St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Computer Programming in C ++
Course Code	**GMPH41**
Class	II Year (2014-2015)
Semester	Even
Staff Name	Dr. A.Arul Gnanam Dr.R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To Learn about C++ Programme
- 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
- To discuss about operators.
- To learn about programme goading.

Syllabus

OBJECT ORIENTED PROGRAMMING WTH C++

UNIT-I: Evolution of C++ - applications of C++ - structure of C++ program. Tokens – keywords – identifiers and constants

– basic data types – user-defined data types – constant pointers and pointers to constants – symbolic constants –type compatibility – declaration of variables – dynamic initialization of variables – reference variables – operators in C++ - scope resolution

operator – memory management operators – manipulators – type cast operator – expressions and their types – special assignment expressions –

implicit conversions – operator precedence.

UNIT-II: Functions in C++ : The main function – function prototyping – call by reference – return by reference – inline functions – default arguments – const arguments – function overloading. Managing Console I/O Operations: C++ streams – C++ stream classes – unformatted console I/O operations – formatted console I/O operations –managing output with manipulators.

UNIT-III: Classes and Objects: Specifying a class – defining member functions – making an outside function inline – nesting of member functions – private member functions – arrays within a class – memory allocation for objects –arrays of objects – objects as function arguments – friend functions – returning objects – const member functions. Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class – constructors with default arguments – copy constructor.

UNIT-IV: Operator Overloading: Introduction – defining operator overloading – overloading unary operators – overloading binary operators - overloading binary operators using friends – rules for overloading operators. Inheritance: Introduction – defining derived classes – single inheritance – making a private member inheritable – multilevel inheritance – multiple inheritance – hierarchical inheritance – hybrid inheritance

UNIT-V: Working with Files: Introduction – Classes for File Stream Operations - Opening and Closing a File – Detecting End-of-file – More about open( ): File Modes – File Pointers and their Manipulations – Sequential Input and Output Operations – Updating a File: Random Access

Course Calendar

Hour allotment	**Class Schedule**
	EVEN Semester 03.12.2014
1-L1	UNIT-I: Evolution of C++ - applications of C++
2-L2	Tokens – keywords – identifiers and constants
3- L3	basic data types – user-defined data types
4-L4	constant pointers and pointers to constants – symbolic constants

5-L5	constant pointers and pointers to constants – symbolic constants
6-L6	type compatibility – declaration of variables – dynamic initialization of variables – reference variables
7-L7	operators in C++ - scope resolution operator – memory management operators
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	manipulators – type cast operator – expressions and their types – special assignment expressions
10- L9	implicit conversions – operator precedence
11-L10	Functions in C++ : The main function – function prototyping – call by reference
12-L11	return by reference – inline functions – default arguments – const arguments – function overloading
13-L12	Managing Console I/O Operations: C++ streams – C++ stream classes – unformatted console I/O operations – formatted console I/O
14-L13	formatted console I/O operations –managing output with manipulators.
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 19.01.2015
16-L15	Classes and Objects: Specifying a class – defining member functions – making an outside function inline – nesting of member functions
17-IT-1	**Internal Test-I**
18-L16	private member functions – arrays within a class – memory allocation for object
19-L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	arrays of objects – objects as function arguments – friend functions – returning objects – const member functions.
21- L19	Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class
22- P2	College level meeting/Cell function
23-L20	Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class
24-L21	Operator Overloading: Introduction
25-L22	defining operator overloading – overloading unary operators
26-L23	overloading binary operators - overloading binary operators using friends –
27-L24	overloading binary operators - overloading binary operators using friends –
28-L25	rules for overloading operators
29-L26	Inheritance: Introduction
30-L27	defining derived classes
31-L28	single inheritance
32-L29	making a private member inheritable
33-L30	multilevel inheritance
34- P3	**Department Seminar**
35-L31	**Rivision**
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 16.02.2015
37- L33	**hierarchical inheritance**
38- IT-II	**Internal Test-II**
39-L34	hybrid inheritance
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	**Working with Files: Introduction**

42- L37	Classes for File Stream Operations
43- L38	Opening and Closing a File
44- P4	College level meeting/ function
45-L39	Detecting End-of-file
46-L40	More about open
47-L41	**Revision**
48-L42	**Revision Class**
49-L43	**File Modes**
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 16.03.2015
51 L45	**File Pointers and their Manipulations**
52- L46	**Revision**
53-IT-III	**Internal Test-III**
54-L47	Sequential Input and Output Operations – Updating a File: Random Access
55-L48	Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
	Model Test begins 16.04.2015
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.4.2015

