods Sultan Chand & Co .New Delhi.
2. Khanum. A& I.A. Khan 2004 Fundamental of Biostatistics ,Ukazz Publication. Hyderabad.
3. Ramakrishnan P.1994 Biostatistics SARAS Publication TamilNadu
4. C.S.V.Murthy 2008 Bioinformatics Himalya Publishing House Pvt Ltd . New Delhi.
5. Sundararajan and Balaji 2007 Introduction to Bioinformatics Himalya Publishing House Pvt Ltd .Mumbai.

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Reference book

1. Gerrold H Zar Fundamentals of Biostatistics 5th edition
2. Banergi,P.K. 2004Introduction to Biostatistics S Chand & company Ltd .NewDelhi.
3. Gurumani,N. 2004Introduction to Biostatistics .MJP Puplishers Chennai
4. Misra ,B.N.and Misra ,B.K.1998 Introductory Practical Biostatistics. Naya Prakash, Calcutta.
5. Pillai, RSN.and Bhavathi ,V.1989 Statistics S Chand & company Ltd .New Delhi
6. Schefler W.C.1980. Statistics for biological sciences Addison –Wesley Publishing Company, NewYork.
7. Sokal,R.R.and Rohif ,F.J. 1987 Introduction to Biostatistics .W.H.Freeman and Company New York.
8. Sundar Rao,P.S.S and Righard ,J.2002 An Introduction to Biostatistics .III edn Prentice Hall of India . NewDelhi.
9. N.J.Chikhale and V.S. Gomare 2007 Bioinformatics Theory and Practice Himalya Publishing House Pvt Ltd .Hyderabad.
10. Attwood T.K. Parry smith D.J. 2006
11. Introduction to biostatistics ,Dorling Kindersley (India) Pvt Ltd .South Asia.

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RESEARCH METHODOLOGY

L T P C
5 0 2 4

Preamble : The purpose of research is to discover answers and questions through the application of scientific procedures. The main aim of research is to find out the truth which is hidden and which has not been discovered as yet. Research study has its own purpose and objectives.

Unit I : Research – Characteristics – types of research – steps in research – objectives of research – research report formatting and typing – laboratory safety – intellectual property rights. **(15L)**

Unit II : Microscopy – Principles – types of light microscopes – bright field – dark field – phase contrast – fluorescence – scanning – micrometry. Electron microscopes and types – atomic force and magnetic force microscopes. **(15L)**

Unit III : Centrifuge – types – principles and applications. pH meter – types – principles and applications. Colorimeter – principles and applications. Cryopreservation and its applications. Freezing and freeze drying microtomes. Cytotechniques. **(20L)**

Unit IV : Chromatography – paper – thin layer – column – gas liquid chromatography – affinity chromatography. Electrophoresis – paper – cellulose acetate – gel – immune electrophoresis. Blotting techniques – southern – northern – western. Radioactive counters – autoradiography – labeling studies. **(15L)**

Unit V : Spectrophotometer - Spectrofluorimeter – ESR –NMR Spectrophotometer – Flame Emission Photometry. **(10L)**

Reference Books

1. Gurumai, N., 2006. Research Methodology for Biological Sciences, MJR Publishers, Chennai.
2. Rana, S. V. S., Biotechniques, Rastogi Publications, Meerut.
3. Vijayalakshmi, G. and Sivapragasam, C., 2008. MJP Publishers, Chennai.
4. Wilson, K. and Walker, J., Practical Biochemistry, Cambridge Publications.
5. Palanivelu, R., Analytical Biochemistry and separation techniques. Tulsi Book Centre, Town Hall Road, Madurai.

MSU / 2017-18 / PG –Colleges / M.Sc.(Zoology) / Semester -III / Ppr.no.18 / Practical - 5

Practicals

1. Estimation of haemoglobin – Any method.
2. Determination of ESR – Demonstration
3. Detection of haemin crystals in blood.
4. Estimation of salt loss in fish.
5. Estimation of salt gain in fish.
6. Opercular activity of fish in relation to salinity
7. Opercular activity of fish in relation to temperature.
8. Qualitative analysis of excretory products in ammonotelic, ureotelic and uricotolic animals.
9. ECG, EEG, conditional reflex – Chart.
10. Kymograph and Sphymomanometer.

Practicals

1. Estimation of citric acid in citrus fruits
2. Preparation of wine - Demonstration
3. Preparation of bread - Demonstration
4. Preparation of yoghurt - Demonstration
5. Diagnosis of diseases using ELISA - Demonstration
6. Preparation of Vermicompost - Demonstration
7. Extraction of genomic DNA from bacteria - Demonstration
8. Southern and Northern blotting techniques –charts
9. Flow Charts - Bioreactor - Antibiotics production
10. Spotters
    - pBR322
    - Lambda phage
    - Dolly
    - RAPD
    - Gene cloning

Stem cells

MSU / 2017-18 / PG –Colleges / M.Sc.(Zoology) / Semester -III / Ppr.no.19 / Practical - 6

Practical

1. Calculation of mean, median, mode, standard deviation, standard error, variance and coefficient of variation - individual observation.
2. Calculation of mean, median, mode, standard deviation, standard error, variance and coefficient of variation – continuous series.
3. Calculation of correlation coefficient – length and width of leaves.
4. Calculation of correlation coefficient – height and weight of students in the class.
5. Calculation of regression co-efficient using length and width of leaves.
6. Probability experiment with coin tossing (one coin, two coins). using chi square test
7. Test of significance for small samples – student's t test.
8. PubMed, NCBI, EMBL, SWISS-PROT – printout.

Practical

1. Centrifuge – techniques, types.
2. Phase contrast microscope – principle
3. Micrometry – measurement of cells.
4. P^H meter – principle, measurement of P^H in water and soil sample
5. Colorimeter – Verification of Beer Lambert's law
6. Microtome techniques – staining procedure
7. Chromatography principle – paper, thin layer, column and gas chromatography
8. Separation of aminoacid mixture using paper chromatography
9. Electrophoresis (demonstration only)
10. Spotters: Spectrophotometry, Flame Emission Photometry.

MSU / 2017-18 / PG –Colleges / M.Sc.(Zoology) / Semester -IV / Ppr.no.20 / Core-19

IMMUNOLOGY

L	T	P	C
4	0	2	4

Preamble : The students will be able to identify the cellular and molecular basis of immune responsiveness. To describe the role of immune system in both maintaining health and contributing to diseases. The course material help to understand the ability of our immune system to defend against invading pathogens.

Unit I : **Scope of Immunology. Innate Immunity** : First line of defense – Second line of defense - Third line of defense. Inflammatory response. Mechanism of innate immune recognition. **Acquired immunity** : Naturally acquired passive immunity, Artificially acquired passive immunity, Naturally acquired active immunity, Artificially acquired active immunity. **Cells of immune system** : Lymphoid lineage –- Myeloid lineage – **Organs of immune system :** Primary lymphoid organs - Secondary lymphoid organs. **(10L)**

Unit II : **Antibodies (immunoglobulins)** : Immunoglobulin structure and function - Immunoglobulin classes **Major histocompatibility complex (MHC)** : Structure and types. **Antigen –antibody interaction and hypersensitivity** : Types of antigen – antibody interactions Hypersensitivity - Type I, II, III, IV and V **Complement system** : Classical complement pathway, Alternative complement pathway, **(15L)**

Unit III : **B -cell maturation, activation and differentiation** : B Cell maturation, Bone marrow micro environment, Ig –gene rearrangements and formation of pre B-Cells receptor, selection of immature self reactive B Cells, B Cell activation and proliferation. **T–cell maturation activation and differentiation** : T –Cell maturation, discrete stages in early T cell development, Thymic selection of T cell repertoire, T cell activation, costimulation in T cell response, T cell clonal anergy. **Antigen processing and presentation** :Cytosolic pathway of antigen presentation, Endocytic pathway of exogenous antigen presentation. **Effectors responses of cell mediated and humoral immunity :** Cell mediated direct cytotoxic response, Natural killer cell mediated cytotoxicity, Antibody dependent cell mediated cytotoxicity, Regulation of immune effectors response, Immunological memory. **(15L)**

Unit IV : **Immune response infectious diseases** : Immune response against viral infection, bacterial infection, protozoan parasites and helminthine parasites. **Autoimmune diseases. Immuno deficiency diseases**. **(10L)**

Unit V : **Transplantation immunology** : Classification of grafts, Method of graft rejection, Graft versus host reaction, Tissue and organ transplantation, Immuno suppressive therapy during transplantation, **Immunological tolerance** –Mechanism of tolerance**. Immunology of tumors** : Tumor antigens, Immune response to tumor antigens, Immunological surveillance, Immune therapy of cancer. **Vaccines** : Vaccines from whole organisms, Polysaccharide vaccines, Outer membrane protein vaccines, Toxoid vaccines, Vaccines from recombinant vectors, DNA as vaccines, Vaccines from synthetic peptides.

(10L)

Text books:

1. C.V.Rao, An Introduction to Immunology Narosa Puplishing House, 35, Greams Road, Thousand light, Chennai -600006.
2. Immunology, 2007. I.Kannan. MJP Publishers, Chennai.

Reference books:

1. Janis Kuby, Immunology W.H.Freeman and Company, New York.
2. Klans.D.Elgert, Immunology Wiley –Liss Pub. Co. U.S.A.
3. R.M.Coleman, M.F.Lomb and R.E.S.Cord Fundamental Immunology 2nd Edn. W.C.Brown Publishers U.S.A.
4. I.M.Roitt, Essential Immunology E.L.B.S.
5. Donald M.Weir and John Shewart Immunology Churchill Livingston 9th Edn.
6. Geroge Pinchuk 2004.Schum's Outlines Immunology Tata McGraw –Hill.
7. Aruna Bhatia Manual of Practical Immunity Vikas Pub. House Ltd., New Delhi.
8. Talwar .G.P. A hand book practical immunology - Third edition ,Backwell scientific publication-ISBN 0-632-01491-1

MSU / 2017-18 / PG –Colleges / M.Sc.(Zoology) / Semester -IV / Ppr.no.21 / Core-20

GENETICS

L T P C
4 0 2 4

Preamble : To learn and apply concepts of modern transmission and molecular genetics. To solve transmission of genetics problem, make accurate prediction about inheritance of genetic traits and map the location of the genes. To understand the patterns of inheritance, autosomal recessive, autosomal dominant and sex linked traits.

Unit I : **Principles of genetic transmission:** Concepts and definitions – Mendelian principles – Allelic and non-allelic interactions – Pleiotropy – Penetrance andexpressivity – Phenocopies – Multiple alleles – Polygenic inheritance – Linkage and Crossing over – tetrad analysis – ClB technique – Sex determination – Sex linked inheritance – Non-disjunction. **(10L)**

Unit II : **Gene Concept:** Fine Structure of gene - Simple and split genes – Intron, Cistron, muton and Recon – Chemical composition of gene - Genes and protein synthesis – Genetic code - works of Khorana and Kornberg – wobble hypothesis - Regulation of gene action – Transposable elements – IS elements – DNA replication – Chemistry of DNA – Geme action related diseases. **(10L)**

Unit III : Mutation and Extra chromosomal inheritance: DNA damage and repairing mechanism – Gene mutation – molecular basis of mutaion – mutagens – causes of mutation – Extra chromosomal inheritance – Kappa particles in Paramecium – Shell coiling – Inbreeding, out breeding and hybrid vigour. **(10L)**

Unit IV : **Population Genetics:** Mendelian population – Gene pool and gene frequency – Hardy Weinberg law, Applications of Hardy-Weinberg law in calculating gene frequencies in a population – Calculation of gene frequencies for sex linked genes – Factors affecting Hardy -Weinberg equilibrium. **(15L)**

Unit V : **Human Genetics:** Pedigree analysis – Aminocentesis – Inborn errors metabolism – Sickle cell anemia – Karyotype – Twins – Chromosonal abnormalities – Genetic Pregnosis – Genetic Counselling – Gene Therapy – Drugs on Human heredity – simple Mendelian traits in man – genetic analysis of complex traits – Threshold traits – DNA finger printing and dermatoglyphics. Eugenics, Euthenics and Euphenics.

(15L)

MSU / 2017-18 / PG –Colleges / M.Sc.(Zoology) / Semester -IV / Ppr.no.21 / Core-20

Reference books :

1. Elof Axel Carlson, 1985. Human Genetics. Tata Mc Graw-Hill Publishing Co., New Delhi.
2. Jain, H. K., 1999. Genetics : Principles, concepts and implications, Oxford & Publishing Co., New Delhi.
3. Benjamin Lewin, 1997. Genes VI, Oxford University Press, Oxford.
4. Sandhya Mitra, 1994. Genetics – A blueprint of life. Tata Mc Graw Hill Publishing Co., New Delhi.
5. Strickberger, M. W., 1996. Genetics, 3rd Edn., Prentice Hall of India, New Delhi.
6. Gardner et al., 1991. Principles of Genetics, 8th Edn., John Wiley & sons Inc., New York.
7. Stansfield, W. D., 1991. Schaum's Outline of theory and problems of Genetics, 3rd Edn., Schaum's Outline Series, Mc Graw Hill Inc., New York.
8. Stent, G. S. and Calender, R., 1986. Molecular Genetics : An introductory narrative, 2nd Edn., CBS Publishers & Distributors, New Delhi.
9. Goodenough, U., 1984. Genetics, 3rd Edn., Saunders College Publishing, New York.
10. Miglani, G. S., Fundamentals of Genetics, Narosa Publishing House, New Delhi.
11. Lewis, Genes X – Jones and Bartlett Publishers, Oxford Publication.
12. Michael R. Commings, Genage Learning Pvt. Ltd., New Delhi.

MSU / 2017-18 / PG –Colleges / M.Sc.(Zoology) / Semester -IV / Ppr.no.22 / Core-21

AQUACULTURE

L T P C
4 0 2 4

Preamble : To promote, facilitate and influence the best possible standards of fisheries management. To provide the technical and general knowledge necessary for competent fisheries management. The basic ideas were studied at UG level and detailed study are carried in the present course.

Unit I : Aquaculture: history, definition, scope & importance, fishery resources of India in general & Tamil Nadu in particular, a biotic and biotic factors of water necessary for fish life, ecological characteristics of lakes & rivers, general ecological characteristics of reservoirs of India. **(10L)**

Unit II : Fish culture: mono, poly, mixed & composite fish culture, fresh water and marine prawn culture and its prospects in India, culture of mussels, clams, oysters and pearl culture, sewage fed fish culture, paddy cum fish culture, frog culture, sea weed culture. **(15L)**

Unit III : Fish breeding in natural conditions, bundh breeding, hypophysation & stripping, transport of live fish and seed, different types of crafts and gears used for fish catching, plankton – its definition, culture & identification, common weeds of fish ponds& methods of their eradication, production of mono sex and sterile fishes, transgenic fishes, hybridization , polyploidy , role of bio technology in conservation of fishes. **(15L)**

Unit IV : Fresh water fish farm: selection of site, construction of fish farm and soil chemistry, designing layout and construction of different types of fish ponds, setting and management of fresh water aquarium, preservation and processing of fish, fish by products industry and their utility. **(10L)**

Unit V : Water pollution, its effects on fisheries and methods of its abatement, common fish diseases(bacterial, viral, fungal and nutritional deficiency diseases), biochemical composition and nutritional value of fish, fisheries economics and marketing, fisheries managements and extension. **(10L)**

Reference Books (latest editions):

1. T.V.R.Pillay & Dill: Advances in Aquaculture
2. Agarwal & S.C.Narendra: A Hand Book of Fish Farming
3. R.K.Rath: Fresh water Aquaculture
4. Schonder: Hypophysation in Indian Major Carp
5. C.B.Hall: Ponds & Fish Culture
6. C.B.L.Srivastava: Fishes of India
7. Jhingaran: Fish and Fisheries of India

8. S.S. Khanna: An Introduction to Fishes
9. B.S.Rath: Fresh Water Aquaculture
10. Gopalji Srivastava: Fishes of U.P.& Bihar
11. H.D.Kumar: Sustainability & Management of Aquaculture & Fisheries
12. A.J.K.Mainan: Identification of Fishes
13. R.Sanatam: A Manual of Fresh Water Aquaculture
14. S.K.Gupta: Fish and Fisheries

MSU / 2017-18 / PG –Colleges / M.Sc.(Zoology) / Semester -IV / Ppr.no.23 / Core-22

SERICULTURE

L T P C
4 0 2 4

Preamble : The main objective of this course is to identify the disease and pests of the mulberry plants and also involves a through knowledge about the cultivation of mulberry, maintenance of the farm, seeds technology, silk worm rearing and silk reeling.

Unit I: Introduction- Scope and importance of sericulture –Sericulture in India. Role of Central Silk Board. Life cycle of *Bombyx mori* – morphology, egg, larva, pupa, adult, silk gland- classification based on number of larval moults and voltinism cocoon colour shape. Non mulberry silkworm. **(15L)**

Unit II: Morphology of mulberry plant – high yielding varieties- optimum conditions for mulberry growth- planting- irrigation- manuring- pruning- harvesting and storing of mulberry leaves- Common diseases of mulberry-causative agent, symptoms and treatment. **(15L)**

Unit III: Egg breeding stations procedure in grainage – silkworm rearing- rearing house – rearing appliances – rearing operations –sericulture products. **(10L)**

Unit IV: Diseases of silkworm – causative agents, symptoms and treatment for bacterial,fungal, viral and protozoan diseases. Genetic resistance of the silkworm – silkworm transgenesis and application. **(10L)**

Unit V: Silk reeling – cocoon marketing –characteristics of cocoon – cocoon stifling types and storage of stifled cocoons – reeling operations – reeling appliances – country charka, cottage basin, multi-end reeling machine – raw silk testing. **(10L)**

REFERENCES

1. Ganga, G and I. Sulochana Chetty. An Introduction to Sericulture. Oxford and IBH publishing co.pvt. ltd. New Delhi. 1991

2. Hisao Aruga. Principles of Sericulture. Oxford and IBH publishing co.pvt. ltd. New Delhi.

3. G. Rangaswamy *etal* . Mulberry cultivation – Central Sericultural Research and Training Institute. Mysore (1972)

4. Ullal, S.R and M.N. Narsimhanna –Hand Book of practical Sericulture – Central Silk Board. Bombay.

MSU / 2017-18 / PG –Colleges / M.Sc.(Zoology) / Semester -IV / Ppr.no.24 / Practical -7

Practicals

1. ABO blood grouping by haemagglutination technique.
2. Immuno-diffusion technique.
3. Counting of white blood corpuscles and red blood corpuscles.
4. Primary and secondary lymphoid organs in man (chart).
5. Lymphoid organs in rat (chart).
6. Cells of immune system – (slides).
7. Immunoglobulin G (chart).
8. Monoclonal antibody preparation (chart).
9. Histology of lymphoid organs: Primary organs – Thymus, Bone marrow. Secondary organs – Lymph node, Spleen. (slides).

Practicals

1. Analysis of simple mendelian inheritance in a small population.
2. Breeding experiments to be demonstrated with the help of colour beads – Monohybrid cross. (using chi-square test).
3. Breeding experiments to be demonstrated with the help of colour beads – Dihybrid cross. (using chisquare test).
4. Estimation of gene and genotype frequencies in the light of Hardy-Weinberg law based on facial traits.
5. Estimation of gene and genotype frequencies in the light of Hardy – Weinberg law based on ABO blood groups.
6. Random genetic drift – using colour beads.
7. Analysis of dermatoglyphic patterns.
8. Charts, models and flash cards pertaining to theory syllabus
    a. DNA replication
    b. Karyotyping
    c. Operon concept
    d. Transposable elements.
    e. Syndrome
    f. Inborn errors of metabolism.
    g. Sex-linked inheritance

MSU / 2017-18 / PG –Colleges / M.Sc.(Zoology) / Semester -IV / Ppr.no.25 / Practical -8

Practicals

1. Morphometry of a pond
2. Estimation of fish population using mark and recapture method
3. Estimation of primary productivity of macrophyte
4. Physical chemical analysis of dissolved oxygen, salinity and alkalinity in any two water samples
5. Study of fish pathology
6. Taxonomic description of cultivable fishes(Indian major carps, 3exotic carps, *Heteropneustes fossilis, Oreochromis mossambicus*
7. Morphological feature of paenaid and non paenaid prawn
8. Determination of age of fishes.

Practicals

1. Dissection : Silkworm digestive system , silk gland
2. Morphology of larva pupa and moth, sex separation in pupa and moth
3. Mouth parts of silkworm
4. Identification and study of sericulture products
5. Rearing appliances : rearing tray, leaf chamber
6. Mountage – Chandrike
7. Diseases of Silkworm –bacterial, fungal
8. Types of mulberry leaves (MR2, K2)and diseases of mulberry (fungal and nematode

MSU / 2017-18 / PG –Colleges / M.Sc.(Zoology) / Semester -IV / Ppr.no.26 / Project

Major Project

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI-12
M. Phil. BOTANY
(For all affiliated Colleges)
(Curriculum Effective From July 2018 Onwards)

Objectives of the program

To provide a holistic understanding in depth to the scholars in the specific area of research

To equip the researchers with complete comprehension on the tools techniques used in botanical research

To make the scholars to develop critical and analytical thinking towards research and enable them for independent writing of research manuscripts, articles review papers and thesis

Course Structure for M. Phil. Program in Botany – 2018 onwards

S. No.		Name of the course	Hrs/ week	Credits
	Semester I	**CORE PAPERS**		
1		Research and Teaching Methodology	4	4
2		Advances in Plant Science	4	4
		ELECTIVE PAPERS (any One)		
3		Plant Conservation Biotechnology	4	4
4		Developmental Botany & Plant Biotechnology		
5		Phytochemistry and Pharmacognosy		
6		Bio fertilizers and Plant Responses		
7		Soil Fertility and Plant Nutrition		
8		Ecology, Biodiversity and Sustainability		
9		Taxonomy of Angiosperms		
10		Plant Anatomy and Reproductive Biology		
11		Algal Technology		
12		Bryophyte Systematics and Evolution		
13		Ethnomedicine		
14		Marine Botany		
15		Vascular Cryptogams		
	Semester II	**MINI PROJECT**		
		Project and viva voce		12
		Total		**24**

RESEARCH AND TEACHING METHODOLOGY

L	C
60	4

Objectives

- To understand the principles and operation of basic and advanced instruments required for doctoral research
- To analyse the scientific findings and data by applying certain statistical methods and software
- To learn the methods of teaching and carrying out scientific research, documentation and communication

Unit I Microscopic and Analytical techniques (15 hrs)

Microscopy - principles and applications. Properties of electromagnetic radiation - Light, Phase contrast and Fluorescence microscopy. Electron Microscopy-Principles and applications of TEM and SEM- Preparation of materials for Electron Microscope. Spectroscopic techniques- UV and Visible, Fluorescence, IR, NMR, AAS, AES and AFM. Electrochemical techniques- Radioisotope techniques-radioactivity, atomic stability and radiation-radiation decay. Detection and measurement of radioactivity and applications of Geiger–Müller and Scintillation Counter. Labelling of biological molecules and autoradiography.