Course Outcomes

Learning Outcomes	**COs** of the course “<Computer Programming in C ++>”
CO1	Get insight knowledge about the language.
CO2	Get trained in writing small programs.
CO3	Capable of executes any programs and identifying errors in them
CO4	Design and implement C programs for any given problem
CO5	Work with existing programs and modify it as per the requirements.
CO6	Identify the errors in a C program.
CO7	Identify the output of a C program without actually executing it
Experimental Learning	
EL1	Capable coding any problem.
EL2	Capable of identifying errors in a coding
EL3	Capable handling any project assigned by a company.
Integrated Activity	
IA1	Individual and Team Work: Function effectively on teams to accomplish a common goal
IA2	Communication: Communicate effectively with a range of audiences and prepare technical documents and make effective oral presentations

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Statistical Mechanics
Course Code	GMPH6A
Class	III year (2014-2015)
Semester	Even
Staff Name	Mr. A. Arul Gnanam
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- understand the strength and limitations of the models used and be able to compare different microscopic models
- describe transport phenomena and show an understanding on how diffusion coefficients are computed
- show an analytic ability to solve problems relevant to statistical mechanics

Syllabus

STATISTICAL MECHANICS
(Major Elective Paper)
Unit I
Statistical basis- probability- principle of equal a priori probability -microstate and macro state- thermodynamic probability -constrains on a system -static and dynamic systems -most probable state (equilibrium state) -concept of a cell in a compartment -ensemble and average properties
Unit II
Degrees of freedom -position space -momentum space- phase space- the mu- space and gamma space- applications -fundamental postulates of statistical mechanics –density of quantum
states of energy of a particle-statistical ensembles- comparison of ensembles- theories based on
statistical mechanics -entropy and probability- Boltzmann‘s canonical distribution law applications

of Boltzmann‘s canonical distribution law-
Unit III
The law of equipartion of energy- statistical interpretation of second law of thermodynamics- partition function and its relation with thermodynamic quantities -entropy of an ideal gas- Gibbs paradox
Unit IV
Three kinds of particles -M.B statistics applicable to ideal gas -Maxwell Boltzmann energy distribution law - applications of M.B distribution law -mean rms and most probable speeds-Maxwell‘s distribution law of velocities-experimental verification Maxwellian distribution of molecular speeds
Unit V
Need of quantum statistics -development of quantum statistics- Bose Einstein distribution law- photon gas- Plank‘s radiation law -Fermi Dirac distribution law-free electrons in metal:electron gas= Fermi level and Fermi energy –EF for electrons in a metal-comparison of the three statistics -difference between classical and quantum statistics
Reference Book:
Heat thermodynamics and statistical physics: Brij Lal N.Subramanium P.S Hemne S.Chand publications
Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 03.12.2014
1-L1	Statistical basis- probability
2-L2	principle of equal a priori probability
3- L3	microstate and macrostate
4-L4	thermodynamic probability
5-L5	constrains on a system
6-L6	static and dynamic systems
7-L7	mostprobable state (equilibrium state)
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	concept of a cell in a compartment
10- L9	ensemble and averageproperties
11-L10	Unit II Degrees of freedom
12-L11	position space -momentum space
13-L12	mu- space and gamma space
14-L13	applications -fundamental postulates of statistical mechanics
15-L14	density of quantum
16-L15	states of enrgy of a particle-statistical ensembles
17- L16	comparison of ensembles- theories based on
18- L17	statistical mechanics -entropy and probability
19- L18	Boltzmann‘s canonical distribution lawapplications
20- L19	Boltzmann‘s canonical distribution law
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins19.01.2015
22- L21	The law of equipartion of energy
23- IT-1	**Internal Test-I**
24- L22	statistical interpretation

25- L23	statistical interpretation of second law of thermodynamics
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	partition function
28- L26	its relation with thermodynamic quantities
29- L27	entropy of an ideal gas
30- P2	**College level meeting/Cell function**
31-L28	- Gibbs paradox
32-L29	Practical Explanation
33-L30	Three kinds of particles
34- L31	M.B statistics applicable to ideal gas
35- L32	Problems Explanation
36- L33	Practical Work
37- L34	Maxwell Boltzmann Explanation
38-L35	Maxwell‘s distribution law of velocities
39- L36	experimental verification Maxwellian distribution ofmolecular speeds
40- L37	Need of quantum statistics
41- L38	development of quantum statistics
42-P3	**Department Seminar**
43- L39	Bose Einstein distribution law
44- L40	photon gas
45- L41	Fermi Dirac distribution law
46- L42	Plank‘s radiation law
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins16.02.2015
48- L44	Fermi Dirac distribution law
49-IT-II	**Internal Test-II**
50-L45	free electrons in metal
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	electron gas Fermi level
53- L48	Fermi energy
54- L49	EF for electrons in a metal
55- L50	comparison of the three statistics
56- L51	difference between classical and quantum statistics
57- L52	Statistics and Explanation
58- L53	Practical Work
59-P4	**College level meeting/ function**
60- L54	Problems Solution
61- L55	Problems
62- L56	Fermi Energy Calculation
63- L57	Bose Einstein distribution law
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins16.03.2015
65- L59	Bose Einstein Law Explanation
66- L60	Theory Verification
67-IT-III	**Internal Test-III**
68- L61	Revision