Unit II Separation techniques (8 hrs)

Chromatography- Principles and applications - GC, GLC, HPLC, MS. Electrophoretic techniques-Principles and construction of horizontal and vertical electrophoresis-Buffers and electrolytic separation- detection by staining and estimation of electrophorograms gel documentation. Molecular techniques: PCR based-RFLP, RAPD, AFLP, SSR, blotting techniques.

Unit III Statistical Methods (10 hrs)

Population and sampling, data collection, analysis and graphical representation. Measures of Central Tendency, Measures of Dispersion-Standard Deviation, Correlation and Regression analysis, Probability -normal and binomial distribution. Statistical testing: F-test, t-test and chi-square test. Experimental design, ANOVA one way and two way analysis, statistical software-MS Excel and SPSS.

Unit IV Research Methods (12 hrs)

Research - Meaning - Role of a researcher – Hypothesis - Methods-Approaches Objectives. Literature and Reference collection. Role of libraries in research, virtual libraries, Internet-World wide web-searching and browsing tools- e-journals and e-books. Impact factor, H- index, citation. Manuscript preparation- Citation and Proof correction, Thesis/Dissertation components - Introduction, Review, Materials and methods, Results - tables, figures, footnote, Discussion, Summary and Conclusion. Role of Supervisors/ Guides in research.

Unit – V Methodology of Teaching (15 hrs)

Teaching – Objectives of teaching, phases of Teaching – Teaching methods: lecture method, discussion method, discovery learning, Inquiry, Problem solving method, project method. Seminar- Integrating ICT in teaching: Individualised instruction, ways for effective presentation with power points, documentation - Evaluation; formative, summative & continuous and comprehensive Evaluation. Later Adolescent Psychology: meaning, physical, cognitive, emotional, Social and moral Development –Teaching later adolescents.

Reference Books:

1. Bryan C Williams and Keith Wilson 1983, A biologist's guide to practical techniques of Practical Biochemistry Second edition. Edward Arnold Publications.
2. David Plummer, 1988. An Introduction to Practical Biochemistry, Tata McGraw Hill Publishing Company, New Delhi.
3. George Casella and Roger L. Berger, 2003. Statistical Inference II Ed. Duxbury Advanced Series, Thomson Press.
4. Jayaraman, J,1985. Laboratory Manual in Biochemistry, Wiley Eastern Ltd.
5. Johansen, M., 1940. Plant Microtechnique, McGraw Hill Publishing Company, New Delhi.
6. Keith Wilson and John Walker., 2000. Practical biochemistry V Edition Cambridge Universities Press, London.
7. Stock, R and Rice, C.B. F., 1980. Chromatographic methods, Chapman and Hall Ltd. London.
8. Steel and Torrie, 1986. Principles and Procedures of Statistics with special reference to Biological Sciences.
9. Kothari, C.R., 2004. Research Methodology Methods and Techniques, New Age International
10. Isaac, S., Michael, W., 1971.Handbook in research and evaluation, (2nd ed.), San Diego, USA
11. Gomez, K.A., Gomez, A.A., 1984. Statistical procedures for agricultural research, John Wiley & Sons.
12. Townend, J., 2012. Practical statistics for environmental and biological scientists, John Wiley & Sons.
13. Sampathkumar, K, Panneerselvam, A. & Santhanam, S. 1984. Introduction to educational technology 2nd revised ed. Sterling Publishers, New Delhi.
14. Sharma, S. R. 2003. Effective classroom teaching modern methods, tools and techniques. Mangal Deep publishers, Jaipur.
15. Vedanayagam, E. G. 1989. Teaching technology for college Teachers, Sterling publishers, New York.

ADVANCES IN PLANT SCIENCE

L	C
60	4

OBJECTIVES

- To comprehend the important aspects of biodiversity and conservation methods
- To make the scholar abreast in advanced areas of plant science and the recent developments
- To equip the scholar to learn the theoretical and application concepts on economic and medicinal importance of plants

Unit 1- Climate change and plant diversity (12 hrs)

Biodiversity – Alpha, Beta, Gamma; Species, genetic and ecosystems diversity. Centres of origins of crops – Vavilov's Theory, Mega biodiversity, centres of origin of genetic diversity, Plant Genetic Resources (IBPGR/ NBPGR). Endangered plants – IUCN categories, Red Data Books, *In Situ* and *Ex situ* conservation strategies. Components of the atmosphere, greenhouse gases & green house effect, global warming and climate change, sea level rise, increased CO_2 levels, impacts on plants. Carbon sequestration, carbon credits and economy and energy policy. Climate Change adaptation and mitigation strategies (UNEP/ FAO/ IPCC / GBIF / CBD).

Unit -2 Plant Physiology (12 hrs)

Photosynthesis recent concepts in Photosystems I & II, ATP complex. Chloroplast DNA. Water transport and utilization. Resource mobilization and allocation. Advances in auxin and cytokinin molecular synthesis and function. Biochemistry of plant animal interaction.

Unit – 3. Plant Energy (12 hrs)

The concept of energy richness in plants – lignocelluloses, sugars and terpenoids. Plants that produce fuel, wood, waxes, alcohol and hydrocarbons. Products include biodegradable plastics, industrial enzymes, industrial oils, biofuels, fibers, papers, agents for bioremediation, phytoremediation.

Unit – 4 Molecular biology (12 hrs)

Cloning vectors and Transgenics. Genetic improvement of medicinal plants through Bio-technology and Genetic engineering. Molecular diversity analysis using various types of markers. Applications of molecular techniques in herbal research. Applications of *in-vitro* culture methods in drug production. Growing and harvesting genetically engineered crops to produce compounds of industrial importance.

Unit – 5 Advances in Plant Medicines (12 hrs)

Plants as bioreactors, molecular pharming - production of pharmaceutically valuable compounds from plants. Plant made pharmaceuticals (PMP). Plantibodies Edible Vaccines / Plantigens, Interferon's, Blood clotting factors, Anticoagulant, Hormones, Enzymes, Secondary metabolites, other proteins. IPR and medicinal plants.

References

1) Melchias, G. 2001. Biodiversity and Conservation. Science Publishers,NH USA
2) Krishnamurthy K.V. 2004. Advanced Textbook on Biodiversity: Principles and Practice. Oxford & IBH, New Delhi.
3) The World Conservation Strategy. IUCN, Switzerland.
4) Heywood, VH (Ed.). 1995. Global Biodiversity Assessment Report .UNEP.
5) Bidwell. R. G. S. 1979 Plant Physiology. Macmillon Delhi.
6) Lea, P. J. and R. C. Leegood. 1993. Plant Biochemistry and Molecular Biology, JohnWiley & Sons. New York.
7) Hans-walter heldt. 1997. Plant biochemistry and molecular biology. Oxford university press, New York. USA.
8) Jogdand. S.N.1997. Environmental Biotechnology – Industrial Pollution Management. Himalaya Publishing House.
9) Watson, J.D. and W.A. Benjamin. 2004. 3nd Edition. Molecular Biology of the Genes. Benjamin Cummings.
10) Freifelder, D. 1983. Molecular Biology. 2nd Ed. Narosa publishing house.
11) Lodish, H., Berk, A., Zipursky, S.L., Matsudaira, P., Baltimore, D. and Darnell, J. 2000. Molecular Cell Biology, W.H. Freeman and Co., New York, USA.
12) Wolfer, S.L. 1993 Molecular and Cellular Biology, Wadsworth Publishing, USA.
13) Revised guidelines for research in Transgenic plants (August 1998), Department of Biotechnology, Ministry of Science & Technology, Government of India, New Delhi.

PLANT CONSERVATION BIOTECHNOLOGY

L	C
60	4

OBJECTIVES

- To study the essentiality of conservation of rare plants and their conservation status by IUCN
- To enhance the understanding on conservation and linking biotechnological tools in conservation programs
- To learn the recent theoretical and practical approaches towards conservation of germplasm

Unit –1 Conservation (12 hrs)

Introduction - Need for inventorying and documentation. Principles of conservation; extinctions; environmental distribution status of plants based on international union for conservation of nature (IUCN). Red data list of Indian plants.

Unit – 2 Plant conservation Biotechnology (12 hrs)

Integration of biotechnology into conservation practices. Molecular approaches to assessing plant diversity. Biotechnology in plant germplasm acquisition. Methods of Plant conservation, and sustainable utilization of plant genetic resources.

Unit – 3 Tissue culture techniques (12 hrs)

In vitro Plant Conservation: Culture room and lab facilities. Media composition and preparation – plant growth regulators, adjuvants; sterilization. Morphogenetic patterns. Callus culture - Subculture, differentiation, and regeneration. Organogenesis : Embryoids, Caulogenesis, Rhizogenesis, Cell Line, Somaclone, Gametoclone.

Unit – 4 Micro propagation (12 hrs)

Preparative stage: Germplasm acquisition and selection of explants. Establishment stage: Axenic and viable cultures. Multiplication stage. Plantlet production: induction of roots and acclimatization of plantlets to green house condition. Somatic embryogenesis. Synthetic seed technology. Suspension culture, in vitro production of secondary metabolites, cell immobilization.

Unit – 5 Cryopreservation and Germplasm storage (12 hrs)

Slow or retarded growth. Principles, Cryoprotection, Freezing and long term cryogenic storage, protocols and recovery of germplasm. Conservation of Rare, endemic, threatened and economically important plants of India, current status and Active research stations in India. Stability assessments of conserved plant germplasm.

References

1. Dodds.I.H, and Roberts. L.W, 1995, Experiments in plant tissue culture. Cambridge University press, London.
2. Erica Benson. 1999, Plant conservation Biotechnology. Taylor and Francis Ltd., UK.
3. Dixon.R.A, 1994, Plant cell culture, A Practical approach.IRL press.Oxford, London.
4. Freifelder.D.1990.Molecular Biology.Narosa publishing house, New Delhi.
5. Murray Moo – Young. Plant biotechnology, comprehensive biotechnology series, pergamon press, Netherlands.
6. Narayanasamy.S, 1994, Plant cell and tissue culture. Tata McGraw – Hill Publishing co., Delhi.
7. Yeomen, 1987, Plant cell culture technology. Narosa Publication. New Delhi.
8. Lindsay, 1992, Plant Tissue Culture manual, Kluver Academic Publishers. Netherland.
9. George. E. F, 1994, Plant Propagation by Tissue culture. Exegetics Ltd., England.
10. Vasil.I.L, and Vasil.V.K, 1992, Plant Biotechnology and tissue culture. Kluver Academic Publishers, Netherlands.
11. Raven, Johnson, Losos, Mason and Singer 2008. BIOLOGY. 8th edition. McGraw Hill. New York, New Delhi.
12. Russell, Wolfe, Hertz and Starr 2008. Biology – THE DYNAMIC SCIENCE. Thomson Brooks/Cole, Australia, United States.

DEVELOPMENTAL BOTANY

L	C
60	4

UNIT I -MERISTEMS

Organization of Meristem – Stem (monocot & dicot) – root (monocot & dicot) cambium and secondary growth in dicots, anomalous secondary growth, Secondary thickening meristem in monocots. Microtechnique – anatomical fingerprinting. Histochemical localization of starch, proteins, oil and phenols. **13 HRS**

UNIT II – PLANT HORMONES

– Growth hormones and their role in development and resource mobilisation : Auxin, Cytokinin and Gibberellins- Functions and genetic molecular mechanism. **8 HRS**

UNIT III – DIFFERENTIATION AND MORPHOGENESIS

Cellular mechanisms of Development – overview of development- cell differentiation – pattern formation – morphogeneis – environmental effects on development. Growth and development through tissue culture – cell, tissue, organ culture – regeneration through somatic embryogenesis. **14 HRS**

UNIT IV – WATER AND FOOD MOVEMENT

Mobilization of food reserve – Pathway of upward movement of water and mineral ions – Mechanism of upward Movement in the xylem – Pathway of Movement of Organic Assimilates – Mechanisms of movement in Phloem. Cell wall architecture Mobilization of cell wall reserves (NSPs) in grasses. **12 HRS**

UNIT V – GENETIC CONTROL IN DEVELOPMENT

Gene expression with reference to plant development- Auxin response genes: Aux/IAAs, sUAR and GH3. Reactive Oxygen Species (ROS)- Nuclear gene expression: regulation by light. Differential gene expression in fruits and seeds. **13 HRS**

References

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2. Russell, Wolfe, Hertz and Starr 2008. Biology – THE DYNAMIC SCIENCE. Thomson Brooks/Cole, Australia, United States.
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11. Primrose and Twyman 2006. Principles of Gene Manipulation and Genomics 7thy edition. Blackwell.

PHYTOCHEMISTRY AND PHARMACOGNOSY

L	C
60	4

Objectives

- To have an understanding on the need for phytochemical studies which help to know the diversity of chemical compounds present in the plants.
- To learn the methods used in the extraction of the diverse compounds and their economic importance.
- To understand the need for pharmacological studies that help in the formulation of drugs for the benefit of humankind.
- To know the various analytical methods approved by WHO to standardize crude drugs.

UNIT- I Phytochemistry:

Scope, importance in pharmaceuticals industry, preparation of plant extracts - digestion, decoction, percolation, hot continuous extraction, aqueous alcoholic extraction, superficial fluid extraction and counter-current extraction. **(12 hrs)**

UNIT - II Secondary metabolites:

Definition, classification, natural sources and therapeutic applications of flavonoids: Flavones, Flavanones Flavonols, Anthocyanins. Alkaloids: Ephedrine, Serpentine and Morphine. Volatile oils - source, constituents, extraction and uses. **(12 hrs)**

UNIT- III Glycosides:

Definition, properties, classification, natural sources, pharmacological and toxicological effects of glycosides. Terpenoids: β-Sitosterol, Glycyrrhizin. Phenolics: Coumarins and Tannins.

(12 hrs)

UNIT-IV Pharmacognosy:

Definition, scope, Classification of drugs - morphological, taxonomical, pharmacological and chemical. Collection and processing of crude drugs - antichemical, phytochemical, antimicrobial and chemical. Preparation of plant extracts - maceration, infusion, decoction, percolation, sonication, hot continuous extraction, superficial fluid extraction and counter-current extraction.

(12 hrs)

UNIT -V

Screening and WHO Standardization of crude drugs (WHO guidelines): Physicochemical (Ash and Extraction values), fluorescence analysis, qualitative and quantitative analysis, basic chromatographic and spectroscopic analysis of crude drugs. **(12 hrs)**

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1. Agarwal, S.S and M. Paridhavi. 2007 Crude Drug Technology. Universities Press, Hyderabad
2. Anonymous, 1948-1976.The Wealth of India 11 Vols.
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4. Evans, W.C. 1997. Pharmacognosy. Harcourt Brace & Co., Asios Pvt., Ltd.
5. Faroogi, A.A and Sreeramu, B.S.2001 Cultivation of Medicinal and Aromatic Crops, Universities press.
6. Gurdeep Chatwal 1983. Organic Chemistry of Natural Products. Himalaya Publishing house, Mumbai.
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BIOFERTILIZER AND PLANT RESPONSES

L	C
60	4

Objectives

- To enhance the understanding of the nutrient management and plant nutrient requirements
- To impart knowledge on the importance and mechanisms of the biological nutrient enhancement and availability to the plants.
- To reveal the application of potential biofertilizer agents currently used

Unit 1: Integrated Plant Nutrient Management (12 hours.)

Biofertilizers - classification, potential to improve crop production, chemically fixed Nitrogen versus biologically fixed nitrogen, and synergistic interaction between biofertilizing agents. Biofertilizing agents and plant disease control. Brief account of beneficial microorganisms – *Rhizobium, Azospirillum*, *Azatobacter* and mycorrhiza.

Unit 2: Nitrogen Fixation (12 hours.)

Historical review, biochemistry and regulation of biological nitrogen fixation, factors affecting nitrogen fixation, key organism fixing nitrogen - *Rhizobium, Azospirillum* and *Frankia*

Unit 3: Phosphate Solubilizing Microorganisms (12 hours.)

Phosphate fixation and solubilization in different soils. Factors affecting phosphate solubilization - mechanisms of action and role of acids. Biological phosphorus solubilization and effect on crop yield. key P-fixing fungal and bacteria with special emphasis on mycorrhiza.

Unit 4: Biofertilizer Application and Evaluation Techniques (12 hours.)

Different methods of biofertilizer inoculation - seed inoculation, top dressing of biofertilizers, granular biofertilizers, frequency of inoculation, liquid inoculation of biofertilizers, culture pellet, and methods of application of other biofertilizers. Preparation and use of inoculant - *Azatobacter*, *Azospirillum*, mycorrhizae, and *Rhizobium*. Role of humus in influencing the biofertilizer inoculation.

Unit 5: Crop Response to Biofertilizers (12 hours.)

Influence of symbiotic nitrogen fixation, *Azatobactor*, *Azospirillum*, and mycorrhizae in irrigated and dry crops and fodder crops. Factors affecting crop response to biofertilizers, interaction effect of microbial strains, effect of nutrient interactions, interaction of inoculants with other nutrients, multi-microbial inoculation and compatibility between biofertilizers and chemical fertilizers.

REFERENCES

1. Rai, M.K. (2006). Handbook of Microbial Biofertilizers, the Haworth Press, Inc
2. Kannaiyan, S. 2002. Biotechnology of Biofertilizers. Springer Netherlands, p.376.
3. Dubey, R.C. and Maheshwari, D.K. 2013. A Textbook of Microbiology (Revised edition). S. Chand & Company Ltd., New Delhi
4. Relevant Journal papers & Reviews

SOIL FERTILITY AND PLANT NUTRITION

L	C
60	4

Objectives

- To introduce the student with the problems of soil plant nutrient availability and the ways to manage and improve the productivity.
- To impart knowledge on the essentiality of the key elements of plant nutrition and the ways to enhance their availability in soil.
- To introduce the biological method of enhancing the nutrient availability and plant uptake

Unit 1: Soil as a medium for plant growth (12 hours.)

Abiotic and biotic elements of soils, formation of soil, classification and soil profiling. Characteristics and impact of acidic, saline, and alkaline soils on crop productivity. Importance of C: N ratio and pH in plant nutrition.

Unit 2: Soil fertility and productivity (12 hours.)

Soil properties on nutrient availability, definition of soil fertility in terms of productivity, soil types in wild and agrarian systems, soil patterns and agricultural regimes in Tamilnadu. Factors affecting soil fertility. Essential plant nutrients- NPK other major and minor nutrients, chelates. Classification of nutrients based on utilization and metabolic functions in plants. Criteria of essentiality of elements.

Unit 3: Plant Essential Nutrients (12 hours.)

Essential plant major and minor nutrient elements - functions, deficiency systems, biogeochemical cycles, transformations and availability. Effective consumption of nutrients, plant-microbe interface interactions in soils, positive and negative plant to plant interactions, changes in water table and its consequences.

Unit 4: Influence of microbes on plant nutrition (12 hours.)

Role of microorganisms in organic matter decomposition, and humus formation. Nitrogen fixation and cycling, phosphorus mobilization, calcium and potassium uptake and transport. Key microorganisms of nitrogen and phosphorus turnover in soil.

Unit 5: Fertilizer application (12 hours.)

Use of fertilizers, manures, mulch and bio supplements, concept of organic farming, and significance of green manure. Agricultural applications and dispensation of fertilizers- Methods of fertilizer application- solid and liquid forms of fertilizer application and their merits and demerits. Comparison of chemical and biological fertilizers on the basis of definition, application and crop protection potential. Analytical methods for soil nutrients.

REFERENCES

1. Western Fertilizer Handbook (9th edition). 2002. California Plant Health Association, Sacramento, Ca.
2. Brady, N.C. and R.R. Weil. 2005. The Nature and Properties of Soils (14th Ed.) Prentice-Hall, Inc.
3. Rai, M.K. (2006). Handbook of Microbial Bio fertilizers, the Haworth Press, Inc.
4. Benton Jones, Jr. J. 2012. Plant Nutrition and Soil Fertility Manual (Second Edition) CRC Press.
5. Journal review and research articles.

ECOLOGY, BIODIVERSITY AND SUSTAINABILITY

L	C
60	4

Objectives

- To gain knowledge on the biogeography, ecosystem diversity and biodiversity hotspots of India.
- To understand the concepts of vegetation analysis
- To understand the reasons for the loss of habitats/biodiversity and learn to find solutions to minimize degradation.
- To understand the need for the sustenance of habitats including man-made ones and conserve them for the benefit of humankind.
- To be aware of the existing social issues and the laws enforced to tackle the issues.

UNIT - I Biodiversity: (12 hrs)

Introduction, definition, genetic and species diversity. Ecosystem diversity - Aquatic: ponds, lakes, streams, rivers, estuaries, oceans, desert ecosystem, grassland ecosystem, forest ecosystem, insular species diversity.

UNIT - II Biodiversity of India (12 hrs)

India as a Megabiodiversity nation, Biogeographical classification of India, Biodiversity hotspots of India, Eastern Himalaya, Western Ghats, Eastern Ghats, Deccan Plateau, Gulf of Mannar, Andaman and Nicobar Islands. **Threats to biodiversity:** Habitat loss - Causes, effects and solutions; Poaching of wildlife - Causes, effects and solutions; Man-wildlife conflicts - Causes, effects and solutions; Endangered and endemic species of Peninsular India.

Unit-III: Vegetation Organisation and Diversity Analysis (12 hours)

Concepts of species, population and community; analysis of communities; community coefficients, inter specific associations, and concept of ecological niche; temporal and seasonal changes; island biogeography, and mangroves.

Ecophysiology and Diversity Analysis - Conceptual introduction; plant functional traits; phenological studies and their importance; analysis of density, species richness and diversity of plants; diversity indices; ecological genetics.

UNIT–IV Food and Agricultural resources and their conservation: (12 hrs)

Centres of origin of cultivated plants, Wild relatives of cultivated plants, Agriculture and food production, Agriculture and ecosystem degradation, Impacts of modern agriculture on environment - effects of fertilizers, pesticides, water logging and salinity, Sustainable

agriculture and food production. Role of FAO.

UNIT – V Social issues and the environment: (12 hrs)

From unsustainable to sustainable development, Environmental ethics: issues and possible solutions, Consumerism and waste products, Environment Protection Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public awareness. KYOTO protocols.

References

1. Annamalai, R. 2004. *Tamil Nadu Biodiversity Strategy and Action plan. Wild Plant Diversity*. Government of Tamil Nadu, Chennai.
2. Chapman, J.L. and Reiss, M.J. 1995. Ecology: Principles and Applications. Cambridge University Press, Cambridge.
3. Chhatwal, G.R. 1998. Encyclopaedia of Environmental Biology. Anmol Publications Pvt., Ltd. New Delhi.
4. Daniels, R.J.R. & Krishnaswamy, J. 2009. Environmental Studies. Wiley, India.
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6. Gleason, H.A. & Cronquist, A. 1964. The Natural Geography of plants. UniversityPress, New York.
7. Groom Bridge, B. 1995. Global Biodiversity. Chapman & Hall, London.
8. Krishnamurthy, K.V., Murugan, R. & Ravikumar, K. 2014. Bioresources of the Eastern Ghats - their conservation and management. Bishen Singh Mahendra Pal Singh, Dehra Dun.
9. Kumaresan, V. and Arumugam, N. 2015. Plant Ecology and Phytogeography. Saras Pub., Nagercoil.
10. Odum, E.P. & Barrett, G.W. 2005. Fundamentals of Ecology, 5th Edition, Affiliated East West Press Pvt. Ltd., New Delhi.
11. Odum, E.P. 1971. Fundamentals of ecology. W.B. Saunders Company, London.
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13. Schulze ED, Beck E, Muller-Hohenstein K. 2005. Plant Ecology, First edition, Springer, Heidelberg, Germany
14. South Wick, C.H. 1976. Ecology and the Quality of our Environment. D. Van Nostrand Company, New York.
15. Turk, J. 1985. Introduction to Environmental Studies, 2nd Edition. Saunders CollegePublishers, Japan.

TAXONOMY OF ANGIOSPERMS

L	C
60	4

Objectives

- To improve the understanding of the taxonomy of angiosperms and its need
- To instill the significance of angiosperm taxonomy and its importance in conservation
- To prepare the students to become a researcher in angiosperm taxonomy

Unit I: Origin and evolution of Angiosperms (10 hours)
Ascent of angiosperms in geological time scale, major sites of origin. Theories with respect to time, place possible ancestors

Unit II: Plant nomenclature (13 hours)
Binomial Nomenclature, ICBN to IUCN; Methods of Botanicsal name(Latin)-Plant identification: Herbarium taxonomy, Botanical gardens, Taxonomic literature, Indented and Bracketed keys; Taxonomic hierarchy - Major categories, minor categories, species concept; Taxonomic evidences - Morphology, Anatomy, Palynology, Embryology, Cytology, Photochemistry, Genome analysis and Nucleic acid hybridization**.**

Unit III: Plant systematics and classification (13 hours)
Pre Darwinian Classification Based on form relationship (Benthem and Hooker); Post Darwinian classification Engler and Prantl, Bessey's, Hutchinson, Takhtajan and Cronquist; Recent modifications : Dahlgren's system of classification; Biosystematics Concept, aims and objectives, categories, methods in biosystematics, Ecotypic variations, scope and limitations, comparison of classical taxonomy and biosystematics; Angiosperm Phylogeny Group IV**.**

Unit IV: Numerical Taxonomy (12 hours)
Phenetic methods in taxonomy (taxometrics), principles, construction of taxonomic groups, OUTs, unit character, measurement of resemblances, cluster analysis, phenons and ranks, discrimination, nomenclature and numerical taxonomy, applications, merits and demerits, cladistics and cladogram, parsimony analysis, cladistics and classification

Unit V: Chemotaxonomy (12 hours)
Significance of chemotaxonomy, classes of compounds and their biological significance, uses of chemical criteria in plant taxonomy, protein and taxonomy, seed proteins, serology and taxonomy, application of serological data in systematic.

REFERENCES

1. Dunn G, Everitt ES. 2012. An Introduction to Mathematical Taxonomy, Dover Publications, New York
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PLANT ANATOMY AND REPRODUCTIVE BIOLOGY

L	C
60	4

Objectives:

1. Understand the types of tissues and their organization.
2. Compare the tissue components of vegetative and reproductive parts of a plant.
3. Principles of histochemistry and mothods of localization of important chemical constituents.

Unit I Meristems

Types: Apical, lateral and intercalary. Tissue system: simple and permanent tissues. Complex tissues- xylem and phloem. vascular cambium origin, structure and development, seasonal activity of cambium, factors affecting cambial activity. **(12 hrs)**

Unit II stem anatomy:

Structure of a typical young dicot stem, normal secondary growth in a dicot stem. Leaf anatomy : structure and ontogeny of a dicot leaf, petiole anatomy. Anatomy of reproductive structure flower bud and mature flower. Nodal anatomy – Uni, tri and multilacunar node. **(13 hrs)**

Unit III Reproductive Biology

Floral structure, Pollination types – anemophily, hydrophily entemophily, ornithophily and chaerapterophily. Pollen pistil interaction and significance of the structure of style and stigma. **(10 hrs)**

Unit IV External secretory structures

Trichomes and glands, Nectaries, Hydathodes Internal secretory structures : secretory cells, secretory cavities and canals, laticifers. **(10 hrs)**

Unit V Histochemistry

Histochemical localization of cellular components - starch, Proteins Nucleic acids and lipids. Phytochemistry - basic concepts. Qualitative tests for alkaloids flavonoids, saponins, tannins, terpenoids and glycosides. **(15 hrs)**

References:

1. Eames A. J. and Mac Daniels L. H., 1990. An introduction to Plant Anatomy Tata McGraw Hill Publishing Company, Bombay-New Delhi. (Unit I & II).
2. Foster and Gifford .1967. Comparative morphology of vascular plants. Second edition. Valkis Feffer and Simons pvt. Ltd. Bombay.
3. Bhojwani,S.S. and Bhatnagar, S.P. 2005. Embryology of Angiosperms. vikas publishing house Pvt. Ltd., New Delhi. (Unit IV&V)
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10. Krishnamurthy, K.V. 1988. Methods in Plant Histochemistry. Viswanathan Printers Publishers Ltd., Chennai.

ALGAL TECHNOLOGY

L	C
60	4

Objectives:

- **To understand the concept and life cycle of algae.**
- **To learn the methods and approach towards the eco friendly aspects.**
- **To gain an insight on the various advancement in algal technology**

Unit:I - General account (12 Hrs)

Introduction: General account- Distribution, resources of algae. Classification of Algae (Fritsch,1935 &1945;Chapman and Chapman,1973;and Sybil and Parker,1981).Taxonomic Key for identification of economically important algae – Intended & Bracketed keys. Identification of algae in the field. Reseacrh centres of algae-Indian algalogists and their contribution: F.Boergeson. M.O.P Iyengar (1886-1963), M.S.Randhawa (1932-1959). and T.V.Desikachary (1919-2005) Role of Centre for Seaweed Herbarium & Marine Algal Research Station (MARS).

Unit: II- Structure and Reproduction of Algae (12 Hrs)

Structure and reproduction.- Range of Thallus structure , Patterns of reproduction and life cycle. Cell structure and oganelles: Fine structure and functions. Chemical composition of marine algae-Macro & Micromolecules. Economic Importance of Algae.

Unit-III- Common Algal Pigments (12 Hrs)

Introduction- Common Algal Pigments : Structure and propertiesof some important algal pigments -Phycoerythrin, Phycocyanin, Beta-carotene, Chlorophyll and Fucoxanthin. Extraction of Algal Pigments and Role of Algal Pigments- Dyes and Colorants from Algae: Textile dyeing- Chlorophyll (*Caulerpa taxifolia.)* and Pharmaceutical dyeing-anthocyanin(*Spirulina sp.*) .

Unit-IV- Extraction, Processing and uses of Nutraceuticals (12 Hrs)

Phycocolloids: Agar-agar (*Gelidiella sp.& Gracilaria sp.*), Carageenan (*Hypnea* sp. & *Eucheuma* sp.), Algin (*Sargassum sp. & Padina sp*.,) Omega-3 polyunsaturated fatty acids (*Nannochloropsis)*. Nutraceutical tablets & tonic from *Spirulina sp.* and β-Carotene (*Dunaliella sp*.).

Unit-V- Commercial products from algae: (12 Hrs)

Preparation and applications of the Following: Salad & Soup (*Ulva, Caulerpa*) Jelly, Candy, Gelatin, Food thickners, Sushi, (*Gracilaria sp.*) Tooth paste (Carageenan- *Euchuma sp.*). Seaweed Liquid Fertilizer (*Sargassum sp*.), Biomedicine: Caulerpin, Caulerpicin (*Caulerpa* sp.) and Heparin (*Grateloupia sp.)*

Text Books :

1. Ashutosh Kar (2010) . Chemistry of Natural Products, Vol. 1 CBS Publishers and Distributors Pvt Ltd, e-book.
2. Boergeson,F.(1938). Contributions to the South Indian marine algal flora.III. J. Indian Bot.Soc.17:205 -242.
3. CMFRI Bulletin:40., (1998). Seweed culture, Processing and utilization, Tatapuram, Cochin.
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7. Khattar, J.I.S., Singh, D.P., Kaur, (2009) Algal Biology and Biotechnology, - Microalgae: A source of natural colours, Edition: 1, I. K. International Publishing House Pvt. Ltd. New Delhi,
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10. NIIR Board of Consultants & Engineers.. ISBN: 8178330326.Code: NI160. Pages: 448. Published: 2005. The Complete book on Natural Dyes & Pigments. Publisher: Asia Pacific Business Press Inc. *e-book*..
11. *Pandey B.P.,* (2000). Revised edition, *Text Book* of Botany *Algae*, *S.Chand* &. Company, New Delhi .
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BRYOPHYTE SYSTEMATICS AND EVOLUTION

L	C
60	4

Objectives

- To gain knowledge on the origin, evolution and distribution of bryophytes including fossil evidences globally.
- To have a knowledge on habitat preferences, diversity of bryophytes and factors influencing their growth.
- To have a brief knowledge on the morphology, anatomy and life-cycle of bryophytes.
- To be aware of the factors responsible for their loss and find measures to minimize them.

UNIT - I

Origin and evolution: Origin and distribution, Fossil bryophytes, Evolution of gametophytes, Evolution of sporophytes, Primitive and advanced features of bryophytes. **(12 hrs)**

UNIT-II

Diversity: Classification of bryophytes, Diversity, Habitat diversity, Factors influencing the growth of bryophytes, Ecological adaptations. **(12 hrs)**

UNIT-III

Mosses: A comparative study of the morphological and anatomical features of Sphagnales, Polytrichales, Fissidentales, Syrrhopodontales, Funariales, Eubryales, Hookeriales and Hypnobryales. **(12 hrs)**

UNIT-IV

Liverworts: Calobryales, Sphaerocarpales, Marchantiales, Metzgeriales Jungermanniales and Anthocerotales. Economic importance of bryophytes. **(12 hrs)**

UNIT-V

Special features: Life-cycle of bryophytes, types of sporogonia/elaters, gemmae/receptacles, calyptrae and operculum and peristome teeth. **(12 hrs)**

References

1. Cavers, F. 1981. The Interrelationships of the Bryophyta. Indian report S.N. Technico (Book House), Patna.
2. Chopra, R.N. & Kumar, P.K. 1988. Biology of Bryophytes. Wiley Eastern Ltd., New Delhi.
3. Daniels, A.E.D. & Daniel, P. 2013. The Bryoflora of the Southernmost Western Ghats,

India. Bishen Singh Mahendra Pal Singh, Dehra Dun.
4. Puri, P. 1981. Bryophytes. Atma Ram & Sons, New Delhi.
5. Watson, E.V. 1980. British Mosses and Liverworts. Cambridge.

ACWBY13- **ETHNOMEDICINE**

L	C
60	4

- To have an insight into the various Indian Systems of medicine.
- To have a knowledge on the plants used in these systems.
- To understand the ethical values of plants involved in these systems.
- To develop methods of conservation of medicinal plants.

Unit-1 Ethnomedicine(12 hrs)

Definition, role of tribal communities in Ethnomedicine. Historical account of medicinal plants in India. Classification of medicinal plants on the basis of morphological structure viz. leaf, root, stem, rhizome, flower, fruits and seeds. Religious values of plants, faith and mythology, folk songs, plants used in rituals, tribals and medicinal plants, Holy plants in ethno medicine.

Unit-2 Distribution and Status(12 hrs)

Medicinal plants in general, distribution in Western Ghats and Eastern Ghats. Medicinal plants of Tamil Nadu: Endemic, rare and endangered species of medicinal plants.

Unit-3 Conservation(12 hrs)

Collection and conservation of medicinal plants. Sacred groves, Herbal farms, Nurseries, Medicinal gardens, Plants in Temples, Churches and Mosques. A general account of active principles found in the medicinal plants of *Aegle, Coriandrum, Cuminum, Piper, Brassica, Catharanthus, Artemisia, Coleus, Trichopus, Wrightia, Azadirachta and Taxus.*

Unit-4 Systems of Medicine(12 hrs)

History of Ayurvedic medicine, Ranges of Ayurveda, Significance and plants used in Ayurveda. Principles of Unani medicine, diagnosis and mode of treatment, Unani approach to common ailments. Difference between Ayurvedic and Unani medicines, safety measures in Unani medicines and plants used in Unani system.

Unit-5 Herbal remedies for Gynaecological morbidity, plants in the treatment of diabetes, herbal remedies for liver diseases, Plants in the treatment of skin diseases, antivenomic and antitoxic plants. **(12 hrs)**

Reference Books

1. Gurdeep Chatwal, 1983. Organic chemistry of Natural Products, Himalaya Publishing House, Mumbai.
2. Jean Bruneton, 1999. Pharmacognosy, Second Edition, Lavoisier Publishers, Inc. USA.
3. Kokate, C.K., Purohit, A.P and Gokhale, S.R. 2004. Pharmacognosy, Nirali Prakashan

Publications, Pune.
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ACWBY14 - **MARINE BOTANY**

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OUTCOMES

- Students will be introduced to marine and estuarine environments
- Students will become familiar with the major micro- and macro- algal groups and marine vascular plants.
- Students will appreciate the roles played by algae, seagrasses and aquatic vascular plants in aquatic ecosystems.
- Students will become aware of how natural events and human activities affect coastal habitats

UNIT: I **(12 hrs)**

Marine plant groups and Organisms – Brief account on Marine Phytoplankton – Seaweeds, Seagrasses and Mangroves – Corals and coral reefs. Mangroves – adaptations of marine plants.

UNIT: II **(12 hrs)**

Marine Ecology – Physical, chemical and biological characteristics of marine water. Zonations in the oceans (Horizontal and vertical) - Dead zones (Annoxia and Hypoxia) - Tides and their importance.

UNIT: III **(12 hrs)**

Photosynthesis of algae (Micro and macro) in sea – Photosynthetic pigments – carbon fixation – Photosynthetic rate – C3 and C4 characters in algae. Photosynthesis of mangroves – carbon fixation – Photosynthetic enzymes – accumulation of free amino acids – photorespiration – Nutrition – Salinity regulation and Metabolism of Seaweeds and Mangroves and their methods of regeneration – Biogeochemical role of algae.

UNIT: IV **(12 hrs)**

Seaweed Polysaccharides – Commercial and economical products of Seaweed (Agar, Algin and Carrageenan) and Low molecular weight compounds in algae – Methods of collection and preservation of Marine algae – Commercial cultivation of seaweeds (Traditional and Recent methods) – Application and uses of Seaweeds - Economic importance of seaweeds.

UNIT: V **(12 hrs)**

Seaweed, Sea grasses, Mangroves and Coral reefs research in India and World. Marine Pollution – human Impact - Conservation strategies of Marine vegetation - Use of Remote sensing techniques in mapping of marine vegetation with GIS.

REFERENCES

1. **Jackson, D.F. 1972.** Algae and Men. Plenum Press.
2. **Krishnamurthy, V. 1985.** Marine Plants. Seaweed Research and utilization Association, madras.
3. **Chapman, V.J. 1976.** Coastal Vegetation. Pergamon press. New York.
4. **Daves, C.J. 1985.** Marine Botany Physiology and Ecology of Seaweeds.
5. **Dawson. 1960.** Marine Botany.

VASCULAR CRYPTOGAMS

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60	4

OUTCOME

- An understanding the diversity, life-cycle patterns and major evolutionary trends of Pteridophytes and gymnosperms.
- An understanding of the diversity of pteridophytes and gymnosperms
- An understanding of the evolution of pteridophytes and the fossilization process.

UNIT: I General characters of Pteridophytes (12 hrs)

General life cycle pattern of homosporous and heterosporous pteridophytes. General ecology of Pteridophytes. Contributions of Indian Pteridologists.

UNIT: II Pteridophyte classification (12 hrs)

A R Smith *et al.* General morphological, anatomical and reproductive characters of major classes of pteridophytes.

UNIT: III Evolution (12 hrs)

Cytological evolution in pteridophytes; apogamy and apospory; mechanism of diplospory in apogamous ferns (Dopp and Manton, Braithwaite system).

UNIT: IV Steels (12 hrs)

Stelar types and stelar evolution, sporangial/soral types and sporangial/soral evolution in pteridophytes.

UNIT: V Pteridophytes of India. (12 hrs)

Pteridophytes in India:- Rare and endangered species in Western Ghats, South India. Medicinal pteridophytes; Conservation of pteridophytes in India.

REFERENCES

1. **Sporne, K.R. 1985.** The Morphology of Pteridophytes, Hutchinson & Co, London.
2. **Pandey, B.P. 1978.** Pteridophyta. S. Chand & Company Ltd., New Delhi.
3. **Vashista, P.C. 1997.** Pteridophyta. S. Chand and Company Ltd., New Delhi
4. **Rashid, A. 1990.** An introduction to Pteridophyta. Vikas Publishing House Pvt. Ltd., New Delhi.
5. **Manickam, V. S. & Irudayaraj, V. 1992**. Pteridophyte Flora of the Western Ghats, South India. BI Publications, Pvt. Ltd. New Delhi.

6. **Manickam, V. S. & Irudayaraj, V. 2003.** Pteridophyte Flora of Nilgiris, south India. Bishen Singh & Mahendra Pal Singh. Dehradun, India.
7. **Nayar, B. K. & Kaur, S. 1971.** Gametophytes of homosporous ferns. The Bot. Rev. 37: 295-396.
8. **Pullaiah, T. 2003.** Pteridophytes in Andhra Pradesh India. Daya Publishing House, India.
9. **Smith *et al.*, 2006.** A classification of extant pteridophytes. *Taxon* 55(3): 705-731.
10. **Schneider *et al.*, 2016.** A community-derived classification for extant lycophytes and ferns. The Pteridophyte Phylogeny Group. *J. Syst. & Evol*. 54: 563-603.

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI-12
Affiliated colleges and Autonomous colleges

M.Phil. CHEMISTRY PROGRAM FROM THE ACADEMIC YEAR 2018-2019

Preamble

M.Phil is a research oriented program. After completing their Masters in Chemistry or equivalent will opt for pursuing research either directly or after completing the above program. The program is useful for research students to evaluate and identify the research problems which is related to social and economical valuable issues to the society.

Objectives

After studying the M.Phil. program, the students will be able to

i. Introduce the purpose and importance of research for future development.
ii. Know the different types of literature search and indexes.
iii. Understand the error analysis, correlation methods and computer application
iv. Enrich the knowledge in various types of spectral techniques and scientific analysis.
v. Develop their skills for carryout the project
vi. Make awareness in social and industrial relevant issues
vii. Expose to present their findings in national and international seminars and conferences.

Outcome

After completing the M.Phil program the students will be able to

i. Pursue research program
ii. Qualify as Chemist/Scientist in various industries and research institutions

SEMESTER – I

Sl. No.	NAME OF COURSE	COURSE	
		Hrs/ week	Credits
1	Research and Teaching Methodology	4	4
2	Advance Scientific techniques in chemical analysis	4	4
3	Project oriented elective course	4	4

SEMESTER – II

4	Project work, dissertation and Viva-voce	-	12
Total			24

Paper-I

RESEARCH AND TEACHING METHODOLOGY

No. of Hrs – 4 / Week **Credits - 4**

Objective

1. *To introduce the purpose and importance of research for future development.*
2. *To know the various indexes and abstracts in science and technology as a source of all information in chemistry.*
3. *To learn the ways of carrying out literature search for current awareness and for the retrospective survey.*
4. *To know the methodology of writing thesis and journal articles.*
5. *To know about the teaching methodology for teaching the scientific concepts and techniques to students*

Unit –I : Scientific Research (12hrs.)

Introduction to Research, Selection of a research topic, reviewing the literature, preparing the proposal and design of study Experimentation and interpretation of results. Formation, testing and rejection of hypothesis. Preparation and presentation of reports, dissertation and thesis writing.