69- L62	Revision Test
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins16.04.2015
71-MT	**Model Test**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2015

Course Outcomes

Learning Outcomes	**COs** of the course “<**statistical mechanics** >”
CO1	Give an account of the theory of **statistical mechanics** and the approximations making a **statistical** description possible.
CO2	Apply the theory to understand gases and crystals and in addition be able to construct microscopic models and from these derive thermodynamic observables.
CO3	apply the theory to understand gases and crystals and in addition be able to construct microscopic models and from these derive thermodynamic observables
CO4	Explain statistical physics and thermodynamics as logical consequences of the postulates of statistical mechanics;
CO5	apply the principles of statistical mechanics to selected problems
CO6	apply techniques from statistical mechanics to a range of situations;
CO7	use the tools, methodologies, language and conventions of physics test and communicate ideas and explanations
CO8	use the tools, methodologies, language and conventions of physics to test and communicate ideas and explanation
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Atomic Physics
Course Code	GMPH51
Class	III year (2014-2015)
Semester	Odd
Staff Name	Mr.A.Arul Gnanam
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To learn electron band theory of solids
- To understand types of spectroscopy
- How to use X-rays and Photoelectric effect.
- To learn atomic structure, and Principle

Syllabus

ATOMIC PHYSICS

UNIT I

The electron ,band theory of solids and positive rays : The free Electron Theory of metals –
Expression for electrical conductivity – expressions for thermal conductivity – Determination of the electronic charge : Millikan‘s oil drop method-electron microscope – band theory of solids – classification of solids on the basis of band theory – optical properties of solids - - energy bands Brillouin zones-origin of forbidden bands

UNIT II

Properties of positive rays – positive ray analysis – Thomson‘s parabola method-Aston‘s mass spectrograph – Bainbridge‘s mass spectrograph – Dempster‘s mass spectrograph – mass defect and packing fraction- Dunnington‘s method of determining e/m

UNIT III

Structure of atom: The vector atom model – quantum numbers associated with the the vector atom model – coupling schemes – the Pauli exclusions exclusion principle – the periodic
classification of elements – magnetic dipole moment due to orbital motion of the electromagnetic dipole moment due to spin-the Stern and Gerlach experiment- quantum mechanical explanation of normal and anomoulous Zeeman effect.

UNIT IV

X-rays: Production of X-rays – spacing between three dimensional lattice planes – the absorption of X-rays – X-ray absorption edges – Bragg's law – the Bragg's X-ray spectrometer – the power crystal method –(a) the Laue method - (b) rotating crystal method – X-ray spectra – characteristic of X-ray spectrum – Moseley's law – Compton scattering

UNIT V

Photoelectric effect and planck's quantum theory: Experimental investigations on the photoelectric effect – failure of electromagnetic theory-Einstein's photoelectric equation – photoelectric cells – Planck's quantum theory-the distribution of energy in the spectrum of a black body-Wien's displacement law-Planck's hypothesis-derivation of Planck's law of radiation

Books for reference:

1. MODERN PHYSICS - By R.Murugeshan and Kiruthiga Sivaprasath (14th Revised multicolour edition) ,S.Chand & Company Ltd. Ram nagar ,New Delhi-110055
2. MODERN PHYSICS - By B.S.Agarwal,Kedarnath Ramnath,Meerut,Delhi
3. ATOMIC AND NUCLEAR PHYSICS- N.Subrahmanyam Brijlal, S.Chand & Company Ltd. Ram nagar ,New Delhi-110055
4. MODERN PHYSICS – B.V.N. Rao,Wiley Eastern Ltd,New Delhi
5. An Introduction to MODERN PHYSICS- P.Mahendru,16/7698 New market,New Rohtak road, Satyaprakashan ,New Delhi-11
6. Halliday Rhesnick walker Ed 6 Wiley

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2014
1-L1	The electron ,band theory of solids and positive rays
2-L2	The free Electron Theory of metals
3- L3	Expression for electrical conductivity – expressions for thermal conductivity
4-L4	expressions for thermal conductivity
5-L5	Determination of the electronic charge
6-L6	Millikan's oil drop method-electron microscope
7-L7	band theory of solids
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	classification of solids on the basis of band theory
10- L9	optical properties of solids
11-L10	energy bands Brillouin zones-origin of forbidden bands
12-L11	Properties of positive rays – positive ray analysis
13-L12	Thomson's parabola method
14-L13	Aston's mass spectrograph
15-L14	**Allotting portion for Internal Test-I**