Unit-II : Chemical Literature (12hrs.)

Primary and secondary literature: Journals, Patents, Reviews, Chemical abstracts, treatises, monographs and online journals. Web browsing for Research. ASAP alerts, CA Alerts, Scifinder, Chemport, Science direct, STN international, Journal home pages. **Impact factor, citations and h-index. Scopus, Web of Science and Google scholar.**

Unit-III: Error Analysis (12hrs.)

Limitation of analytical methods, accuracy, precision & minimization of errors – systematic and random errors and reliability of results – Mode – Median – Mean – Standard deviation- Variance & Covariance, normal distribution and the normal probability curve.

Unit-IV: Correlation methods & Non-parametric tests (12hrs.)

Scatter diagram and linear regression line: Spearman rank order correlation, Pearson's product moment correlation - Correlation co-efficient.

Non-parametric tests - χ^2 test, Median test, Mann-Whitney test, Sign test, Wilcox on matched-pairs signed ranks test.

Unit-V: Methodology of Teaching (12hrs.)

Teaching- Objectives of Teaching, Phases of Teaching – Teaching methods: Lecture Method, Discussion Method, Discovery Learning, Inquiry, Problem Solving Method, Project method, Seminar – Integrating ICT in Teaching: Individualized Instruction, Ways for Effective Presentation with Power Point- Documentation – Evaluation: Formative, Summative & Continuous and comprehensive Evaluation- Later Adolescent Psychology: Meaning, Physical, Cognitive, Emotional, Social and Moral Development – Teaching Later Adolescents

References:

1. Rajammal P. Devadas, A Handbook of Methodology of Research, S.R.K. Vidyalaya Press, Chennai, 1976.
2. J. Anderson, B.H. Durstan and M. Poole, Thesis and assignment writing, Wiley Eastern, New Delhi, 1977.
3. R.O. Butlet, Preparing thesis and other manuscript.
4. R. L. Dominoswki, *Research Methods*, Prentice Hall, 1981.
5. J. W.Best, *Research in Education*, 4th ed. Prentice Hall of India, New Delhi, 1981.
6. H. F. Ebel, C. Bliefert and W.E. Russey, *The Art of Scientific Writing*, VCH, Weinheim, 1988.
7. Joseph, A. *Methodology for Research*; Theological Publications: Bangalore, 1986.
8. Sampath, K., Panneerselvam, A. & Santhanam, S. (1984). Introduction to educational technology. (2nd revised ed.). New Delhi: Sterling Publishers.
9. Sharma, S.R. (2003). Effective classroom teaching modern methods, tools & Techniques. Jaipur: Mangal Deep
10. Vedanayagam, E.G. (1989). Teaching technology for college teachers. New York: Sterling Publishers.

Paper-II

ADVANCED SCIENTIFIC TECHNIQUES IN CHEMICAL ANALYSIS

No. of Hrs – 4 / Week **Credits - 4**

Objectives

1. *To master the basic principles of spectroscopy to apply for structural elucidation.*
2. *To learn the methods of characterizing compounds by spectroscopic techniques.*
3. *To learn the various instrumental methods studying a given compound.*
4. *To learn the separation techniques for organic and inorganic compounds.*
5. *To learn about industrial analytical processes.*

Unit –I : Absorption Spectroscopy (12hrs.)

Infrared and Raman Spectroscopy: FT-IR, basic principles, quantitative IR, resonance Raman and laser Raman spectroscopy, applications of IR and Raman spectroscopy to organic and inorganic compounds.

Electronic Spectroscopy: term symbols, spin-orbit coupling in free ions, electronic spectra of O_h and T_d complexes, charge transfer transition, structural evidence from electronic spectra.

Unit II: Applications of Advanced Organic Spectroscopy (12hrs.)

NMR: Basic principles of two-dimensional NMR spectroscopy – HOMOCOSY, HETCOSY and NOESY spectra and their applications – use of INEPT and DEPT methods and their applications.

Mass: Molecular ions, isotope peaks, fragmentation pattern – McLafferty rearrangement - measurement techniques (EI, CI FI, FD, FAB, SIMS, MALDI) – M^{+1} and M^{+2} ions – calculation of molecular formula from P_{M+1} and P_{M+2}

Road-map problems covering UV, IR, ^{1}H-NMR, ^{13}C-NMR and mass spectral data.

Unit-III: Spectroscopy (12hrs.)

Nuclear Quadruple Resonance Spectroscopy: effect of magnetic field on the spectra, electric field gradient and molecular structure, structural elucidation of inorganic and coordination compounds.

Electron Paramagnetic Resonance Spectroscopy: hyperfine splitting in isotropic systems; epr spectra of systems with more than one unpaired electrons-Kramer's degeneracy, zero field

splitting, epr of triplet states, anisotropy in *g*-value, anisotropy in hyperfine splitting, nuclear quadrupleinteraction; applications of epr to organic and inorganic compounds.

Mossbauer Spectroscopy: interpretation of isomer shifts, quadruple and magnetic interactions, Mossbauer emission spectroscopy, structural elucidation.

Unit IV: Diffraction & Surface Techniques: (12hrs.)

Principles and applications of XRD, Neutron and electron diffraction – Scanning electron microscopy (SEM)- Instrumentation – applications – surface area analysis, particle size determination – Scanning Probe Microscopes – Scanning Tunneling Microscopes – Atomic force microscopes (AFM) – Principle &applications.

Unit V: Electrochemical Techniques (12hrs.)

Polarography – Chronopotentiometry – Chronoamperometry – chronocontometry- Linear Potential Sweep voltametry – Cyclic Voltametry – ImpendenceMeasurements – AC Voltametry – Principles and their applications.

References:

1. Introduction to Nanoscience- Gabor. L, Hornyak. Joydeep Dutta CRC Press 2008.
2. L. Antropov, Theoretical Electrochemistry, Mir Publication, Moscow, 1972.
3. D.A. Skoog and J.J. Leary, Principles of Instrumental Analysis, 4th Edn., Saunders College Publishing, 1992.
4. D.A. Skoog, F.S.Holler, S.R.Crouch, Principles of Instrumental Analysis, 6th Edn., Thomson Brooks/cole, 2007.
5. A.K. Cheetham, P.Day, Solid State Chemistry: Techniques, Oxford University Press, Oxford, 1987.
6. G. E. Bacon, Neutron diffraction, Oxford Universtiy Press, Oxford, 1975.
7. R.S. Drago, Physical Methods in Chemistry, Saunders, 1999.
8. Spectrometric Identification of Organic Comounds – Silverstein, Bassler and Morril.
9. Organic Spectroscopy – William Kemp

Paper III - Elective Paper- 1

ADVANCED TOPICS IN ORGANIC CHEMISTRY

No. of Hrs – 4 / Week **Credits - 4**

Objectives

1. *To learn the various reagents and their application in organic synthesis*
2. *To study the retro synthetic analysis*
3. *To understand the concept of linear free-energy relationships*
4. *To know about the biochemical activities of amino acids and proteins*
5. *To study on the nucleic acids structure and function*

Unit I : Organic Reagents (12hrs.)

Gilman's reagents – DCC – Grignard reagents – crown ethers – NBS – BF_3 complexes – SeO_2 – 1, 3-dithiane, tri-n-butyl tin hydride – phase transfer catalysts – Wilkinson's catalyst.

Unit II: Retro synthetic Analysis (12hrs.)

Introduction to disconnections – one group disconnections – two group disconnections – peri cyclic reactions – Heteroatoms and heterocyclic compounds – small rings: three membered, four membered, and five membered.

Unit III: Advances in Linear Free-Energy Relationships (12hrs.)

An introduction to linear free-energy relationships (LFER) – the Hammett equation – the duality of substituent constants and the Yukawa-Tasumo equation – the general validity of the Hammett equation – deviations from the Hammett equation in its various forms; the separation of polar, steric and resonance effects – Taft's equations; the ortho-effect; application of LFER to organic reactions; Influence of solvent on organic reactivity; the reactivity-selectivity principle.

UNIT IV: Amino Acids and Proteins (12hrs.)

Structure and Classification – abbreviated names (1 letter and 3 letter) – Physical properties of amino acids – chemical properties – codons – Structure and importance of simple peptides like glutathione, Carnosine, anserine, vasopressin – Peptide antibiotics – gramicidin,

bacitracine, actinomycin D - Peptide synthesis – Acid chloride method – DCC method – Determination of primary structure of peptide – Identification of N-terminal amino acid – Barger's method – the DNP method – identification of C-terminal amino acid – Hierarchial representation of protein Primary, Secondary, tertiary and quaternary structures – Ramachandran plot.

UNIT V: Purine, Pyrimidine and Nucleic Acids (12hrs.)

Structure of Purines, Pyrimidines – Nucleoside – ribonucleoside, deoxyribonucleosides – nucleotides – ribonucleotides – deoxyribonucleotides – structure and functions of DNA - Watson and Crick model of DNA- Structure of types of RNA (m-RNA, t-RNA and r-RNA) – Nucleases – structure and function of DNA and RNA – polynucleotide – cyclic nucleotide – structure and function of cAMP, cGMP nucleoprotein – Types of DNA (A-DNA, B-DNA, Z-DNA)

References:

1. Reaction Mechanism and Reagents in Organic Chemistry – Gurdeep R. Chatwal
2. Designing Organic Synthesis: A Programmed Introduction to the Synthon Approach – Stuart Warren
3. N.B. Chapman and J. Shorter, Eds., Advances in Linear Free-Energy Relationships, Plenum Press, London, 1972.
4. J. Shorter, Correlation Analysis in Organic Chemistry – An Introduction to Linear Free-Energy Relationships, Clarendon Press, Oxford, 1973.
5. N.B. Chapman and J. Shorter, Eds., Correlation Analysis in Chemistry-Recent Advances, Plenum Press, New York, 1978.
6. J. Shorter, Correlation Analysis of Organic Reactivity, Research Studies Press, England, 1982.
7. Biochemistry, Lehinger J.CB S.Publishers,1993.
8. Biochemistry, U. Satyanarayana & U. Chakrapani, Books & Allied Pvt. Ltd, 1999.
9. Biochemistry — Lubert Stryer – W. H. Freeman and company, 4th Edn., New York, 1995.

Paper III -Elective Paper 2

CHROMATOGRAPHY

No. of Hrs – 4 / Week **Credits - 4**

Objectives

1. *To understand the chromatographic basic principles*
2. *To learn the thinlayer chromatographic techniques*
3. *To understand about the ion exchange concepts*
4. *To learn about the high performance liquid chromatography for organic analysis*
5. *To study about the gas chromatography technique for volatile and gas molecule analysis*

UNIT I: Chromatography (12hrs.)

Classification of Chromatography methods. Column Chromatography- Principles, experimental procedures, stationary and mobile phases, Choice of Solvent Systems, Separation techniques. Applications.

R_f values, Factors affecting R_f values, Experimental procedures, Choice of paper and solvent systems, developments of chromatogram. Detection of the spots. Ascending, Descending and Radial Paper Chromatography, Two Dimensional Chromatography –Applications**.**

UNIT II: THINLAYER CHROMATOGRAPHY (12hrs.)

Principles, factors affecting R_f values. Experimental Procedures, Choice of adsorbents and Solvents. Preparation of plates, development of the Chromatogram. Detection of the spots, advantages of thin Layer Chromatography over paper chromatography and Applications.

UNIT III: ION EXCHANGE CHROMATOGRAPHY (12hrs.)

Principle, ion exchange resins and their types- cation exchange resins, anion exchange resins, ion exchange equilibria, properties of ion exchange resins, ion exchange capacity and techniques – applications.

UNIT IV: HIGH PERFORMANCE LIQUID CHROMATOGRAPHY (12hrs.)

Introduction, instrumentation, stationary and mobile Phases. Mobile Phase – Composition. Column – Preparation, Cleaning –regeneration and Storage Conditions. Retention time- Types of HPLC. Applications.

UNIT V: GAS CHROMATOGRAPHY (12hrs.)

Principle, instrumentation choice of injectors, column and detectors - Programmed temperature chromatography, flow programming chromatography, gas-solid chromatography, and hyphenated techniques in chromatography- Applications of Gas chromatography.

REFERENCES:

1. Fundamentals of Analytical Chemistry – D.A.Skoog, D.M. West, F.J. Holler and S.R. Crouch – 2004; Thompson Asia Private Ltd., Bangalore.
2. Instrumental Methods of Analysis – B. K. Sharma, 2003; Goel publishing House, Meerut.
3. Contemporary Chemical Analysis - Judith F. Rubinson, Prentice Hall (India).
4. Instrumental Methods of Analysis Hobart H. Willard, Lynne L. Merritt Jr, John Dean, Wadsworth Publishing Co Inc; 7th Edn., 1988.
5. Thin Layer Chromatography- A laboratory Handbook, Ashworth, Stahl. E., 1st Edn., Springer-Verlag, 1969.
6. Dynamics of Chromatography - Principles and Theory, J. Calvin Giddings, CRC Press, 2002.
7. Principles of Instrumental Analysis, Douglas A. Skoog, F. James Holler, Stanley R. Crouch, 2006.

Paper III -Elective Paper 3

ADVANCED TOPICS IN PHYSICAL CHEMISTRY

No. of Hrs – 4 / Week **Credits - 4**

Objectives

1. *To study about the concept of Photochemistry*
2. *To understand the principles about the chemical kinetics*
3. *To learn about the thermodynamics behavior of systems in chemistry*
4. *To understand the physical characteristics of biomolecules*
5. *To understand the various concept of Analytical techniques*

Unit I: Advanced Photochemistry (12hrs.)

Artificial photosynthesis and solar energy conversion – Photo electrochemical cells – dynamics of excited state processes (excited state energy, redox properties, emission lifetime and its temperature dependence) in micelles, reverse micelles and biomembranes – Fluorescence – quenching and anisotropy concepts; fluorescence sensing – mechanism and applications; Radioactive decay engineering – metal-enhanced fluorescence and surface Plasmon-coupled emission.

Unit – II: Advanced chemical kinetics (12hrs.)

Experimental methods for fast reactions- temperature jump, pressure jump stopped flow and flash photolysis – pulse technique – short tube kinetics.

NMR studies in rate process - Enzyme kinetics of complicated systems – theory of diffusion controlled reactions.

Unit – III: Irreversible thermodynamics (12hrs.)

Internal heat & entropy production – relation of entropy production with flux & forces – phenomenological equation – Prigogine's principle of minimum entropy production at non-equilibrium stationary state.

Unit – IV: Biophysical chemistry (12hrs.)

Biomembranes (structure & function) – Active transport & passive transport – multiple equilibria – specific examples of multiple equilibria – Transport processes – general features of transport processes optical systems of rht e study of transport processes – self organizing systems

– (Micelles, lipids, cyclodextrins, liquid crystals, reverse micelles) their interactions and solutions properties.

Unit – V: Analytical techniques (12hrs.)

Thermal methods: TGA, DTA, DSC, Thermometric titration - Adsorption/desorption techniques: BET and EGME methods of determination of external and total surface area.

References:

1. K. Kalyanasundaram, Photochemistry in Microheterogeneous Systems, Academic Press, Orlando, 1987.
2. Extended irreversible thermodynamics – David Jon, Jose casas Vazques, 2012
3. Understanding Non-equilibrium Thermodyanmics – Geogy Lebon, David Jon- 02008
4. Chemical kinetics: Fundementals & New developments, E.T. Densov, Ergenii tinofeerich , 2003
5. Chemical Kinetics, Laidler
6. Biophysical chemistry Alan Cooper – 2011
7. Biophysical chemistry, James P. Allen – 2008
8. Fundamentals of Analytical chemistry – Douglas A. Skoog Donal M. west 2013

Paper III -Elective Paper 4

ADSORPTION AND CATALYSIS

No. of Hrs – 4 / Week **Credits - 4**

Objectives

1. *To study about the various adsorption process connected with catalysis process*
2. *To study about the preparation methods of adsorbents*
3. *To evaluate the physico chemical properties of adsorbent by spectral studies*
4. *To study about the vapour phase and liquid phase catalysis and adsorption parameters*
5. *To learn about the adsorption isotherms and product analysis*

Unit: I Adsorption & Catalysis (12hrs.)

Concept of adsorption – types of adsorption, monolayer and multilayer adsorption. Adsorption - activation energy and temperature relationships, different between adsorption and catalysis, catalysis - homogeneous catalysis, heterogeneous catalysis, Acid -- base catalysis.

Unit: II Methods of preparation (12hrs.)

Adsorbent - adsorbent preparation from plant materials, activated carbon preparation, synthetic adsorbent/catalyst - Molecular sieves – microporous & mesoporous molecular sieves – silicates, Aluminosilicates, Aluminophosphates – structure, acidic and basic sites.

Unit: III Spectral studies on Adsorbent (12hrs.)

Characterization of adsorbent and catalyst - X-Ray Diffraction (XRD), Fourier transform infrared spectroscopy (FT-IR), Differential thermal analysis(DTA) , Nuclear magnetic resonance spectroscopy (NMR), Temperature programmed desorption (TPD), Electron spin resonance spectroscopy(ESR) Scanning electron microscopy(SEM), BET Surface Area, pore size analysis.

Unit: IV Reactions & Factors (12hrs.)

Liquid phase - heterogeneous reaction conditions optimization - Temperature, pH, time and molar ratios. Vapor phase reaction, Regeneration of catalyst.

Adsorption – adsorption of dye molecules, metal ions, sugar molecules and other suitable molecules, conditions optimization – time, temperature, p^H, concentration and adsorbent dosage.

Unit: V Techniques (12hrs.)

Product analysis in catalysis reactions – Gas chromatographic technique, conversion and product selectivity.Interpretation of adsorption parameters - Adsorption kinetics, adsorption isotherms and adsorption thermodynamics.

References:

1. Environmentally stable adsorbent of tetrahedral silica and non tetrahedral alumina for removal and recovery of malachite green dye from aqueous solution, *J.Hazardous materials*, 157 (2008) 137-145.
2. Plant poisoning organic dyes adsorption on tomato plant root and green carbon from aqueous solution, *Desalination*, 249 (2009)1132-1138.
3. Film and pore diffusion modeling for the adsorption of direct red 81 on activated carbon prepared from balsamodendron caudatum wood waste, *Digest Journal of Nanomaterials and Biostructures*, Vol. 5, No 3, July 2010, p. 911 – 919
4. Plant toxic and non-toxic nature of organic dyes through adsorption mechanism on cellulose surface, *Journal of Hazardous materials*,189 (2011) 294–300.
5. Adsorption of cationic and anionic organic dyes from aqueous solution using Silica, *J. Environmental Science and Engineering*, volume 52, No.4 **(2010)** 361-366
6. Hazardous dyes removal from aqueous solution over mesoporous aluminophosphate molecular sieves with textural porosity by adsorption, Journal of Hazardous Materials 244– 245 (**2013**) 10– 20.
7. A Simple Method for the Synthesis of Thermally Stable Large Pore Mesoporous Aluminophosphate Molecular Sieves, Materials letters, 113 (**2013**) 93–95.
8. Aniline methylation over AFI and AEL type molecular sieves, *App. Catal*., Vol. 174, **1998**, 213.
9. Adsorptive removal of metanyl yellow on mesoporous Nickel aluminophosphate molecular sieves from aqueous solution, Asian J. of chemistry, vol. 24, no.12(2012), 5775-5778
10. Recent trends in catalysis**,** Narosa publication, 1st edition 2000.

Paper III -Elective Paper 5

NANOMATERIALS AND THEIR APPLICATIONS TO SOLAR ENERGY CONVERSION

No. of Hrs – 4 / Week **Credits - 4**

Objectives

1. *To study about the Nanomaterials*
2. *To study about the dye-sensitized solar cells*
3. *To learn about the Semiconductor and microemulsion (quantum dots)*
4. *To understand the Photochemistry and corrosion principles*
5. *To understand about the solar cell concepts*

Unit I: Nanomaterials (12hrs.)

Introduction to Nanoscience: Introduction- definition of Nanoscience, nanochemistry- classification of the nanomaterials

Synthesis of nanomaterials: Precipitative methods – hydrothermal and solvothermal methods - chemical methods - reduction methods – colloidal and micellar approach – sol-gel method – chemical vapor deposition method.

Specialized Nanomaterials: Metal oxide nanoparticles, semiconductor nanoparticles and core/shell nanoparticles

Unit II: Dye-sensitized solar cells (12hrs.)

Solar energy conversion and storage – photo electrochemical cells – dye-sensitized solar cells – design and fabrication - power conversion efficiency

Use of metal and metal-free dye sensitizers in photovoltaic devices.

Unit III: Semiconductor and microemulsion (quantum dots) (12hrs.)

Review of published literature – Water-soluble silica-coated semiconductor quantum dots – synthesis, characterization and properties.

Thickness-controllable silica coating of quantum dots – synthesis by microemulsion method and application in the growth of rice.

Unit IV: Photochemistry and corrosion (12hrs.)

Review of published literature – Silica coated cadmium sulfide nanocomposites – synthesis, structure, optic and its photo catalytic properties.

Zirconia-coated carbonyl iron particles – synthesis and corrosion study.

Unit V : Solar cell (12hrs.)

Review of published literature – Ruthenium (II) sensitizer in dye-sensitized solar cells using an organic dye as co-sensitizer – Fabrication and device characterization - photovoltaic performance.

Dye-sensitized solar cells - Co-sensitization strategy – electrochemical properties – Photo electrochemical performances – Electrochemical impedance spectroscopy – dark current measurement – Open-circuit voltage decay.

References

1. H. R. Allcock, Introduction to Materials Chemistry, John Wiley & Sons, Inc. Publication, 2008.
2. T. Pradeep, Nano: The Essentials, Tata Mc Graw-Hill, 2007.
3. A. Hagfeldt, *et al.* Chem. Rev., 2010, 110, pp. 6595–6663.
4. J. Gong, J. Liang, K. Sumathy, Renewable and Sustainable Energy Reviews, 2012, 16, 8, 5848-5860.
5. X. Chen, F. Liu, Q. Jiang, L. Sun, Q. Wang, J. Inorg. Organomet. Polym, 2012, 22:6-11.
6. A. Wang, Y. Zheng, F. Peng, J. Spectros. 2014, Article ID 169245, 1-5.
7. N. Gupta, B. Pal, J. Colloid and Int. Sci., 2010, 368, 250-256.
8. R. Chen et al. J. Colloid and Int. Sci., 2010, 342, 49-56.
9. U. Mehmood, I. A. Hussein, K. Harrabi, N. Tabet, G. R. Berdiyorov, RSC Adv., 2016, 6, 7897-7901.
10. L. Wei, Y. Na, Y. Yang, R. Fan, P. Wang, L. Li, Phys. Chem. Chem. Phys., 2015, 17, 1273-1280.

Paper III -Elective Paper 6

PHYTO-BIOSYNTHESIS AND APPLICATIONS OF METAL NANOPARTICLES

No. of Hrs – 4 / Week **Credits - 4**

Objectives

1. *To study about the Extraction and Isolation of natural products from Medicinal plants*
2. *To synthesis nanomaterial by using natural products*
3. *To understand the physico chemical properties of Nanoparticles*
4. *To utilize the nanoparticles for Biological Applications*
5. *To study the Nanoparticles application on Green catalysis*

Unit I - Extraction and Isolation of some Indian Medicinal plants (12hrs.)

i) Solid-Phase Extraction and LC−MS analysis of Pyrrolizidine Alkaloids in Honeys.

ii) Comparative study of phytochemical screening, antioxidant and antimicrobial capacities of fresh and dry leaves crude plant extracts of *Datura metel* L.

Unit II – Biosynthesis of Metal Nanoparticles (12hrs.)

i) Green synthesis of silver nanoparticles using *Ixora coccinea* leaves extract.

ii) Ultrasmall Copper Nanoparticles Synthesized with a Plant Tea Reducing Agent.

Unit III – Characterization of Nanoparticles (12hrs.)

i) Phytosynthesis of silver nanoparticles using *Coccinia grandis* leaf extract and its application in the photocatalytic degradation

ii) A facile synthesis of high optical quality silver nanoparticles by ascorbic acid reduction in reverse micelles at room temperature.

Unit IV – Biological Applications of Nanoparticles (12hrs.)

i) The green synthesis, characterization and evaluation of the biological activities of silver nanoparticles synthesized from *Iresine herbstii* leaf aqueous extracts

ii) In vitro evaluation of antioxidant and anticancer potential of *Morinda pubescens* synthesized silver nanoparticles.

Unit V – Green catalytic activity of Nanoparticles (12hrs.)

i) Catalytic Reduction of 4-Nitrophenol using Biogenic Gold and Silver Nanoparticles Derived from *Breynia rhamnoides*.

ii) Catalytic degradation of organic dyes using biosynthesized silver nanoparticles.

References

1. K. A. Beales, K. Betteridge, S.M. Colegate, J.A. Edgar. Journal of Agric. Food Chem. 2015, 63, 7421−7427
2. Tahiya Hilal Ali Alabri, Amira Hamood Salim Al Musalami, Mohammad Amzad Hossain, Afaf Mohammed Weli, Qasim Al-Riyami. Journal of King Saud University – Science 2014, 26, 237–243
3. Muthu Karuppiah, Rangasamy Rajmohan. Materials Letters 97 (2013) 141–143.
4. Aaron D. Brumbaugh, Katelyn A. Cohen, and Sarah K. St. Angelo. ACS Sustainable Chem. Eng. 2014, 2, 1933−1939.
5. Rajeswari Arunachalam, Sujatha Dhanasingh, Balasaraswathi Kalimuthu, Mani Uthirappan, Chellan Rose, Asit Baran Mandal. Colloids and Surfaces B: Biointerfaces 94, 2012, 226-230
6. Debabrata Singha, Nabajeet Barman, Kalyanasis Sahu. Journal of Colloid and Interface Science 413 (2014) 37–42.
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8. L. Inbathamizh, T. Mekalai Ponnu, E. Jancy Mary. Journal of pharmacy research 6 (2013) 32-38.
9. Abilash Gangula, Ramakrishna Podila, Ramakrishna M, Lohith Karanam, Chelli Janardhana, and Apparao M. Rao. Langmuir 2011, 27, 15268 – 15274.
10. V.K. Vidhu, D. Philip. Micron 56 (2014) 54–62.

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI

MASTER OF PHILOSOPHY – COMMERCE
For Affiliated Colleges (Full-Time) – CBCS

(Revised Effective from the academic year 2018-2019 and thereafter)

OBJECTIVES

To Provide Exposure to emerging issues in the area of Commerce

To Undertake Research Problems on the Contemporary Issues with Social Relevance

To Persuade to Undertake Independent Projects and Consultancy

Scheme of Examination (Revised)

SI.No	Semester	Subject	Credits	Hours / Week
1.	I	Core I – Research and Teaching Methodology	4	4
2.	I	Core II – Contemporary Functional Management	4	4
3.	I	Project Oriented Elective Course (Theory) – Professional Competencies	4	4
4.	II	Dissertation and Viva - Voce	12	-
		Total	24	-

PAPER-I
RESEARCH AND TEACHING METHODOLOGY

L	T	P	C
2	1	1	4

Objectives:

- To enable the students acquire knowledge on Research methods.
- To enable the students develop understanding of Research design.
- To enable the students apply their knowledge in carrying out research.
- To enable the students develop skills to undertake research in select areas.

Unit-I - Research Approach (12 L)

Research Approach - Research process-problem Identification-Research Designs-Principles-sample Design – Experimental Designs.

Unit-II – Sampling (12 L)

Sampling – Probability and Non- Probability sampling – Measurement and scaling – Scaling Techniques- multidimensional scaling – data collection – primary and secondary, data Preparation – Process: Editing,Coding,Classification,Tabualation.

Unit-III - Data analysis (12 L)

Data analysis – Testing of Hypothesis- Statistical Inferences- Parametric tests- t- test, Z-test, F-test, ANOVA – one way – two way – MANOVA -paired sign test - Non-Parametric test – Chi-Square test – U test - H test - Sign test; Factor analysis - Discriminate analysis- Multiple Correlation – Multiple Regression- statistical packages- SPSS – AMOS – Lisrel, Mendeley.

Unit-IV - Interpretation and Report Writing (12 L)

Interpretation and Report Writing - Steps in writing report, Layout of research Report – Types of Reports – mechanics of writing a research report – Ethics in report writing- Plagiarism

Unit-V – Methodology of Teaching (12 L)

Teaching – Objectives of Teaching, Phases of Teaching – Teaching Methods: Lecture Method, Discussion Method, Discovery Learning, Inquiry, Problem Solving Method, Project Method, Seminar – Integrating ICT in Teaching: Individualized Instruction, Ways for Effective Presentation with Power Point – Documentation – Evaluation: Formative, Summative & Continuous and Comprehensive Evaluation – Later Adolescent Psychology: Meaning, Physical, Cognitive, Emotional, Social and Moral Development – Teaching Later Adolescents.

Total: 60 L

Question Papers shall consist of questions in the proportion 60% Theory 40% Problem.

References:

1. Research Methodology: Methods and Techniques, C.R.Kothari, Gaurav garg, New Age International Publishers.
2. Business Research Methods – Donald Cooper & Pamela Schindler, TMGH, 9th edition.2016.
3. Business Research Methods – Alan Bryman & Emma Bell, Oxford University Press.2016.
4. Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002. An introduction to Research Methodology, RBSA Publishers. 2015
5. Kothari, C.R., 1990. Research Methodology: Methods and Techniques. New Age International. 418p.2015.
6. Sampath,K.,Panneerselvam, A. & Santhanam, S. (1984). Introduction to educational technology. (2nd revised ed.). New Delhi: Sterling Publishers.
7. Sharma,S.R.(2003),Effective classroom teaching modern methods, tools &techniques,Jaipur:Mangal Deep.
8. Vedanayagam, E.G, (1989), Teaching technology for college teachers, New York: Sterling Publishers.

PAPER-II

CONTEMPORARY FUNCTIONAL MANAGEMENT

L	T	P	C
4	0	0	4

Objectives:

- To enable the students acquire overall knowledge on functional management.
- To enable the students develop understanding of the components of functional management.
- To enable the students apply the acquired knowledge in solving the business issues.
- To enable the students develop skills in areas of functional management.

Unit-I - General Management (12 L)

General Management - Modern Management response to globalization-deregulated environment – paradigm shift in management principles- diversification and advance in Information Technology

Unit-II - Human Resources Management (HRM) (12 L)

Human Resources Management (HRM) - Managing diversity-Dual Career Management-Glass Ceiling- Quality of Work Life (QWL)-Outsourcing HR Activities-Ethical issues in HRM- Dimensions of E-HRM.

Unit-III - Financial Management (12 L)

Financial management- Portfolio Management- Determinants –Investors preferences-Efficient portfolios – Corporate Restructuring -Mergers and Acquisitions- Corporate governance.

Unit-IV - Marketing Management (12 L)

Marketing Management - Service Marketing- CRM- Ethics in Marketing- Social Marketing- E-Marketing- Global Marketing

Unit-V - Information Technology in Business (12 L)

Information Technology in Business - Business pressure- Organizational responses -IT Support at different Organizational levels- Telecommunication and Networks – Internet, Intranet and Extranet- Information System for the Enterprises (ERP).

Total: 60 L

References:

1. P.SubbuRao, Management Theory and practice; Himalaya Publishing House.2006.
2. K.Aswathappa, Human Resources Management Text and Cases; MC Graw Hill pvt Ltd.2015.
3. Bhabatosh Banerjee, Fundamentals of Financial Management; PHI learning pvt Ltd.2014
4. IM Pandey ,Financial Management,Vikas Publishing House pvt Ltd.2015.
5. Tejashree Patankar; Marketing Management; International Book House.2014.
6. Alexis Lean, Mathews Lean; Introduction to Information System; Tata MC Graw Hill pvt ltd.2014.

PAPER-III
PROFESSIONAL COMPETENCIES

L	T	P	C
4	0	0	4

Objectives:

- To enable the students acquire overall knowledge on Professional Competencies.
- To enable the students develop understanding on Professional Competencies.
- To enable the students apply the acquired knowledge Professional Competencies
- To enable the students develop skills of Professional Competencies.
- To enable the students to compete in the professional competitive examination.

Unit-I - Teaching Aptitude (12 L)

Teaching Aptitude- Modern methods of Teaching- Multimedia tools- Games and simulation relevant to the area of specialization

Unit-II - General Awareness (12 L)

General Awareness - Knowledge on Contemporary economic, social and Business issues- Reports on Industry and Trade analysis- People and Environment- Pollution and its impact on human life.

Unit-III – Communication (12 L)

Communication - Nature- Characteristics- types, barriers and effective classroom communication- Time Dynamics- visuals to improve verbs – Arts of Writing – Non verbal communication – word processing stations – Teleconferencing.

Unit-IV - Information Communication and Technology (12 L)

Information Communication and Technology - Concepts, advantages, disadvantages- using web as a tool of updating knowledge- Competency to download and save, ability to follow the right link.

Unit-V - Reasoning Aptitude (12 L)

Reasoning Aptitude - Number Series, letter series, codes; Relationships, Classification, understanding the structure of arguments- evaluating and distinguishing deductive, inductive reasoning.

Total: 60 L

References:

1. Arun Sharma, General Studies paper – II for civil services preliminary examination, McGrew Hill Education (india) Private Limited, New Delhi, 2016.
2. IBPS – Bank PO/MT/SO, CWA – VI , kiran institute of career excellence Pvt.Ltd., Delhi,2016.
3. Group –I, General Studies, sakthi's publishing house, Chennai, 2017.
4. P.Subba Rao, Business Communication, Cengage learning India Pvt.Ltd.2012.
5. Mallika Nawal, Business Communication, , Cengage learning India Pvt.Ltd.2012

MANONMANIAM SUNDARANAR UNIVERSITY

TIRUNELVELI – 12

MPhil English (For affiliated colleges)

(For those who joined the course from the academic year 2018-2019 onwards -Fulltime)

Sl. No.	Sem	Course Title	Credits	LHrs/Wk
1.	I	Core –I- Research and Teaching Methodology	4	4
2.	I	Core—II – Critical Theory	4	4
3.	I	Elective –Contemporary Literature (or) Women's Studies	4	4
4.	II	Project and Viva Voce	12	-
		Total	**24**	

MANONMANIAM SUNDRANAR UNIVERSITY

MPhil English

Paper - I

RESEARCH AND TEACHING METHODOLGY **L T P C**

OBJECTIVES: **4 0 0 4**

1. To introduce the students to the research methodology associated with future courses in literature.
2. To make the students understand the methodology of research.
3. To enable the learners to prepare dissertation/thesis/journal papers.

Unit – I - **Meanings and objectives of research (12 Hours)**

Research in language and literature, Materials and tools of research (books, anthologies, thesauruses, encyclopedias, conference proceedings, unpublished thesis, newspaper articles, journals, govt. publications, e-journals, web references, research cities, printed and web indexes, etc. e-mail discussions groups, special libraries. Advanced study centers, virtual libraries, web search engines, etc.)

Unit – II – The Process of research (12 Hours)

Selecting a project: the survey of relevant literature: defining aims and objectives: designing hypothesis: scope and limitations: preparing a research proposal: planning, etc. – Mechanics of research

Unit – III – Presentation of Research (12 Hours)

Title, aims and objectives: research format: avoiding plagiarism: quoting and creating in-text citations (documentation); research findings; using standard style sheets.

Unit – IV – Language, style and types of discourses (12 Hours)

Diction, the style suitable for a literary thesis, Narration, Argumentation, Explosion, Description, Affective Fallacy. Dissociation of Sensibility, Figurative; Language, Intentional Fallacy, Objective Correlative, Pathetic fallacy, Point of view, Satire.

Unit – V – Methodolgy of Teaching (12 Hours)

Teaching – Objectives of Teaching, Phases of Teaching- Teaching Methods; Lecture Method, Discussion Method, Discovery Learning, Inquiry, Problem Solving Method, Project Method, Seminar – Integrating ICT in Teaching: Individualised Instruction, Ways for Effective Presentation with Power Point – Documentation – Evaluation ; Formative, Summative & Continuous and Comprehensive Evaluation – Later Adolescent Psychology: Meaning, Physical, Cognitive, Emotional, Social and Moral Development – Teaching Later Adolescents.

(Total 60 Hours)

References:

- Paltridge, B (2006). *Discourses Analysis: An Introduction. London: Continuum Discourses*
- Barry, Peter.2002. *Beginning Theory: an Introduction to Literary and Cultural Theory*. New York: Manchester United Press.
- Crystal, David. 1994. *The Cambridge Encyclopedia of the English Language*. London. CUP.
- Madden,Frank.2002. *Exploring Poetry*. London: Longman.
- Versonk, Peter.2002. *Stylistics.* Oxford:OUP
- Frow,John.2009. *Genere*, Routledge Publication
- Black Elizabeth, 2006. *Pragmatic, Stylistics,* Edinburgh University Press Ltd.
- Gilbaldi, *MLA Handbook for writers of Research Papers*(8th Edition)
- Sampath.K, Panneerselvam, A & Santhanam, S. (1984). *Introduction to Educational Technology (2nd revised ed.)* New Delhi; Sterling Publishers.
- Sharma, S.R.(2003). *Effective classroom teaching modern methods, tools & techniques.* Jaipur: Mangal Deep.
- Vedanayagam, E.G. (1989). *Teaching technology for college teachers*, New York: Sterling Publishers.

Paper –II CRITICAL THEORY

L T P C

Objectives:

(1) Acquainting the learners with the various literary theories. **4 0 0 4**

(2) To make the students appreciate and criticize texts and works of art themselves.

UNIT – I Theory after Theory (12 Hours)

1. Peter Barry -- Legacies of Theory – Presentism – Presentism in practice – New Aestheticism – New aestheticism in practice – What to read on new aestheticism – Cognitive poetics – Cognitive poetics in practice – What to read on cognitive poetics.

2.Jonathan Culler – Structuralism and Literature

UNIT – II Marxist literary theories (12 Hours)

Roland Barthes - Andy Stafford and Susan McManus

Moyra Haslett - The politics of literature: Marxist Literary Theories

UNIT – III Feminist Theory (12 Hours)

Helene Cixous – Julia Dobson

Ruth Robbins - Will the real feminist theory please stand up?

UNIT – IV Deconstruction (12 Hours)

Paul de Man – The Resistance to Theory

Julian Wolfreys – Deconstruction, what remains unread

UNIT – V Postmodernism (12 Hours)

Cleanth Brooks - The Primacy of the Reader

Arkady Plotnitsky – Postmodernism and Postmodernity

(Total 60 Hours)

REFERENCES:

- Peter Barry, *Beginning Theory an Introduction to Literary and Cultural Theory* Third Edition
- S. Ramaswami & V.S. Sethuraman. *English Critical Tradition an Anthology of English Literary Criticism Volume 2*. Chennai. Trinity Press.
- *Contemporary Critical Theories From Lacan to Said*, Edited by Jon Simons, Edinburgh University Press.
- *Introducing Literary Theories: A Guide and Glossary* Edited by Julian Wolfreys, Edinburgh University Press.
- *Contemporary Criticism an Anthology* Edited by V.S. Sethuraman , Macmillan Publishers India Ltd.

Paper III – Elective I — L P T C
Contemporary Literature — 4 0 0 4

Objectives:

- To familiarize the students with the literary works of different countries and cultures.
- To enable the learners to compare the different works and get a better understanding of them.

Unit I British Literature(12 Hours)

Poetry — Benjamin Zephaniah – *1) We Refugees 2) The Race Industry*
Drama — Tom Stoppard - *Arcadia*
Fiction — Zadie Smith - *Swing Time*

Unit II American Literature(12 Hours)

Poetry - Charles Bright-
North American Bear (*The Norton Anthology of American Literature*)
Drama — Tracy Letts - *August:Osage County*
Fiction — Rachel Gold - *Being Emily*

Unit III African Literature(12 Hours)

Poetry — Francis Duggan -- Racism is Around me Everywhere
Herbert Logerie -- *The Colour of Racism*
Drama — Athul Fugord -- *A Lesson From Aleos*
Fiction — Ben Okri -- *The Famished Road*

Unit Canadian Literature(12 Hours)

Poetry — Dorothy Livesay --1) *Green Rain* 2) *Nocturne*
Drama — Joan Mac Leod -- *The Valley*
Fiction — Michael Ondaatje -- *Divisadero*

Unit V South Asian Literature(12 Hours)

Poetry — Basil Fernando *Yet Another Incident in July 1983*
Drama — Girish Karnad *Wedding Album*
Fiction — Khalid Hosseine *And the Mountains Echoed*

(Total 60 Hours)

References:

1. David Lane - *Contemporary British Drama,* 2010.
2. **Tracy J. Prince, *Culture Wars in British Literature: Multiculturalism and National Identity, 2012.***
3. **Florence Stratton *Contemporary African Literature and the Politics of Gender, 1994***
4. **Karen Meyers, Erik V. R. Rangno, Jerry R. Phillips, Michael Anesko Contemporary American Literature, 1945 – Present, 2010**
5. **W. J. Keith ,Canadian Literature in English, Volume 2, 2006**
6. **Alex Tickell, South-Asian Fiction in English: Contemporary Transformation**

Elective – II

Women's Studies

L P T C

4 0 0 4

Objectives:

- To sensitize the learners on the issues of women
- To analyze and interpret the various voices raised in support of women and to contribute towards women empowerment.

Unit I : Prose (12 Hours)
Virginia Woolf – *Modern Fiction*
Arundhati Roy -- *Walking with the Comrades*

Unit II : Poetry (12 Hours)
Carol Ann Duffy -- "Anna Hathaway" , " Onion"
Sylvia Plath -- "Daddy" , "The Colossus"
Kamala Wijeyaretna -- " On Seeing a White Flag Across a Road"
Imtiaz Dharkar – "Purdah I"

Unit III : Drama (12 Hours)
Susan Glaspel -- *Trifles*
Vinodini -- *Thirst*
Lorrainne Hansberry -- *What Use are Flowers?*

Unit IV : Fiction (12 Hours)
Jeannette Winterson -- *Oranges are not the Only Fruit*
Mahasweta Devi – *Draupadi*

Unit V : Fiction (12 Hours)
Bama – *Karukku*
Chimamanda Ngozi Adichie – *Half of a Yellow Sun*

(Total 60 Hours)

References:

- Winterson, Jeanette. *Oranges Are Not the Only Fruit*. , 1987
- Nick Bentley, *Contemporary British Fiction*, 2008
- Angela Y. Davis, *Women, Race, & Class,* 2011.
- Kathy Davis, Mary Evans, Judith Lorber, *Handbook of Gender and Women's Studies,* 2006.

MANONMANIAM SUNDARANAR UNIVERSITY

M.Phil Mathematics (for Affiliated Colleges)

(From the academic year 2018 -19)

1. SCHEME OF EXAMINATION

Sl. No	Sem-ester	Paper title	Hrs/Week	Credits
1.	I	Research and Teaching Methodology	4	4
2.	I	Advanced Analysis	4	4
3	I	Project Oriented Elective Course (Theory)	4	4
4	II	Project and Viva Voce		12
		TOTAL		24

LIST OF PROJECT ORIENTED ELECTIVE PAPERS

1 Banach Algebra and Spectral Theory
2 Advanced Graph Theory
3 Harmonic Analysis
4 Theory of Near-rings
5 Advanced Calculus
6 Algebraic Graph Theory
7 Stochastic Modeling.
8. Wavelets

Core Paper- I

RESEARCH AND TEACHING METHODOLOGY (60 hours)

It is the study of commutative rings. The objective of the paper is to introduce algebraic structure through the modules and different types of modules and it's algebraic application. A pass in PG level algebra course is the prerequisite for this paper. Out come of this paper is to motivate students to do research in diverse fields such as homological algebra, algebraic number theory, algebraic geometry, finite fields and computational algebra.