	Internal Test I begins30.07.2014
16-L15	Bainbridge's mass spectrograph
17-IT-1	**Internal Test-I**
18-L16	Dempster's mass spectrograph
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	mass defect and packing fraction
21- L19	Dunnington's method of determining e/m
22- P2	**College level meeting/Cell function**
23-L20	Structure of atom : The vector atom model
24-L21	quantum numbers associated with the the vector atom model
25-L22	coupling schemes
26-L23	the Pauli exclusions exclusion principle
27-L24	Periodic classification of elements
28-L25	magnetic dipole moment due to orbital motion of the electronmagnetic dipole moment due to spin
29-L26	the Stern and Gerlach experiment
30-L27	quantum mechanical explanation of normal and anomoulous Zeeman effect.
31-L28	X-rays: Production of X-rays
32-L29	spacing between three dimensional lattice planes
33-L30	absorption of X-rays
34- P3	**Department Seminar**
35-L31	Problem Solving
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 18.08.2014
37- L33	Revision
38- IT-II	**Internal Test-II**
39-L34	X-ray absorption edges
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Bragg's law
42- L37	the Bragg's X-ray spectrometer
43- L38	the power crystal method
44- P4	**College level meeting/ function**
45-L39	X-ray spectra characteristic of X-ray spectrum – Moseley's law – Compton scattering
46-L40	Photoelectric effect and planck's quantum theory: Experimental investigations on the photoelectric effect
47-L41	failure of electromagnetic theory
48-L42	photoelectric cells – Planck's quantum theory-the distribution of energy in the spectrum of a black body
49-L43	Wien's displacement law-Planck's hypothesis-derivation of Planck's law of radiation
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 15.09.2014
51 L45	Class Test
52- L46	Problem Solving
53-IT-III	**Internal Test-III**

54-L47	Revision
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins 24.10.2014
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2014

Course Outcomes

Learning Outcomes	**COs** of the course “<Atomic Physics >”
CO1	The structure and dynamics of atoms and simple molecules.
CO2	The interaction between atoms, molecules and electromagnetic fields. collision processes involving atoms, charged particles and molecules..
CO3	The structure of the periodic system, many-electron and relativistic effects
CO4	Get the knowledge about forces help the students in their daily life.
CO5	The velocity and acceleration parameter give the knowledge about how the vehicles Move.
CO6	The information will teach the students about the rolling concept.
CO7	The course provide the students about the knowledge of M.I.
CO8	The course provide the students about the knowledge of hollow cylinder and solid cylinder
CO9	The course will give knowledge about the general parameter like velocity, acceleration
Experimental Learning	
EL1	Experimental nuclear physics is the practical investigation of the processes that occur at the heart of an atom.
EL2	This includes building a better fundamental understanding of fusion and fission, and harnessing them for sustained energy generation.
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

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Department of Physics

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Electricity and Magnetism
Course Code	GMPH31
Class	II year (2014-2015)
Semester	Odd
Staff Name	Mrs. R. Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To learn electricity and magnetism
- To understand electric Current
- How to apply Transient Current
- To understand Alternating Current

Syllabus

ELECTRICITY AND MAGNETISM
Unit I
Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux – Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux – electric potential – relation connecting electric potential and electric field – potential at a point due to a point charge – potential due to an electric dipole – capacity – capacitance of a spherical and cylindrical
Capacitor – energy of a charged capacitor – Loss of energy due to sharing of charges.
Unit II
Chemical Effects of Electric Current: Faraday‘s Laws of Electrolysis – electrical Conductivity of an electrolyte – specific conductivity – Kohlrausch bridge – Thermoelectricity –

Seebeck effect – Peltier effect – Thomson effect – total e.m.f – thermodynamics of thermocouple
– thermoelectric power diagram – its uses – applications.

Unit III

Transient Current: Growth and decay of current in a circuit containing resistance and inductance – Growth and decay of charge in a circuit containing resistance and capacitance – Determination of high resistance by leakage – Growth and decay of charge in a LCR circuit – condition for the discharge to be oscillatory – Frequency of Oscillation.

672

Unit IV

Alternating Current: j operator – properties – use of j operator in the study of A.C Circuit With R only – inductance only – capacitance only – LCR series and parallel circuits – power in an AC circuit – Wattless current – choke coil – construction and working of AC generator, 1 phase and 3 phase AC generator – distribution of 3 phase AC – star connection – delta Connection.

Unit V

Magnetic Properties of Materials: Magnetic induction – Magnetism – Relation between B, H and M – Magnetic susceptibility – Magnetic permeability – Relation between them – Electron theory of dia, para and ferromagnetism – Determination of susceptibility – Curie balance method – Moving coil Ballistic galvanometer – construction – theory – correction for damping in B.G – Measurement of Charge sensitiveness – absolute capacity of a condenser.