Unit I: Rings and Ideals – Modules **(12 hours)**

Unit II: Rings and Modules fractions – Primary Decomposition **(12 hours)**

Unit III: Integral Dependence and valuations – Chain conditions **(12 hours)**

Unit IV: Noetherian Rings – Artin Rings **(12 hours)**

Unit V: Methodology of Teaching **(12 hours)**

Teaching - Objectives of Teaching, Phases of Teaching - Teaching Methods: Lecture Method, Discussion Method, Discovery Learning, Inquiry, Problem Solving Method, Project Method, Seminar - Integrating ICT in Teaching: Individual Instruction, Ways for Effective Presentation with Powerpoint - Documentation - Evaluation: Formative, Summative & Continuous and Comprehensive Evaluation - Later Adolescent Psychology: Meaning, Physical, Cognitive, Emotional, Social and Moral Development - Teaching Later Adolescents.

Text Book: Content and Treatment as in Atiyah and Macdonald, Introduction to Commutative Algebra, Chapters 1 to 9.

References:

1. Sampath, K., Pannerselvam, A. & Santhanam, S. (1984). Introduction to educational technolog. (2nd revised ed.). New Delhi: Sterling Publishers.
2. Sharma, S. R. (2003). Effective classroom teaching modern methods, tools & techniques. Jaipur: Mangal Deep.
3. Vedanayagam, E. G. (1989). Teaching technology for college teachers. New York: Sterling Publishers.

Core Paper II

ADVANCED ANALYSIS (60 hours)

Preamble: The objective of the paper is to understand borel measure in real and complex. Field. Prerequisite for this course is a good knowledge in calculus, real and complex analysis, topology and measure theory concepts. Motivation is to prepare scholars with Lp spaces for the study of analysis.. The out come of this paper is to help the students to undertake further research in Fourier analysis, Harmonic analysis and Functional analysis.

Unit I : Abstract Integration : The concept of measurability – Simple functions – Elementary properties of measures – Arithmetic in $[0,\infty]$ - Integration of positive functions – Integration of complex functions – The role played by sets of measure zero. **(12 hours)**

Unit II : Positive Boral Measures : Topological preliminaries – The Riesz representation theorem – Regularity properties of Borel measures – Lebesgue measure – Continuity properties of measurable functions. **(12 hours)**

Unit III : Complex Measures : Total variation – Absolute continuity – Consequences of the Radon-Nikodym theorem – Bounded linear functions on L^p- The Riesz representation theorem. **(12 hours)**

Unit IV : H^p- Spaces : Sub-harmonic functions – The spaces H^p and N - The theorem of F. and M. Reisz – Factorization theorems – The shift operator – Conjugate functions. **(12 hours)**

Unit V : Fourier Transforms : Formal properties – The inversion theorem – The Plancherel theorem – The Banach algebra L^1.

Holomorphic Fourier Transforms : Two theorems of Paley and Wiener – Quasi-analytic classes – The Denjoy- Careman theorem. **(12 hours)**

Text Book : Content and Treatment as in Walter Rudin, Real and Complex Analysis, Third Edition, Chapters 1, 2, 6, 9, 17 and 19.

PAPER III

PROJECT ORIENTED ELECTIVE COURSE (THEORY)

1. BANACH ALGEBRA AND SPECTRAL THEORY (60 hours)

Preamble: This syllabus is designed to introduce the students to the topics of Banach algebra and Hilbert spaces. Knowledge expected is to be aware of the background concepts in algebra. The students are expected to know about functionals. This will motivate the students to learn about various operators and their characteristics.

Unit I: Banach algebras – Complex Homomorphisms – Basic properties of Spectra – Symbolic Calculus. **(12 hours)**

Unit II: Differentiation - Group of invertible elements – Commutative Banach algebra – Ideals and Homomorphisms – Gelfand transforms. **(12 hours)**

Unit III: Involutions – Applications to non commutative algebra – Positive Linear functionals. **(12 hours)**

Unit IV: Bounded Operators on Hilbert spaces – Bounded Operators – A commutativity theorem – Resolution of the Identity – Spectral theorem. **(12 hours)**

Unit V: Eigen values of normal operators – Positive operators and square roots – Group of invertible operators – Characterization of V* algebra. **(12 hours)**

Text Book: Content and Treatment as in Rudin, Functional Analysis, Tata McGraw Hill, Chapters 10,11 & 12.

2. ADVANCED GRAPH THEORY (60 hours)

Preamble: This course aims to introduce the learner some topics for his research in graph theory. It provides several conjectures and open problems to widen the scope of research. The pre-requisite for the course is a sound knowledge in graph theory at the post-graduate level. The outcome of the course is identification area and problems for research in graph theory.

Unit I: Dominating sets in graphs - Bounds on the domination number: in terms of order, degree, size, degree, diameter and girth. **(12 hours)**

Unit II: Product graphs and Vizing's conjecture – Domatic number - Nordhaus-Gaddum type theorems - dominating functions. **(12 hours)**

Unit III: Decompositions and colorings of a graph – Generalizations of graph decompositions. **(12 hours)**

Unit IV: Necessary conditions for the existence of a G-decomposition of a graph - Cycle decompositions, Vertex labelings and graceful graphs. **(12 hours)**

Unit V: Perfect graphs: The perfect graph theorem – p-critical and partitionable graphs – A polyhedral characterization of perfect graphs and p-critical graphs – The strong perfect graph conjecture (and recent theorem). **(12 hours)**

Text Books: Content and Treatment as in

1) Teresa W. Haynes, Stephen T. Hedetniemi and Peter J. Slater, Fundamentals of Domination in graphs, Marcel Decker (1998), Section 1.2, 2.1to2.4 (For Unit I)
   Sections 2.6, 8.3, 9.1 and 10.1 to10.3 (for Unit II)

2) Juraj Bosak, Decompositions of graphs , Kluwar Academic Publishers, Chapters 2, 3 4, 6 and 7. (for Units III and IV)

3) Martin Charles Golumbic, Algorithmic graph theory, Academic Press, Chapter 3 (for Unit V)

3. HARMONIC ANALYSIS (60 hours)

Preamble: Periodic functions play a vital role in solving many problems in Mathematics and Physics. Fourier analysis is the study of various aspects of periodicity of functions. Harmonic Analysis is a natural generalization of Fourier analysis and is significant for its mathematical aspect. The pre requisite for this course is a basic knowledge of Real and Complex analysis covered in a post graduate programme in Mathematics. The outcome of the course is to help researchers in both pure and applied mathematical fields.

Unit I: Fourier series and integrals – Definitions and easy results – The Fourier transform – Convolution – Approximate identities – Fejer's theorem – Unicity theorem – Parselval relation – Fourier Stieltjes Coefficients – The classical kernels. **(12 hours)**

Unit II: Summability – Metric theorems – Pointwise summability – Positive definite sequences – Herglotz;s theorem – The inequality of Hausdorff and Young. **(12 hours)**

Unit III: The Fourier integral – Kernels on R. The Plancherel theorem – Another convergence theorem – Poisson summation formula – Bachner's theorem – Continuity theorem. **(12 hours)**

Unit IV: Characters of discrete groups and compact groups – Bochners' theorem – Minkowski's theorem. **(12 hours)**

Unit V: Hardy spaces- Invariant subspaces – Factoring F and M. Rieza theorem – Theorems of Szego and Beuoling. **(12 hours)**

Text Book: Content and Treatment as in Henry Helson, Harmonic Analysis, Hindustan Book Agency, Chapters 1.1 to 1.9, 2.1 to 3.5 and 4.1 to 4.3.

4. THEORY OF NEAR-RINGS (60 hours)

Preamble: The main objective of this course is to provide the knowledge about the generalized ring structures. In fact, near-ring is a natural generalization of rings in the sense that the set of all endomorphisms of a group form a ring, where the set of all mappings of a group form a near-ring. The structure of near-rings is useful in project geometry to deal about generalized field conditions.

Unit I: The elements of theory of near-rings. **(12 hours)**

Unit II: Ideal theory. **(12 hours)**

Unit III: Elements of structure theory. **(12 hours)**

Unit IV: Near-fields. **(12 hours)**

Unit V: More classes of near-rings. **(12 hours)**

Text Book: Content and Treatment as in G. Pilz, Theory of Near-rings, North Holland, Chapters 1,2,3, 8(a), 9(a) and 9(b).

5. ADVANCED CALCULUS (60 hours)

Preamble: The Calculus of several variables involves many branches of Mathematics such as Partial Differential Equations, Optimization, Statistics etc. The main objective of this course is to give a thorough understanding of differentiation and integration of functions of several variables. The prerequisite is a precise knowledge of Calculus of single variable. The outcome of the course is the ability to solve problems involving several variables.

Unit I : Differentiation – Basic theorems – Partial derivatives – Derivatives – Inverse functions. **(12 hours)**

Unit II : Implicit functions – Integration – Measure zero and Content zero – Integrable functions. **(12 hours)**

Unit III : Fubini's theorem – Partitions of Unity – Change of Variables. **(12 hours)**

Unit IV : Integration on chains - Algebraic preliminaries – Fields and Forms - Geometric preliminaries – The fundamental theorem of Calculus. **(12 hours)**

Unit V : Manifolds – Fields and Forms on Manifolds – Stokes' theorem on Manifolds - The Volume element – The Classical theorems. **(12 hours)**

Text book : Calculus on Manifolds by Michael Spivak, The Benjamin / Cummings Publishing Company. **(12 hours)**

References : (1) Mathematical Analysis by Tom M. Apostol, Narosa Publishing Company.

(2) Advanced Calculus by Gerald B.Folland, Pearson Publishing Company.

6. ALGEBRAIC GRAPH THEORY (60 hours)

Preamble: This course aims to improve the knowledge of the learner to apply algebra in graph theory. It is framed to give adequate exposure about algebraic approach to graph theory. The beginner of this course is expected to have sound understanding of graph theory and algebra at PG level. The outcome of the course is to enable the student to do qualitative research in algebraic graph theory.

Unit 1: Linear Algebra in graph theory: The spectrum of a graph – Regular graphs and line graphs - The homology of graphs. **(12 hours)**

Unit 2: Spanning trees and associated structures – Complexity – Determinant expansions. **(12 hours)**

Unit 3: Symmetry and regularity of graphs: General properties of graph automorphisms – Vertex-transitive graphs – Symmetric graphs – Trivalent symmetric graphs. **(12 hours)**

Unit 4: The Covering - graph construction – Distance-transitive graphs - The feasibility of intersection arrays. **(12 hours)**

Unit 5: The Laplacian of a graph: The Laplacian matrix – trees – representations – energy and eigenvalues – connectivity – the generalized Laplacian – Multiplicities – embedding. **(12 hours)**

Text Books:

1. **Norman Biggs,** Algebraic Graph Theory, Cambridge University Press, London, 1974. Chapters 2, 3 and 4 for Unit I, 5, 6 and 7 for Unit II,C 15, 16, 17 and 18 for Unit III,19, 20 and 21 for Unit IV.

2. **Chris Godsil, Gordon Royle,** Algebraic Graph Theory, Springer-Verlag, New York, 2006. Chapter 13 (Sections 13.1 to 13.6, 13.9 to 13.11) for Unit V.

7. STOCHASTIC MODELING (60 hours)

Preamble: The theory of stochastic modelling is considered to be an important contribution to mathematics and it is an active topic of research. It is concerned with concepts and techniques and it is oriented towards a broad spectrum of mathematical, scientific and engineering interests. Characterization, structural properties , inferences and control of Stochastic processes are covered in every unit. The paper is designed to get deep knowledge of stochastic processes.

Recap : Basics of Probability space random variable – Discrete distributions and Continuous distributions – Expectation – Conditional Expectation – Moment Generating Function – Probability Generating Function – Laplace Transform – Joint Distributions – Functions of random variables and random vectors.

Unit I : Markov chains : Transition probability matrix of a Markov chain – First step Analysis – Functional of Random walks and successive runs – classification of states – Basic Limit Theorem of Markov Chain. **(12 hours)**

Unit II : Continuous time Markov Chains : Poisson distribution and Poisson process – Distributions associated with Poisson process – Pure Birth Process – Pure Death process – Birth and Death Process – Limiting behavior of Birth and Death Process – Birth and Death Process with absorbing states. **(12 hours)**

Unit III : Renewal Phenomena : Renewal process and Related concepts – Poisson process viewed a Renewal Process – Asymptotic behavior of Renewal process. **(12 hours)**

Unit IV : Branching Process and Population Growth : Branching process – branching process and generating functions – Geometrically distributed offspring – variation on Branching process – Stochastic models of Plasmid Reproduction and Plasmid copy Number partition. **(12 hours)**

Unit V : Queueing Systems : Queueing Processes – Poisson Arrival and exponentially distributed service times – The M/G/I and M/G/8 systems – variations and extensions. **(12 hours)**

Text Book : Content and Treatment as in Howard M. Taylor and Samuel Karlin, An Introduction to Stochastic Modeling (Revised Version), Academic Press, New York, 1984.

8. WAVELETS (60 hours)

Preamble: Wavelet analysis has drawn much attention from both mathematicians and engineers alike. The emphasis of the course is on spline wavelets and time-frequency analysis. The only pre-requisite is a basic knowledge of function theory and real analysis. The outcome of the course is to enable the learner to apply the pure mathematics in signal processing and image analysis.

Unit I : An Overview : Fourier to Wavelets – Integral Wavelets Transform and Time frequency analysis – Inversion formulas and duals – Classification of Wavelets – Multi-resolution analysis – Spines and Wavelets.

Fourier Analysis : Fourier and Inverse Fourier Transformation – Continuous Time Convolution – The delta function – Fourier Transformation of square integrable functions. **(12 hours)**

Unit II : Fourier Analysis (contd): Fourier Series – Basic Convergence Theory – Poisson Summation Formula.

Wavelet Transforms and Time Frequency Analysis : The Gabor Transforms – Short time Fourier Transforms and the uncertainty principle – The integral Wavelet Transform – Dyadic Wavelets – Inversion – Frames – Wavelet Series. **(12 hours)**

Unit III : Cardinal Spline Analysis : Cardinal Spline spaces – B-splines and their basic properties – The time scale relation and an interpolating graphical display algorithm – B-Net representations and computation of cardinal splines - Constructions of cardinal splines – constructions of spline application formulas – Construction of Spline interpolation formulas. **(12 hours)**

Unit IV : Scaling functions and Wavelets : Multi-resolution analysis – Scaling functions with finite two scale relation – Direction sum Decompositions of $L^2(R)$ - Wavelets and their duals. **(12 hours)**

Unit V : Cardinal Splines Wavelets : Interpolating splines wavelets – Compactly supported spline – Wavelets – Computation of Cardinal spline Wavelets – Euler – Frebenious Polynomials. **(12 hours)**

Orthogonal Wavelets : Examples of orthogonal Wavelets - Identification of orthogonal two scale symbols - Construction of compactly supported orthogonal wavelets. **(12 hours)**

Text Book : Content and Treatment as in Charles K. Chui, An introduction to Wavelets, Academic Press, New York, 1992.

Reference Books :

1. Chui C. K. (ed), Approximation theory and Fourier Analysis, Academic Press Boston, 1991.
2. Daribechies I, Wavelets, CBMS-NSF Series in Appl, SIAM Philadelphia, 1992.
3. Schurnaker L, L. Spline Functions : Basic Theory, Wiley, New York, 1981.
4. Nurnberger G, Applications to Spline Functions, Springer Verlag, New York, 1989.

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MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI – 12
DEPARTMENT OF PHYSICS
M. Phil. (Physics) For Affiliated Colleges- Choice Based Credit System (CBCS)
(From the academic year 2018-2019 onwards)

S. No.	Semester	Subject	Credits	Teaching Hours / week
1	I	Research and Teaching Methodology	4	4
2	I	Advanced Physics	4	4
3	I	Project related Elective (section 3.1)	4	4
4	II	Project and Viva-voce	12	-
Total			**24**	**-**

PAPER – 1: RESEARCH AND TEACHING METHODOLOGY

Preamble: To introduce the knowledge on research. This paper provides a broad knowledge on methods of research**,** problem solving and analytical techniques

Unit - I: Research Methodology (12 hrs)

Methods of Research and Methodology of Research – Types of Research – Selection of Research Topic and Problem – Literature survey – Reference collection – Internet and its applications – Inflibnet - Accessing the current status – Mode of Approach – Actual Investigation – Results and Conclusion – Presenting a paper in a Scientific Seminar – - Art of writing a Research Paper – Layout of M.Phil. Dissertation

Unit - II: Statistical Methods And Simulations (12 hrs)

Statistical description or data: Mean, Variance, Skewness, Median, Mode; Distributions: Binomial, Poisson, Gaussian – Student's t-test and chi-square test - Simulation studies (theory only): Generation of uniform random numbers by Park - Miller method – Gaussian random number generation – Box-Muller method – Basic ideas of Monte-Carlo method – Evaluation of definite integrals and value of π.

Unit – III: Numerical Methods (12 hrs)

Curve fitting: straight line and exponential, Numerical integration: Composite Trapezoidal rule, Interpolation: Newton's forward and backward interpolation – Numerical integration – Ordinary differential equation: Fourth order Runge-Kutta method – Eigen value problem

Unit – IV: Analytical Techniques (12 hrs)

Analytical techniques –X - Ray Diffraction – SEM and TEM techniques – XPS – TG-DTA – Hall measurement – VSM and EDAX

Unit – V: Methodology of Teaching (10 hrs)

Teaching – Objectives of Teaching, Phases of Teaching – Teaching Methods: Lecture Method, Discussion Method, Discovery Learning, Inquiry, Problem Solving Method, Project Method, Seminar – Integrating ICT in Teaching: Individualised Instruction, Ways for Effective Presentation with Power Point – Documentation – Evaluation: Formative, Summative & Continuous and Comprehensive Evaluation – Later Adolescent Psychology: Meaning, Physical, Cognitive, Emotional, Social and Moral Development – Teaching Later Adolescents.

Books for Study and References

1. J. Anderson, B.H. Durstan and M.Poole, Thesis and Assignment Writing (Wiley Eastern, New Delhi,1977)
2. Rajammal P. Devadas, A Handbook of Methodology of Research (S.R.K. Vidyalaya Press, Chennai, 1976)
3. G.B.Arfken and H.J.Weber, Mathematical Methods for Physicists (Academic Press,2005)
4. C.R.Kothari, Research methodology methods and techniques
5. Vijaya How to teach science
6. J A Belk: Electron Microscopy and Microanalysis of Crystalline Materials (Applied Science Publishers), 1979.
7. K.P.N. Murthy, Monte - Carlo Basics (ISRP, Kalpakkam, 2000)
8. K.P.N. Murthy: Monte-Carlo Methods (University Press, 2004)

9. Louis A. Pipes and Lawrence R. Harvill: Mathematical Physics for Engineers and Physicists (McGraw Hill International, Singapore, 1971)
10. Hobarl H. Willard, Lynne L. Merritt, Jr., and John A. Dean, Instrumental Methods of Analysis
11. Sampath K, Panneerselvam, A & Santhanam S (1984). Introsuction to educationaltechnology. (2nd revised ed.) New Delhi:Sterling Publishers.
12. Sharma. SR (2003) Effective classroom teaching modern methods, tools & techniques. Jaipur: Mangal Deep
13. Vendanayagam EG (1989). Teaching technology for college teachers. New York: Sterling Publishers.

Paper - 2: ADVANCED PHYSICS

Preamble: To impart knowledge on various materials of technological importance. To make the students learn the basics of quantum mechanical calculations, nanomaterials, thin films, environmental physics and biophysics

Unit - I: Quantum Mechanical Calculations (12 hrs)

Molecular orbital theory - Basis set – Electronic structure methods – Semi empirical methods – *Ab initio* methods - density functional theory methods – Z-matrix - geometry optimization – Harmonic Vibrational analysis – Atoms in molecules charges and bond order – Potential energy surface – Mullican population analysis – Vibrational circular dichroism intensities – Softwares: MOPAC, Gaussian.

Unit - II: Nanomaterials (12 hrs)

Nanomaterials: Salient features – Different methods of fabrication – Physical and chemical methods - Characterisation – Effect of size on various physical properties – Applications – Quantum wells, wires, dots – Fullerenes – Nanotubes – Carbon Nanotubes

Unit - III: Thin Films (12 hrs)

Thin films - Fundamentals and Salient features – Different methods of preparation – Solution growth - Spray Pyrolysis – Electrodeposition - Thermal evaporation – Flash evaporation – Electron beam evaporation – Thickness measurement method – Applications of thin films.

Unit - IV: Environmental Physics (12 hrs)

UV radiation impact on human health – Ozone formation – Depletion of Ozone layer – Conservational methods – Montreal Protocol – Effect of Nuclear Radiation - Radioactive Pollution – IR radiation and its effect – Green house effect – Global warming – Impact of microwave radiation.

Unit - V: Biophysics (12 hrs)

Molecular alphabets of life (Amino acids, nucleic acid bases, saccharides and lipids) – Roles of biomolecules in biological functions – Geometry of biomolecules – Conformation and Configuration – Lennord-Jones potential – Basis of molecular interactions – Various bonds involved in structural stabilization of biomolecules

Books for Study and References

1. Rodney Cotterill: Biophysics: An Introduction (John Wiley & Sons), 2003.
2. G. Cao: Nanostructures & Nanomaterials: Synthesis, Properties & Applications, (Imperial College Press), 2004.
3. B.D. Cullity: Elements of X-ray diffraction, (Addison – Wesley, London), second edition, 1977.
4. A.Goswami: Thin film fundamentals (New Age international (P) Ltd., New Delhi), 2006. Charles P. Poole Jr and Frand J. Owens : Introduction to Nanotechnology, (John Wiley & Sons), 2003.
5. Vasantha Pattabhi, Gautham N: Biophysics (Narosa Publishing House, 2nd Edition), 2011

Paper - 3(a): MATERIALS SCIENCE

Preamble: To expose the students with theoretical aspects of materials science. To provide the knowledge about phase diagrams, mechanical properties, ceramics, polymers, plastics and crystals.