Books for Study and reference:

1.Electricity and Magnetism - D.N. Vasudeva
2.Electricity and Magnetism - Brijlal and Subramanian
3.Electricity and Magnetism - R. Murugeshan
4.Electricity and Magnetism - K.K. Tewari
5.Halliday Rhesnick walker Ed 6 Wiley

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.6.2014
1-L1	Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux
2-L2	Coulomb‘s law – electric field – electric dipole – electric flux – electric potential relation connecting electric potential and electric field
3- L3	potential at a point due to a point charge – potential due to an electric dipole
4-L4	potential due to an electric dipole – capacity
5-L5	capacitance of a spherical and cylindrical
6-L6	capacitor – energy of a charged capacitor – Loss of energy due to sharing of charges
7-L7	Unit II Chemical Effects of Electric Current: Faraday‘s Laws of Electrolysis
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Electrical conductivity of an electrolyte
10- L9	specific conductivity – Kohlrausch bridge – Thermoelectricity –
11-L10	See beck effect – Peltier effect – Thomson effect
12-L11	thermoelectric power diagram – its uses – applications
13-L12	Unit III Transient Current: Growth and decay of current in a circuit

14-L13	Growth and decay of charge in a circuit containing resistance and capacitance
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 30.07.2014
16-L15	Determination of high resistance by leakage
17-IT-1	Growth and decay of charge in a LCR circuit **Internal Test-I**
18-L16	condition for the discharge to be oscillatory – Frequency of Oscillation.
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Alternating Current: j operator – properties
21- L19	properties – use of j operator in the study of A.C Circuit
22- P2	**College level meeting/Cell function**
23-L20	inductance only – capacitance only – LCR series and parallel circuits – power in an AC circuit
24-L21	Wattless current – choke coil
25-L22	construction and working of AC generator, 1
26-L23	phase and 3 phase AC generator
27-L24	distribution of 3 phase AC
28-L25	star connection – delta connection.
29-L26	Magnetic Properties of Materials
30-L27	Magnetic induction – Magnetism
31-L28	Relation between B, H and M – Magnetic susceptibility
32-L29	Magnetic permeability
33-L30	Relation between them Electron theory of dia, para and ferromagnetism
34- P3	**Department Seminar**
35-L31	Determination of susceptibility
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 18.08.2014
37- L33	Curie balance method
38- IT-II	**Internal Test-II**
39-L34	Moving coil Ballistic galvanometer
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Moving coil Ballistic galvanometer – construction
42- L37	theory – correction for
43- L38	correction for damping in B.G
44- P4	**College level meeting/ function**
45-L39	Measurement of Charge sensitiveness
46-L40	absolute capacity of a condenser
47-L41	Solving Problems
48-L42	Curie balance method explanation
49-L43	.Determination of susceptibility
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 15.09.2014
51 L45	Practical explanation
52- L46	Measurement of Charge sensitiveness
53-IT-III	**Internal Test-III**
54-L47	Revision

55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins 24.10.2014
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2014

Course Outcomes

Learning Outcomes	**COs** of the course “<Electricity and Magnetism>”
CO1	The use of Coulomb's law and Gauss' law for the electrostatic force
CO2	The relationship between electrostatic field and electrostatic potential
CO3	The use of the Lorentz force law for the magnetic force
CO4	The use of Ampere's law to calculate magnetic fields
CO5	The use of Faraday's law in induction problems
CO6	The basic laws that underlie the properties of electric circuit elements
Experimental Learning	
EL1	The abstraction from forces to fields using the examples of the electric and magnetic fields, with some applications
EL2	The connection between conservative forces and potential energy
EL3	How charges move through electric circuits -
EL4	The close connection between electricity and magnetism, leading to the discovery of electromagnetic waves.
EL5	the integral form of Maxwell's Equations
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Electricity and Magnetism
Course Code	GMPH31
Class	II year (2014-2015)
Semester	Odd
Staff Name	Mrs. R. Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To learn electricity and magnetism
- To understand electric Current
- How to apply Transient Current
- To understand Alternating Current

Syllabus

ELECTRICITY AND MAGNETISM
Unit I
Electrostatics: Coulomb's law – electric field – electric dipole – electric flux – Electrostatics: Coulomb's law – electric field – electric dipole – electric flux – electric potential – relation connecting electric potential and electric field – potential at a point due to a point charge – potential due to an electric dipole – capacity – capacitance of a spherical and cylindrical
Capacitor – energy of a charged capacitor – Loss of energy due to sharing of charges.
Unit II
Chemical Effects of Electric Current: Faraday's Laws of Electrolysis – electrical Conductivity of an electrolyte – specific conductivity – Kohlrausch bridge – Thermoelectricity –

Seebeck effect – Peltier effect – Thomson effect – total e.m.f – thermodynamics of thermocouple
– thermoelectric power diagram – its uses – applications.