Unit – I: Phase Diagrams **(12 hrs)**

Solid solutions and intermediate phases – Equilibrium phase diagrams, Cu-Ni, Pb-Sn, Al-Cu system phase diagrams – Free energy and equilibrium phase diagrams – Nucleation and growth – Martenstic transformation – Strengthening mehanisms – Iron-Carbon system – Alloy steels – Aluminium-Copper system – Copper-Zinc system – Corrosion

Unit - II: Mechanical Properties **(12 hrs)**

Stress- Strain curve – Elastic deformation: Characteristics, Atomic mechanism, Sheer stress, Bulk modulus, Strain energy, Strain deformation – Viscous deformation: Spring-Dashpot models – Anelastic and Viscoelastic deformation: Viscoelastic models – Plastic deformation: Dislocations and Stress-strain curves, Plasticity theory – Fracture: Ideal fracture, Brittle fracture, Fracture mechanics, Cohesive models, Ductile fracture – Mechanical testing

Unit - III: Ceramics **(12 hrs)**

Structure of ceramics – Production of ceramics: Raw materials, Forming and Post-forming processes – Production of glass: Melting of glass, Glass forming and annealing – Mechanical properties of ceramics – Wear and erosion resistance – Thermal shock – Silica-Alumina system – Commercial systems: Zirconia, Sialones, Cement and Concrete

Unit - IV: Polymers and Plastics **(12 hrs)**

Molecular structure: Monomers & Polymers, Synthesis, Molecular weight measurement, Branching & Tacticity, Copolymets and blend – Mechnaics of polymer chain: Freely jointed chains, Entanglements, Rubber elasticity – Thermoplastic melts: Viscosity, Shear thinning, Processing, Extrusion – Amorphous polymers: Solidification, glass transition, Various models – Crystalline polymers – Crosslinked polymers: Elastomers, Thermosets – Liquid crystal polymers – Mechanical properties: Stress-Strain behaviour – Chemical properties

Unit - V: Crystals **(12 hrs)**

Crystal growth from solution – Melt growth techniques: Bridgman method, Czochralski crystal pulling technique, Crystal growth from Vapour phase – Crystal Imperfections – Point defects: Vacancies, interstitals, Impurities, electronic defects – Lline defects: Edge dislocation, Screw dislocation – Surface defects: Grain boundaries, Tilt boundaries, Twin boundaries, Stacking faults, Ferromagnetic domain walls – Volume defects: Cracks, Voids

Books for Study and References

1. J.C.Anderson, K.D.Leaver, P. Leevers and R.D.Rowlings, Materials Science for Engineers, Nelson Thomas Ltd, First Indian reprint, 2010
2. M.Arumugam, Materials Science, Anuradha Agencies, Publishers, Sechond Edition, Fifth Reprint, 2005
3. R,Balasubramaniam, Materials Science and Engineering, Wiley India (P) Ltd, 2010
4. V.Raghavan, Materials Science for Engineering, Prentice Hall of India Pvt Ltd, 2006

Paper - 3(b): NANOMATERIALS

Preamble: To felicitates the knowledge on nanomaterials. To make the students understanding the fundamental aspects of nanomaterials, synthesis, nanostructures, properties and characterization techniques

Unit-I: Synthesis **(12 hrs)**

Sol-Gel and Precipitation technologies - Ball milling - RF plasma - Combustion Flame - Chemical Vapor Condensation process – Electrodeposition - Laser synthesis - Gas phase condensation - Sonochemical.

Unit-II: Nanostructures **(12 hrs)**

Preparation of quantum nanostructures: Preparation - Size and Dimensionality Effects – Excitations - Single-Electron Tunneling - Applications. Nanomachines and Nano devices: Micoelectrochemical systems – Nano electrochemical systems - Molecular and Super molecular switches.

Unit-III: Properties **(12 hrs)**

Properties of Individual Nanoparticles: Metal Nanoclusters – Semiconducting Nanoparticles - Rare Gas and Molecular clusters. Bulk Nanostructured Materials: Solid disordered Nanostructure - Nanostructured crystals.

Unit - IV: Characterization Techniques **(12 hrs)**

Structural: Powder XRD & particle size determination, Neutron diffraction; Spectroscopic: X-ray Photoelectron (XPS), Photoluminescence, Impedance and Energy Dispersive X-ray (EDAX) spectroscopy.

Unit - V: Characterization Techniques **(12 hrs)**

Thermal: Differential Thermal Analysis (DTA), Differential Scanning Calorimetry (DSC); Microscopic: Atomic Force Microscopy (AFM); Electrical and Magnetic: Four - probe method, Vibrating sample Magnetometer.

Books for Study and Reference

1. Evgenij Barsoukov and J. Ross Macdonald : Impedance Spectroscopy : Theory, Experiment and Applications, (John Wiley & Sons, Inc., Hoboken, New Jersey, second edition), 2005.
2. G. Cao: Nanostructures & Nanomaterials: Synthesis, Properties & Applications, (Imperial College Press), 2004.
3. Koch CC, Nanostructured Materials processing, properties and potential applications, Williams Andrew Publishing, Noyes, 2002
4. Pavia, Lampman, Kriz and Vyvyan, Spectroscopy, Cengage Learning India Pvt Ltd., 2011.
5. Willard, Merritt, Dean and Settle, Instrumental Methods of Analysis. CBS Publishers & Distributors, Delhi, 1986.
6. J.Ross Mcdonald, Impedance Spectroscopy Emphasizing solid materials and systems, John Wiley & sons, New York, 1996.
7. T. Pradeep, NANO: The Essentials, Tata Mc Graw-Hill Pvt. Ltd., New Delhi, 2007.
8. Charles P. Poole Jr & Frank J. Owens, Introduction to Nanotechnology, John Wiley & Sons (Asia) Pvt. Ltd., New Delhi, 2006.
9. Jackie Y.Ying, Nanostructured Materials, Academic Press, USA, 2001.

Paper – 3(c): SPACE PHYSICS

Preamble: To enlighten the students with the concepts of space physics. To make the students understanding the concepts of remote sensing of earth's climate system, space and plasma physics, space weather, introduction to magneto hydrodynamics, x-ray astronomy

Unit – I: Remote Sensing of Earth's Climate System (12 hrs)

Remote sensing of earth's climate system- requirements for remote sensing of climate system- methodology- constrains- basic concept of remote sensing- surface factors- atmospheric factors- instrumental factors- using reflected sunlight- global vegetation remote sensing- using thermal emission- global sea surface temperature measurement- radar altimetry- surface effects- atmospheric effects- ocean and ice monitoring by radar altimetry.

Unit - II: Space and Plasma Physics (12 hrs)

Basic plasma physics- principle- application- space plasma- the frozen in-flux-MHD plasma waves- solar wind and IMF- collision less shocks- bow shocks- shock jumps- shock structure- shock acceleration- magnetic reconnection- terrestrial magnetosphere- closed, open and flux transfer events- storms , sub storms- solar wind interaction with ionosphere- planets- insulator bodies(moon)- comets.

Unit – III: Space Weather (12 hrs)

Space weather- structure of sun- solar cycle- solar activity- coronal heating. The solar wind- wind- Aurora- Auroral sub storms- co-rotating interaction region(CIR)- solar flares- the ionosphere- solar energetic particle events(SEP)- coronal mass ejections(CME) and geomagnetic storms- Halo CME's- interplanetary CME's- magnetic clouds.

Unit - IV: Introduction to Magneto Hydrodynamics (12 Hrs)

Maxwell's equations in MHD- magnetic Reynold's number- Alfven speed- plasma beta parameter- force free magnetic field- magnetic buoyancy- magneto ststic equilibrium- magnetic reconnection- current sheet- acoustic waves- Alfven waves compressional Alfven waves- magneto acoustic waves- inertial waves.

Unit – V: X-Ray Astronomy (12 hrs)

Origin of X-rays astronomy- X-ray binaries- black hole- neutron stars- pulsars- white dwarfs- clusters of galaxies.

Books for Study and References

1. Thomas E Cravens, Physics of Solar System Plasma, (Cambridge University Press), 1997.
2. Thomas I Gombosi, Physics for Space Environment, (Cambridge University Press), 2004.
3. Louise K Hara and Keith O Mason, Space Science, (University of London, World Scientific Publishing Co.), 2004.
4. Margaret G Kivelson and Christopher T Russell, Introduction to Space Physics, (Cambridge University Press), 1995.

Paper – 3(d) : CRYSTAL GROWTH

Preamble: To introduce the knowledge on crystal growth and characterization. To expose the students with theories of nucleation & crystal growth, crystal growth from various techniques such as, solution, melt and vapour phase and their characterization.

Unit – I: Fundamentals of Crystal Growth (12 hrs)

Importance of crystal growth – Classification of crystal growth methods – Basic steps: Generation, transport and adsorption of growth reactants – Nucleation: Kinds of nucleation –Classical theory of nucleation: Gibbs Thomson equations for vapour and solution – Kinetic theory of nucleation – Becker and Doring concept on nucleation rate – Energy of formation of a spherical nucleus – Statistical theory on nucleation: Equilibrium concentration of critical nuclei, Free energy of formation.

Unit – II: Theories of Crystal Growth (12 hrs)

An introductory note to Surface energy theory, Diffusion theory and Adsorption layer theory – Concepts of Volmer theory, Bravais theory, Kossel theory and Stranski's treatment – Two-dimensional nucleation theory: Free energy of formation, Possible shapes and Rate of nucleation – Mononuclear, Polynuclear and Birth and Spread models – Modified Birth and Spread model – Crystal growth by mass transfer processes: Burton, Cabrera and Frank (BCF) bulk diffusion model, Surface diffusion growth theory.

Unit – III: Experimental Crystal Growth-Part-I: Melt Growth Techniques (12 hrs)

Basics of melt growth – Heat and mass transfer – Conservative growth processes: Bridgman-Stockbarger method – Czochralski pulling method – Kyropolous method – Non-conservative processes: Zone-refining – Vertical and horizontal float zone methods – Skull melting method – Vernueil flame fusion method.

Unit – IV: Experimental Crystal Growth-Part-Ii: Solution Growth Techniques (12 hrs)

Growth from low temperature solutions: Selection of solvents and solubility – Meir's solubility diagram – Saturation and supersaturation – Metastable zone width – Growth by restricted evaporation of solvent, slow cooling of solution and temperature gradient methods– Crystal growth in Gel media: Chemical reaction and solubility reduction methods – Growth from high temperature solutions: Flux growth Principles of flux method – Choice of flux – Growth by slow evaporation and slow cooling methods – Hydrothermal growth method.

Unit –V: Experimental Crystal Growth-Part-Iii: Vapour Growth Techniques (12 hrs)

Basic principles – Physical VapourDoposition (PVD): Vapour phase crystallization in a closed system – Gas flow crystallization – Chemical Vapour Deposition (CVD): Advantageous and disadvantageous – Growth by chemical vapour transport reaction: Transporting agents, Sealed capsule method, Open flow systems – Temperature variation method: Stationary temperature profile, Linearly time varying temperature profile and Oscillatory temperature profile.

Books for Study and Reference

1. 'Crystal Growth Processes' by J.C. Brice, 1986, John Wiley and Sons, New York.
2. 'Crystallization' by J.W. Mullin, 2004, Elsevier Butterworth-Heinemann, London.
3. 'Crystal Growth: Principles and Progress' by A.W. Vere, 1987, Plenum Press, New York.

4. ‘Crystals: Growth, Morphology and Perfection’ by Ichiro Sunagawa, 2005, Cambridge University Press, Cambridge.
5. ‘Crystal Growth’ by B.R. Pamplin, 1975, Pergamon Press, Oxford.

PAPER – 3 (e): Thin film

Preamble: To expose the students with knowledge of understanding the basic preparation and to get knowledge about the various properties of thin films. To make the understand the preparation and various necessary techniques used for analyzing the thin films

Unit- I: Preparation of Thin Films (12 hrs)

Spray pyrolytic process – characteristic feature of the spray pyrolytic process – ion plating – Vacuum evaporation – Evaporation theory – The construction and use of vapour sources – sputtering Methods of sputtering – Reactive sputtering – RF sputtering - DC planar m magnetron sputtering .

Unit - II: (Thickness Measurement and Nucleation and Growth in Thin Film (12 hrs)

Thickness measurement: electrical methods – optical interference methods – multiple beam interferometry – Fizeau – FECO methods – Quartz crystal thickness monitor. Theories of thin film nucleation – Four stages of film growth incorporation of defects during growth.

Unit - III: Electrical Properties of Metallic Thin Films (12 hrs)

Sources of resistivity in metallic conductors – sheet resistance - Temperature coefficient of resistance (TCR) – influence of thickness on resistivity – Hall effect and magneto resistance – Annealing – Agglomeration and oxidation.

Unit - IV: Transport Properties of Semiconducting and Insulating Films (12 hrs)

Semiconducting films ; Theoretical considerations - Experimental results – Photoconduction – Field effect thin films – transistors, Insulation films Dielectric properties – dielectric losses – Ohmic contracts – Metal – Insulator and Metal – metal contacts – DC and AC conduction mechanism

Unit - V: Optical Properties of Thin Films and Thin Films Solar Cells (12 hrs)

Thin films optics –Theory – Optical constants of thin films – Experimental techniques – Multilayer optical system – interference filers – Antireflection coating ,Thin films solar cells : Role, Progress , and production of thin solar cells – Photovoltaic parameter, Thin film silicon (Poly crystalline) solar cells : current status of bulk silicon solar cells – Fabrication technology – Photo voltaic performance : Emerging solar cells : GaAs and CulnSe.

Books for study and reference

1. Hand book of Thin films Technology: L I Maissel and R Clang .
2. Thin film Phenomena : K L Chopra .
3. Physics of thin films, vol. 12 , Ed George Hass and others .
4. Thin films solar cells – K L Chopra and S R Das .
5. Thin films processes – J L vilsan
6. vacuum deposition of thin films – L Holland .
7. The use of thin films in physical investigation – J C Anderson.
8. Thin films technology – Berry, Koil and Harri

PAPER – 3(f): ELECTRONIC STRUCTURE CALCULATION

Preamble: To introduce knowledge on electronic structure calculation. To make the students to understand basic concepts, various analysis on natural bond Orbitals, normal coordinates and different experimental methods

Unit – I: FTIR Raman Spectra (12 hrs)

Normal modes of vibration – Group frequencies – Origin of Infrared and Raman spectra – Infrared and Raman activity – IR and Raman spectral characteristics – FTIR and Raman spectra and their interpretation – Factors affecting Vibrational spectra - Hydrogen bonding – Structure elucidation using IR and Raman spectra – Resonance Raman scattering – Vibrational spectra of aromatic molecules

Unit – II: Quantum Chemical Computation (12 hrs)

Molecular Orbital Theory - Basis set – Electronic structure methods – Semi empirical methods – *Ab initio* methods - density functional theory methods - Z-matrix – geometry optimization – Harmonic Vibrational analysis – Atoms in molecules charges and Bond order – Potential energy surface – Mullican population analysis – Vibrational circular dichroism intensities – Software: MOPAC, Gaussian

Unit – III: Natural Bond Orbital Analysis (12 hrs)

Natural bond orbitals and one-particle density matrix – Atomic eigenvectors – Natural atomic orbitals and natural population analysis – Bond eigenvectors – natural hybrids and natural bond orbitals – Natural localized molecular orbitals – Hyperconjugative interaction in NBO analysis.

Unit – IV: Normal Coordinate Analysis (12 hrs)

Classical theory of molecular vibrations – Construction of force constant matrix F – Internal coordinates in force field calculations – Theory of lattice vibrations – Scale factor calculation – Intensity calculation – Natural internal coordinates – MOLVIB software: General structure input data – Control parameters

Unit – V: Experimental Techniques (12 hrs)

IR spectrometer instrumentation – IR sources – Sample handling techniques – IR detectors – FTIR spectrometer – FTIR Raman spectrometer – Sample handling techniques – Laser exciting sources – Raman detectors – SERS techniques.

BOOKS FOR REFERENCE

1. Brain Smith, Infrared Spectral Interpretation – A Systematic Approach , CRC Press, New York, (1999)
2. G.Aruldhas, Molecular structure and spectroscopy, prentice-Hall of India (P) Ltd., New Delhi-1110001, (2001).
3. G.Socrates, Infrared characteristic group frequencies, John Wiley & Sons, New York, (1980)
4. Ira N.Levine, Quantum chemistry V Ed., Prentice Hall International, Inc., London (2003).
5. Alan E. Reed et al., Chem. Rev. 88 (1988) 899-906.
6. Tom Sundius, MOLVIB User's guide Ver. 2, Helsinki (June 2002)
7. Robert M. Silverstein et al., Spectrometric identification of organic compounds, John Wiley & Sons, Inc., New York, (2003).

PAPER – 3(g) : NONLINEAR DYNAMICS

Preamble: To understand the basic concepts of nonlinear dynamics. This course provides knowledge about the effects of nonlinearity on dynamical systems

Unit – I: Nonlinearity, linear and nonlinear oscillators (12 hrs)

Dynamical systems - linear and nonlinear forces - Mathematical implications of nonlinearlty - Working definition of nonlinearity - Effects of nonlinearity-Linear oscillators and predictability - Damped and driven nonlinear oscillators.

Unit – II: Equilibrium points, bifurcations and chaos (12 hrs)

Equilibrium points - General criteria for stability – Classification - Some simple bifurcations - Saddle node, pitch fork, transcritical and Hopf bifurcations - Discrete dynamical systems - Logistic map - Equilibrium points and their stability - period doubling phenomenon - chaos.

Unit – III: Chaos in nonlinear electronic circuits (12 hrs)

Linear and nonlinear circuit elements - nonlinear circuits - Chua's diode - Autonomous case - Bifurcations and chaos - Chaotic dynamics of MLC circuit-Analogue circuit simulation - Some other useful nonlinear circuit - Colpitt's oscillator.

Unit – IV: Fractals (12 hrs)

Self similarity - Properties and examples of fractals - Fractal dimension - Construction and properties of some fractals-Middle one third cantor set-Koch curve - Sierpinski triangle-Julia set - Mandelbrot set - Applications of fractals.

Unit – V: Solitons (12 hrs)

Linear waves - Linear non dispersive wave propagation - Linear dispersive wave propagation - Nonlinear dispersive systems - Korteweg de vries equation - solitary and cnoidal waves - Numerical experiments of Zabusky and Kruskal - birth of solitons - Properties of solitons - applications of solitons.

Book For Study:

Nonlinear dynamics, Integr ability, Chaos, Patterns, M. Lakshmanan and S.Rajasekar, Springer, Berlin, 2003.

Books for Reference:

1. Chaos in nonlinear oscillator, controlling and synchronization, M.Lakshmanan and K.Murali (World Scientific, Singapor,1997.)
2. Deterministic chaos, H.G.Schuster, (Verlag,Weinheim,1998.)

PAPER – 3(h): MEDICAL PHYSICS

Preamble: To study the basic concepts of medical physics. To make the students to understanding the concepts of Physics in lungs and breathing, sound in medicine, light in medicine, physics of diagnostic X-rays and cardio vascular systems.

Unit - I: The Physics of the Lungs and Breathing (12 hrs)

The Airways– How the blood interact – Measurement of Lung Volumes – Pressure, Airflow, Volume Relationships of the Lungs – Physics of the Alveoli – The Breathing Mechanism – Airway Resistance – work of Breathing – Physics of some common Lung Diseases. Electricity within the Body: Electric signals – from the Heart (Electro Cardiogram) – From the Brain (Electro encephalogram) – From the Eye (Electro retinogram and electrooculogram) – Magnetic signals from Heart and Brain (Magnetocardiogram and Magnetoencephalogram) – Current Research involving electricity in the body.

Unit – II: Sound in Medicine (12 hrs)

General properties of sound, the body as a drum (percussion in medicine) – The stethoscope – ultrasound pictures of the body – ultrasound to measure motion – physiological effects of ultrasound in therapy – the production of speech – Physics of the ear and hearing : The outer ear – the middle ear – the inner ear – sensitivity of the ears – testing your hearing – deafness and hearing aids

Unit – III: Light in Medicine (12 hrs)

Measurement of light and its units – applications of visible light in medicine – applications of ultraviolet and infrared light in medicine – Lasers in Medicine applications of microscopes in medicine – Physics of eye and vision: Focusing elements of the eye – some other elements of the eye – the retina – the light detector of the eye – how sharp are your eye? Optical illusions and related phenomena – defective vision and its correction – colour vision and chromatic aberration – instruments used in ophthalmology.

Unit – IV: Physics of Diagnostic X-Rays (12 hrs)

Production of X-ray beam – how X-ray are absorbed – making an X-ray image – radiation to patients from X-rays – producting live X-ray images – fluoroscopy – X-ray slices of the body – radiographs taken without film Physics of Radiation Therapy: The dose units used in radiotherapy – the red and the gray – principles of radiation therapy – a short course in radiotherapy planning – megavoltage therapy – short distance radiotherapy or brachytherapy other radiation sources – closing thought of radiotherapy.

Unit – V: Physics of the Cardiovascular System (12 hrs)

Major Components of the Cardiovascular system – O_2 and CO_2 Exchange in the Capillary system – Work done by the Heart – Blood pressure and its measurement Transmural Pressure– Bernoulli's Principle – Blood flow – Heart Sounds – Cardiovascular Diseases – Functions of Blood Cardiovascular Instrumentation: Biopotentials of the Heart – Electrodes – Amplifiers – Patient Monitoring – Defibrillators – Pacemakers

BOOK FOR STUDY

Medical Physics–John R.Cameron & James G.Skofronick (John Wiley&Sons, New York1978)

PAPER – 3(i): RADIATION PHYSICS

Preamble: To teach the students about the basic concepts of radiation physics. To impart knowledge on radiation and interaction, principles of radiation detection and measurement, radiation therapy techniques, diagnostic radiology and radiation protection.