Unit III

Transient Current: Growth and decay of current in a circuit containing resistance and inductance – Growth and decay of charge in a circuit containing resistance and capacitance – Determination of high resistance by leakage – Growth and decay of charge in a LCR circuit – condition for the discharge to be oscillatory – Frequency of Oscillation.

672

Unit IV

Alternating Current: j operator – properties – use of j operator in the study of A.C Circuit With R only – inductance only – capacitance only – LCR series and parallel circuits – power in an AC circuit – Wattless current – choke coil – construction and working of AC generator, 1 phase and 3 phase AC generator – distribution of 3 phase AC – star connection – delta Connection.

Unit V

Magnetic Properties of Materials: Magnetic induction – Magnetism – Relation between B, H and M – Magnetic susceptibility – Magnetic permeability – Relation between them – Electron theory of dia, para and ferromagnetism – Determination of susceptibility – Curie balance method – Moving coil Ballistic galvanometer – construction – theory – correction for damping in B.G – Measurement of Charge sensitiveness – absolute capacity of a condenser.

Books for Study and reference:

1.Electricity and Magnetism - D.N. Vasudeva
2.Electricity and Magnetism - Brijlal and Subramanian
3.Electricity and Magnetism - R. Murugeshan
4.Electricity and Magnetism - K.K. Tewari
5.Halliday Rhesnick walker Ed 6 Wiley

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.6.2014
1-L1	Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux
2-L2	Coulomb‘s law – electric field – electric dipole – electric flux – electric potential relation connecting electric potential and electric field
3- L3	potential at a point due to a point charge – potential due to an electric dipole
4-L4	potential due to an electric dipole – capacity
5-L5	capacitance of a spherical and cylindrical
6-L6	capacitor – energy of a charged capacitor – Loss of energy due to sharing of charges
7-L7	Unit II Chemical Effects of Electric Current: Faraday‘s Laws of Electrolysis
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Electrical conductivity of an electrolyte
10- L9	specific conductivity – Kohlrausch bridge – Thermoelectricity –
11-L10	See beck effect – Peltier effect – Thomson effect
12-L11	thermoelectric power diagram – its uses – applications
13-L12	Unit III Transient Current: Growth and decay of current in a circuit

14-L13	Growth and decay of charge in a circuit containing resistance and capacitance
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 30.07.2014
16-L15	Determination of high resistance by leakage
17-IT-1	Growth and decay of charge in a LCR circuit **Internal Test-I**
18-L16	condition for the discharge to be oscillatory – Frequency of Oscillation.
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Alternating Current: j operator – properties
21- L19	properties – use of j operator in the study of A.C Circuit
22- P2	**College level meeting/Cell function**
23-L20	inductance only – capacitance only – LCR series and parallel circuits – power in an AC circuit
24-L21	Wattless current – choke coil
25-L22	construction and working of AC generator, 1
26-L23	phase and 3 phase AC generator
27-L24	distribution of 3 phase AC
28-L25	star connection – delta connection.
29-L26	Magnetic Properties of Materials
30-L27	Magnetic induction – Magnetism
31-L28	Relation between B, H and M – Magnetic susceptibility
32-L29	Magnetic permeability
33-L30	Relation between them Electron theory of dia, para and ferromagnetism
34- P3	**Department Seminar**
35-L31	Determination of susceptibility
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 18.08.2014
37- L33	Curie balance method
38- IT-II	**Internal Test-II**
39-L34	Moving coil Ballistic galvanometer
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Moving coil Ballistic galvanometer – construction
42- L37	theory – correction for
43- L38	correction for damping in B.G
44- P4	**College level meeting/ function**
45-L39	Measurement of Charge sensitiveness
46-L40	absolute capacity of a condenser
47-L41	Solving Problems
48-L42	Curie balance method explanation
49-L43	.Determination of susceptibility
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 15.09.2014
51 L45	Practical explanation
52- L46	Measurement of Charge sensitiveness
53-IT-III	**Internal Test-III**
54-L47	Revision

55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins 24.10.2014
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2014

Course Outcomes

Learning Outcomes	**COs** of the course "<Electricity and Magnetism>"
CO1	The use of Coulomb's law and Gauss' law for the electrostatic force
CO2	The relationship between electrostatic field and electrostatic potential
CO3	The use of the Lorentz force law for the magnetic force
CO4	The use of Ampere's law to calculate magnetic fields
CO5	The use of Faraday's law in induction problems
CO6	The basic laws that underlie the properties of electric circuit elements
Experimental Learning	
EL1	The abstraction from forces to fields using the examples of the electric and magnetic fields, with some applications
EL2	The connection between conservative forces and potential energy
EL3	How charges move through electric circuits -
EL4	The close connection between electricity and magnetism, leading to the discovery of electromagnetic waves.
EL5	the integral form of Maxwell's Equations
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature　　　　　　　　　　　　　　　　　　Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2015-2016)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Statistical Mechanics
Course Code	GMPH6A
Class	III year (2015-2016)
Semester	Even
Staff Name	Mr. A. Arul Gnanam
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- understand the strength and limitations of the models used and be able to compare different microscopic models
- describe transport phenomena and show an understanding on how diffusion coefficients are computed
- show an analytic ability to solve problems relevant to statistical mechanics