Unit-I: Radiation and Interactions (12 hrs)

Interaction of Electromagnetic radiation with matter – Photoelectric and Compton process – pair production – interaction of particles with matter – neutrons – heavy ions – nuclear reactions and production of radioisotopes – radiation sources – natural and artificial radio active for medical applications – Bethe- Bloch formula.

Unit – II: Principles of Radiation Detection and Measurement (12 hrs)

Radiation units and definitions – G.M. Counter – Scintillation detectors – Solid state detectors – Photofilm method - Pocket dosimeter – TLD - FBX dosimeters.

Unit – III: Radio Therapy Techniques (12 hrs)

Telegamma unit – accelerators for therapy – Iridium and cobalt needles – preparation of tracers and labeled compound – uses of radioisotopes (Gamma and beta) in brachytherapy. Dosimetry in medical applications – beta particles dose computation for biological models – dosimetry of internally administered isotopes Principles and overview of conformal radiotherapy, SRS, SRT and IMRT.

Unit – IV: Diagnostic Radiology (12 hrs)

The physical basis of diagnostic radiology – the diagnostic X-ray tube – electrical circuits – rating of the x-ray unit – factors on which quality and quantity of x-ray production depends – geometric factor which influences the radiographic image – fluoroscopy – tomography – radio isotopes in clinical medicine – rectilinear scanner – gamma camera.

Unit – V: Radiation Protection (12 hrs)

Philosophy behind radiation protection – basic concepts of MPD – recent ICRP recommendations – tissues at risk – risk factor – evaluation of internal and external radiation hazards – transport and waste disposal of radioactive materials.

REFERENCES

1. Meredith and Massay. "Fundamental Physics of Radiology", John Wright & Sons Jones M.E. and Cunningham J, "Physics of Radiology", Charles C. Thomas, USA, 1984.

2. Knoll, "Radiation Detection and Measurement", John Wiley and Sons, New York, 1982.
3. Mould R.F, "Radiation Protection", Adam Hilger's Boston, 1985.
4. Govindarajan K.N, "Advanced Medical Radiation Dosimetry", Prentice Hall of India, New Delhi, 1992

PAPER- 3(j) : ALTERNATIVE ENERGY CONVERSION DEVICES

Preamble: To introduce knowledge on alternative energy sources. To introduce the importance and overview of alternate energy sources. To make the students learn the basics of various energy conversion devices

Unit – I: Introduction and Overview of Alternative Energy Sources and Utilization (12 hrs)

Global energy budget – origins of fossil fuels – Principles of energy conversion: thermodynamic first and second laws – the Carnot cycle – Solar energy: Solar intensity and spectrum – global solar energy potential and current level of utilization – Photovoltaic: history – principles and theoretical limits – Solar cells and modules – semiconductor materials – single and multiple layer p-n junction diodes – Solar cells and modules – maximum power output – energy efficiency – quantum efficiency – Solar cells: characterization and modeling – Photovoltaic utilization.

Unit – II: Fundamentals of Electrochemistry and Electrode Kinetics (12 hrs)

Charge transfer reaction and reaction kinetics – Third-generation solar cells: dye-sensitized photocell – organic/polymer solar cell-Fuel cells: overview of types – basic operation and performance – Fuel cells: catalysis – Fuel cells: charge and mass transport – PEM fuel cells' Molten carbonate fuel cells – Solid oxide fuel cells – Overview of fuel cell systems: fuel-cell stack and thermal management.

Unit – III: Hydrogen as a Renewable Energy Source (12 hrs)

Sources of Hydrogen, Fuel cell – Principle of working – construction and applications – Fuel for Vehicles – Hydrogen Production: Direct electrolysis of water, thermal decomposition of water, biological and biochemical methods of hydrogen production – Storage of Hydrogen: Gaseous, Cryogenic and Metal hydride – Environmental impact.

Unit – IV: Batteries (12 hrs)

Primary and Secondary batteries - principles and application – Lithium batteries, Lithium ion and polymer batteries. Super-capacitors: principles and working, electrode materials synthesis process, fabrication of the devices and their applications.

Unit – V: Biomass Utilization (12 hrs)

Biodiesel and ethanol, Biomass utilization, Nuclear Energy: Potential of Nuclear Energy, International Nuclear Energy Policies and Regulations. Nuclear Energy Technologies – Fuel enrichment, Different Types of Nuclear Reactors, Nuclear Waste Disposal, and Nuclear Fusion.

REFERENCES:

1. Renewable Sources of Energy and Conversion Systems: N.K.Bansal and M.K.Kleeman.
2. Principles of Thermal Process : Duffie -Beckman
3. Solar Energy Handbook: Kreith and Kreider (McGrawHill)
4. Solar Cell : Marteen A. Green
5. Solar Hydrogen Energy Systems -T. Ohta (Ed.) (Pergamon Press)
6. Hydrogen Technology for Energy – D.A.Maths (Noyes Data Corp.)
7. Handbook : Batteries and Fuel cell – Linden (Mc.Graw Hill)
8. Batteries Volume (I) and (II) – Collins
9. Fuel Cell Fundamentals :O'Hayre, Suk-Won Cha, Whitney Colella, and Fritz B. Prinz, 2nd ed, John Wiley & Sons, New York.
10. Energy Storage Materials: S.Selladurai Proceedings, 2010
11. Practical Photovoltaics: Electricity from Solar Cells, 3rd Ed.Richard J. Komp, Aatec Publications, Ann Arbor, MI, 2002

PAPER – 3(k) : LASERS AND APPLICATIONS

Preamble: To facilitates the students with theoretical aspects of laser theory and its applications. To provide the knowledge on laser theory, resonators and switching theory, gas & liquid lasers, solid state & semiconductor lasers and their applications.

Unit – I: Laser Theory (12 hrs)

Absorption - Spontaneous and stimulated emission - Einstein's coefficients - threshold conditions for laser action - Line broadening, Mechanism - Lorentzian and Doppler line shapes - Small signal gain - Gain coefficient - gain saturation - Rate equations for 3 and 4 level systems.

Unit – II: Resonators and Switching Theory (12 hrs)

Resonant cavity - Fox and Li - Boyd and Gorden's theory on resonators - modes - Spot size - Types of resonators - Mode selection - Q switching theory and technique - Mode locking theory and technique.

Unit – III: Gas and Liquid Lasers (12 hrs)

He-Ne, Argon Ion, Carbon dioxide, Nitrogen - Metal vapour - Gas dynamics - Excimer - Free electron lasers - Dye lasers organic dyes - Pulsed and CW dye lasers - Threshold conditions - Puming configurations.

Unit – IV: Solid State And Semiconductor Lasers (12 hrs)

Ruby, Nd : YAG, Nd : Glass, Ti-sapphire, Alexandrite, lasers - Semiconductor lasers - Homo function - Hetro function - Quantum well laser.

Unit – V: Applications (12 hrs)

Speckle, speckle interferometry - Holography - Holographic interferometry - Material processing - Surface treatment - welding, drilling - Laser ranging - Laser Doppler Velocimetry - Pollution monitoring - Medical applications.

REFERENCES

1. Laser Fundamentals, William T. Silfvast, Cambridge University Press, 1999.
2. Oshea, Callen and Rhcdes, "An Introduction to Lasers and their Applications", Addison Wesley, 1985.
3. A.Yariv, "Quantum Electronics", Third Edn., Addison-Wesley 1990.
4. Hariharan, "Optical Holography", Academic Press, New York, 1983.
5. Erf.R.K."Speckle Metrology", Academic Press, New York, 1978.

MANONMANIAM SUNDARANAR UNIVERSITY

M. Phil., Zoology

M.S. University Affiliated Colleges-CBCS

With effect from the academic year 2018-19 onwards

Sem.	Course Code	Title of the Paper	Credits	Contact Hours/week
I	MZO-1	Research and Teaching Methodology	4	4
I	MZO-2	Animal Biodiversity	4	4
I	MZOE3 (or) MZOE4	Elective 1- Animal Health (or) Elective 2– Applied Zoology	4	4
II	MZOP5	Project and Viva-voce	12	-
		Total	24	-

MZO-1: RESEARCH AND TEACHING METHODOLOGY

L	P	T	C
4	0	0	4

Course objective:

To provide in-depth Knowledge on methods involved in preparation of working solutions, quantitative and also on the working principles of equipments involved in research and teaching pattern.

Learning outcome:

- Know to significance and preparation protocol of solution and buffers for research work.
- Learn to know the principle and functions of advanced biological instruments and their applications.
- Acquired Knowledge on the histopathological and histochemcical techniques.
- know the quantitative and qualitative estimation of biological macro and micro molecules.
- Learn to handle the computer aided statistical software packages.
- Enable to familiarize the methods of thesis writing and project proposal preparation.
- Inculcate the knowledge on the teaching and learning methods.

Unit I : Preparation of solutions :Types of Solutions- Standard Solutions, Stock Solution, Saturated Solution, Solution of Acids; Expression of Concentration - Molarity (M), Molality (m), Preparation of One Molar (1 M) Solutions, Normality (N), Mass Percent % (w/w), Percentage by Volume or % (v/v), Volume/Weight (V/W), Parts per Million (ppm), Parts per Billion (ppb); pH; Buffers and their preparation. -12h

Unit II: **Microscopy and Microtechnique**:Microscopy–Principle, working mechanism and applications of Light, Phase contrast, Fluorescent,Darkfield, SEM, TEM and STEM.Microtechnique–Preparation of Whole mount and sections, staining, mounting and preparation of permanent slides; Cyto and Histochemical techniques.-

-10h

Unit III: **Quantitative and Molecular Techniques**: Quantification of carbohydrate, protein, lipid, fatty acids and amino acids (Proximate composition); Estimation of Hydrolytic and Detoxication enzymes. Molecular Techniques – Principle, mechanism and application of SDS PAGE, AGE, PCR, RT-PCR; Basic principle and application of Chromatography; Basic principle and application of Spectrophotometer and UV Spectrophotometer. -14h

Unit IV: **Biostatistics:** Parametric – Student T test, F Test, Z – Test, Correlation, Regression and Co-efficient, ANOVA (One-way, Two-way), MANOVA, ANCOVA; Non-parametric – Chi-square, Wilcoxon signed rank test, Mann-Whitney test, Kolmogorov-Snirnow tests; SPSS, Sigma Plot, MAT LAB, and MiniTab for Biological data analysis. -12h

Unit V: Methodology of Teaching: Teaching-Objectives of Teaching, Phases of Teaching-Teaching methods: Lecture Method, Discussion method, Discovery learning, Inquiry, Problem Solving method, Project method, Seminar-Integrating ICT in teaching: Individualized instruction, ways for effective presentation with power point-Documentation-Evaluation: Formative, Summative and Continuous and

comprehensive evaluation-Later adolescent psychology: meaning, physical, cognitive, emotional, social and moral development-Teaching later adolescents. Manuscript, Thesis and Project writing. -12h

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60h

Reference Books:

1. Rodney F. Boyer 2012. Biochemistry Laboratory: Modern Theory and techniques, second edition, Prentice Hall
2. Rajan Katoch. 2011. Analytical Techniques in Biochemistry and Molecular Biology, Springer, New York.
3. Chander,D.E. and Rtoberson, R.W.2009. Bioimaging: Current concepts in light and electron microscopy. Jones & Bartlet Publishers Jandberry M.A., USA.
4. Gurumani.2008. Text book of Research methodology.
5. Hoppert M.2003. Microscopic Techniques in Biotechnology. Wile and VCH,G Book & Co, Germany.
6. Sampath, K. Pannerselvam,A and Snathanam,S.1984. Introduction to educational technology(2nd Rebised edition), New Delhi:Sterling Publ.
7. Sharma, S.R.2003. Effective class room teaching modern methods, tools & techniques. Jaipur: Mangal Deep.
8. Vedanayagam, E.G.1989. Teaching technology for college teachers. New York: Sterling Publishers.

MZO-2: ANIMAL BIODIVERSITY

L	P	T	C
4	0	0	4

Course Objective : To provide knowledge on animal diversity, its significance in natural environmental and conservation strategies.

Learning Outcome:

- Understand the ecosystem, diversity of organisms and their ecological relationship.
- Know the genetic relationship of an animals their distribution and biological hotspot areas.
- Realize the importance of animal classification and taxonomy; species concept and their evolutionary significance.
- Inculcate conservation strategies of ecosystem and various enactments relating to conservation policy at national and international status.
- Learn the measurement of biodiversity richness, species evenness and geometric analysis.

Unit I : **Basic concepts of Biodiversity**: Definition - Components of Biodiversity – Ecosystem – Genetic and Species diversity Species Concept – Patterns of Diversity (alpha, beta and gamma diversities) – Principles of Taxonomy: Animal diversity – Distribution, Population inventory – Biodiversity Hotspots – Mammals, Birds, Reptiles, Fishes and Invertebrates. -10h

Unit II : **Identification of below ground faunal biodiversity**: meso- or meio- and macro faunal biodiversity and estimation of their diversity indices. Environmental pollution; global environmental change; biodiversity: status, monitoring and documentation; major drivers of biodiversity change; biodiversity management approaches. -10h

Unit III : **Biological diversity** : Species richness gradient, levels of diversity – genetic, species and ecosystem diversity, patterns of diversity – alpha, beta and gamma diversities, diversity indices – Shannon, Simpson, Brillounin index, Jaccard index, Keystone species – predators, food source, Ecosystem modifies and ecosystem engineers, indicator species, endemism and hot spots – ecosystem services. -14h

Unit IV : **Threats to biodiversity (Extinctions)**: IUCN categories of threat, red data book, causes for biodiversity loss – habitat fragmentation, population reduction - Threats Status of Species Isolated species – Rate, Endemic and Threatened towards extinctions Wild species – Measurement – Organizations – UNEP, MoEF (India), NERI, NBA (India) – A brief account. -12h

Unit V : **Conservation of biodiversity**: Principles of conservation, studies on conservation/management strategy - Environmental impact assessment (EIA)

– Remote sensing in EIA – *In situ* conservation (Project Tiger, biosphere reserves, national parks, wild life sanctuaries) and *Ex situ* conservation (Zoological and Botanical gardens, Cryopreservation, Tissue culture) – Tools in Conservation of wild life (statistics) and methods of interpretation wild life maps – Economics of biodiversity conservation. -14h

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60h

Reference Books

1. Parker, T. F. and W. A. Haswell. 1921. Text Book of Zoology. Macmillan and Company Limited.
2. Simpson, G. G. 1961. Principle of animal taxonomy, Columbia University Press.
3. Avise, J.C. 1994. Molecular Markers, Natural History, and Evolution. Chapman and Hall, New York.
4. Odum, E. P. 1996. Fundamentals of Ecology, Nataraj Publishers, Dehradun.
5. Wilson, E. O. 1999. The Diversity of Life (The College Edition), W.W. Northern and Co.
6. Stiling, P. 2004. Ecology – Theories and Applications, Prentice Hall of India Pvt. Ltd. New Delhi, India.
7. Avise, J.C. 2008. Clonality: The Genetics, Ecology, and Evolution of Sexual Abstinence in Vertebrate Animals. Oxford Univ. Press, New York.
8. Hickman, P. C., Roberts, L.S., Keen, S.L., Larson, A. and D. Eisenhour. 2011. Animal Diversity. McGraw-Hill Higher Education.

MZOE3: ELECTIVE - ANIMAL HEALTH

L	P	T	C
4	0	0	4

Course Objective:

To provide knowledge on animal health, disease control, and related farm management practices.

Learning Outcome:

- Know the importance of animal nutrition, nutritional deficiency diseases and feed management.
- Learn the control and management of zoonotic organisms.
- Know the cattle/livestock management practices.

Unit I:Animals nutrition and Nutritional diseases: Animals nutrition- Nutritional importance of carbohydrates, lipids, proteins, vitamins, minerals and water- Nutritional deficiency diseases- Feeds and fodders, Scientific feeding of livestock, Feeding schedule for different categories of livestock and poultry- Feed additives- Silage making, Diet formulation for newborn, growing, pregnant, lactating and sick animals; Milking techniques and clean milk production- Sanitation and hygiene practices, Common health problems and their prevention. 14h-

Unit II:Zoonoses: Introduction to Zoonoses- Viral Zoonoses, Signs, symptoms, diagnosis and treatment of (Rabies, Japanese encephalitis, Dengue, SARS, Swine Influenza and Yellow fever)- Bacterial Zoonoses (Anthrax, Borreliosis, leptospiroses, plague, vibrioses, tuberculosis and Tetanus)- Rickettsioses (Scrub Typhus, Murine Typhus; Tick Typhus)- Parasitic Zoonoses (Toxoplasmosis, leishmaniases and Filariasis)- Fungal Zoonoses (Aspergillosis, Candidiasis, Histoplasmosis and blastomycosis)- Zoonoses associated with meat, fish and milk- Prevention and control measures of Zoonotic diseases. -14h

Unit III:**Epidemiology:** Principles of epidemiology, surveillance, forecasting and monitoring of diseases- Public health considerations of Disposal of cadaver and clinical waste- Guidelines for control of contagious diseases and infectious diseases, disease outbreaks- Prevention of cruelty to animals (CSPSCEA guidelines)- Introduction of Pharmacology, Nature and sources of drugs, Routes of drug administration, Dosage forms, Antiseptics and disinfectants- Handling of Hazardous substances. -12h

Unit IV :Poultry disease and Management: Chicken breeds, Duck breeds, Goose breeds and Turkey breeds- Poultry Nutrition- Diseases of poultry: Common poultry diseases, Different types of poultry diseases, Signs, symptoms, diagnosis and treatment of Bacterial, Viral, Parasitic diseases in poultry- Importance of water in poultry health- Integrated diseases prevention management in poultry- Epidemic threat from poultry farming- Epidemiology of Newcastle disease and economics of its control- Transmission, infection, pathogenesis and prevention of H5NI, Avian flu and Fowlpox- Flu vaccines- Probiotics in the Poultry industry. -10h

Unit V:Cattle Disease and Management: Dairy Breeds: Indigenous breeds of Cow, Buffalo, Goat ad Sheep-Dairy products- Common Dairy diseases; Signs, symptoms, diagnosis and treatment of Bacterial, Viral, Fungal, Parasitic diseases in Dairy- Integrated diseases prevention management in Dairy- Epidemiology of Foot and mouth diseases- Anthrax disease, Bluetongue, Bovine ephemeral fever, transmission, infection, pathogenesis and prevention- Vaccines- Artificial insemination for Live stock improvement. -10h

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60h

Reference Books:

1. Naresh Mahajan. 2014. Hand book of Poultry of Diseases. Random Publications, New Delhi.
2. Sumen kumara Joshi 2015.A text book of Zoonotic Diseases. Satish Serial publishing house,Delhi
3. Divyesh Pandey .2014. Poultry Husbandry. Random Publications, New Delhi.

(OR)

MZOE4: ELECTIVE – APPLIED ZOOLOGY

L	P	T	C
4	0	0	4

Course Objective: To provide knowledge on vermiculture techniques, harmful insects related to agriculture, infectious and communicable diseases, live stocks diseases and farming also on the significance and economic importance of sericulture and apiculture.

Learning outcome:

- Know the importance of productive insects and their conservation strategies.
- Learn the management and control of causative agents.

Unit I:**Apiculture and Sericulture**: APICCULTURE: Types of honey bees, social organization, Life history of honey-bee, Bee keeping, Economic importance of honey bee, Bee Hive, Management of Bee Hive, Swarming, Pests and diseases. SERICULTURE: Silk moth, silk farming-cocoon processing-other farm of silk:-Tasar silk, Muga silk and Eri silk-Pests and Diseases in silkworm. -12h

Unit II**: Agricultural Zoology**: Beneficial Insects: Mantis-lady bird beetle-damsel fly-Predators-Parasitoids. Harmful Insects: Migratory locust, Rhinoceros beetle-Aphids-Economic Importance of rodents, snakes and bates. -10h

Unit III:**Medical Zoology:** Infectious and communicable diseases: Small box, AIDS, Influenza, Tuberculosis, Plaque, Cholera, Amoebiasis, Malaria, Dengue, Chicgunkunya, Trypanosomiasis and Elephantiasis. Vectors - definition, types of vector. Arthropod vector of medical importance. -12 h

Unit IV: **Veterinary Zoology**: Importance of live stock, cattle, coat, sheep and rabbit-live stock diseases: Anthrax, Ranikhet-Live stock parasites: Helminthes- Arthropod vector of veterinary importance – sand flies, mosquitoes, horse flies and Rat flea, ticks, mites and vector control. Diary and Poultry farming. -12h

Unit V: **Vermiculture**: Vermiculture – definition, scope and importance. Exotic species of earthworm-Biology of *Eisenia fetida* &*Eudrilus eugeniae*-Taxonomy Anatomy, physiology and reproduction .Culture methods: indoors and out door; Monoculture and polyculture. Applications of Vermiculture /Vermiculture Bio-technology. Vermicomposting, Chemical composition of vermicastings. Use of Earthworms as feed/bait for capture/culture fisheries. Role of earthworms in agro-ecosystems Land reclamation and sustainable soil fertility; forest regeneration Earthworms for management of municipal/selected biomedical solid wastes. -14h

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60h

Reference Books:

1. Edwards CA & Bater JE. 1977. Biology of Earthworms. Chapman & Hall.
2.Edwards CA. 1998. Earthworm Ecology. CRC Press.
3.Sultan Ahmed Ismail,2005. The Earthworm Book, Second Revised Edition. Other India Press, Goa, India.

4.Shukla, G.S. and V.B.Upandhyya.2017. Economic Zoology, 5th Edition. Rev.Edn.Rastogi Publ., Meerut.

5. Kotpal , R.L.2000. Modern text of Zoology. Rastogi Publication.

6. Ashok Kumar ,2000. Text book of Animal Disease, Sonali Publication

7. Pradip,V.Jabde.2005. Text book of Applied Zoology.

8.Ashok Kumar and Prem Mohan Nigam.1991. Economic and Applied Entomology. Emjkay Publications, New Delhi.

SEMESTER-II: MZOP5-PROJECT WORK