Syllabus

STATISTICAL MECHANICS
(Major Elective Paper)
Unit I
Statistical basis- probability- principle of equal a priori probability -microstate and macro state- thermodynamic probability -constrains on a system -static and dynamic systems -most probable state (equilibrium state) -concept of a cell in a compartment -ensemble and average properties
Unit II
Degrees of freedom -position space -momentum space- phase space- the mu- space and gamma space- applications -fundamental postulates of statistical mechanics –density of quantum

states of energy of a particle-statistical ensembles- comparison of ensembles- theories based on
statistical mechanics -entropy and probability- Boltzmann‘s canonical distribution law applications of Boltzmann‘s canonical distribution law-

Unit III

The law of equipartion of energy- statistical interpretation of second law of thermodynamics- partition function and its relation with thermodynamic quantities -entropy of an ideal gas- Gibbs paradox

Unit IV

Three kinds of particles -M.B statistics applicable to ideal gas -Maxwell Boltzmann energy distribution law - applications of M.B distribution law -mean rms and most probable speeds-Maxwell‘s distribution law of velocities-experimental verification Maxwellian distribution of molecular speeds

Unit V

Need of quantum statistics -development of quantum statistics- Bose Einstein distribution law- photon gas- Plank‘s radiation law -Fermi Dirac distribution law-free electrons in metal:electron gas= Fermi level and Fermi energy –EF for electrons in a metal-comparison of the three statistics -difference between classical and quantum statistics

Reference Book:

Heat thermodynamics and statistical physics: Brij Lal N.Subramanium P.S Hemne S.Chand publications

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 02.12.2015
1-L1	Statistical basis- probability
2-L2	principle of equal a priori probability
3- L3	microstate and macrostate
4-L4	thermodynamic probability
5-L5	constrains on a system
6-L6	static and dynamic systems
7-L7	mostprobable state (equilibrium state)
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	concept of a cell in a compartment
10- L9	ensemble and averageproperties
11-L10	Unit II Degrees of freedom
12-L11	position space -momentum space
13-L12	mu- space and gamma space
14-L13	applications -fundamental postulates of statistical mechanics
15-L14	density of quantum
16-L15	states of enrgy of a particle-statistical ensembles
17- L16	comparison of ensembles- theories based on
18- L17	statistical mechanics -entropy and probability
19- L18	Boltzmann‘s canonical distribution lawapplications
20- L19	Boltzmann‘s canonical distribution law
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins25.01.2015

22- L21	The law of equipartion of energy
23- IT-1	**Internal Test-I**
24- L22	statistical interpretation
25- L23	statistical interpretation of second law of thermodynamics
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	partition function
28- L26	its relation with thermodynamic quantities
29- L27	entropy of an ideal gas
30- P2	**College level meeting/Cell function**
31-L28	- Gibbs paradox
32-L29	Practical Explanation
33-L30	Three kinds of particles
34- L31	M.B statistics applicable to ideal gas
35- L32	Problems Explanation
36- L33	Practical Work
37- L34	Maxwell Boltzmann Explanation
38-L35	Maxwell‘s distribution law of velocities
39- L36	experimental verification Maxwellian distribution ofmolecular speeds
40- L37	Need of quantum statistics
41- L38	development of quantum statistics
42-P3	**Department Seminar**
43- L39	Bose Einstein distribution law
44- L40	photon gas
45- L41	Fermi Dirac distribution law
46- L42	Plank‘s radiation law
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins22.02.2016
48- L44	Fermi Dirac distribution law
49-IT-II	**Internal Test-II**
50-L45	free electrons in metal
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	electron gas Fermi level
53- L48	Fermi energy
54- L49	EF for electrons in a metal
55- L50	comparison of the three statistics
56- L51	difference between classical and quantum statistics
57- L52	Statistics and Explanation
58- L53	Practical Work
59-P4	**College level meeting/ function**
60- L54	Problems Solution
61- L55	Problems
62- L56	Fermi Energy Calculation
63- L57	Bose Einstein distribution law
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins28.03.2016
65- L59	Bose Einstein Law Explanation

66- L60	Theory Verification
67-IT-III	**Internal Test-III**
68- L61	Revision
69- L62	Revision Test
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins11.04.2016
71-MT	**Model Test**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 22.04.2016

Course Outcomes

Learning Outcomes	**COs** of the course “<**statistical mechanics** >”
CO1	Give an account of the theory of **statistical mechanics** and the approximations making a **statistical** description possible.
CO2	Apply the theory to understand gases and crystals and in addition be able to construct microscopic models and from these derive thermodynamic observables.
CO3	apply the theory to understand gases and crystals and in addition be able to construct microscopic models and from these derive thermodynamic observables
CO4	Explain statistical physics and thermodynamics as logical consequences of the postulates of statistical mechanics;
CO5	apply the principles of statistical mechanics to selected problems
CO6	apply techniques from statistical mechanics to a range of situations;
CO7	use the tools, methodologies, language and conventions of physics test and communicate ideas and explanations
CO8	use the tools, methodologies, language and conventions of physics to test and communicate ideas and explanation
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2015-2016)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Atomic Physics
Course Code	GMPH51
Class	III year (2015-2016)
Semester	Odd
Staff Name	Mr.A.Arul Gnanam
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To learn electron band theory of solids
- To understand types of spectroscopy
- How to use X-rays and Photoelectric effect.
- To learn atomic structure, and Principle

Syllabus

ATOMIC PHYSICS

UNIT I

The electron ,band theory of solids and positive rays : The free Electron Theory of metals –
Expression for electrical conductivity – expressions for thermal conductivity – Determination of the electronic charge : Millikan's oil drop method-electron microscope – band theory of solids – classification of solids on the basis of band theory – optical properties of solids - - energy bands Brillouin zones-origin of forbidden bands

UNIT II

Properties of positive rays – positive ray analysis – Thomson's parabola method- Aston's mass spectrograph – Bainbridge's mass spectrograph – Dempster's mass spectrograph – mass defect and packing fraction- Dunnington's method of determining e/m

UNIT III

Structure of atom: The vector atom model – quantum numbers associated with the the vector atom model – coupling schemes – the Pauli exclusions exclusion principle – the periodic
classification of elements – magnetic dipole moment due to orbital motion of the electromagnetic dipole moment due to spin-the Stern and Gerlach experiment- quantum mechanical explanation of normal and anomoulous Zeeman effect.

UNIT IV

X-rays: Production of X-rays – spacing between three dimensional lattice planes – the absorption of X-rays – X-ray absorption edges – Bragg's law – the Bragg's X-ray spectrometer – the power crystal method –(a) the Laue method - (b) rotating crystal method – X-ray spectra – characteristic of X-ray spectrum – Moseley's law – Compton scattering

UNIT V

Photoelectric effect and planck's quantum theory: Experimental investigations on the photoelectric effect – failure of electromagnetic theory-Einstein's photoelectric equation – photoelectric cells – Planck's quantum theory-the distribution of energy in the spectrum of a black body-Wien's displacement law-Planck's hypothesis-derivation of Planck's law of radiation

Books for reference:

1. MODERN PHYSICS - By R.Murugeshan and Kiruthiga Sivaprasath (14^{th} Revised multicolour edition) ,S.Chand & Company Ltd. Ram nagar ,New Delhi-110055
2. MODERN PHYSICS - By B.S.Agarwal,Kedarnath Ramnath,Meerut,Delhi
3. ATOMIC AND NUCLEAR PHYSICS- N.Subrahmanyam Brijlal, S.Chand & Company Ltd. Ram nagar ,New Delhi-110055
4. MODERN PHYSICS – B.V.N. Rao,Wiley Eastern Ltd,New Delhi
5. An Introduction to MODERN PHYSICS- P.Mahendru,16/7698 New market,New Rohtak road, Satyaprakashan ,New Delhi-11
6. Halliday Rhesnick walker Ed 6 Wiley

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2015
1-L1	The electron ,band theory of solids and positive rays
2-L2	The free Electron Theory of metals
3- L3	Expression for electrical conductivity – expressions for thermal conductivity
4-L4	expressions for thermal conductivity
5-L5	Determination of the electronic charge
6-L6	Millikan's oil drop method-electron microscope
7-L7	band theory of solids
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	classification of solids on the basis of band theory
10- L9	optical properties of solids
11-L10	energy bands Brillouin zones-origin of forbidden bands
12-L11	Properties of positive rays – positive ray analysis
13-L12	Thomson's parabola method
14-L13	Aston's mass spectrograph
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins

16-L15	Bainbridge's mass spectrograph
17-IT-1	**Internal Test-I**
18-L16	Dempster's mass spectrograph
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	mass defect and packing fraction
21- L19	Dunnington's method of determining e/m
22- P2	**College level meeting/Cell function**
23-L20	Structure of atom : The vector atom model
24-L21	quantum numbers associated with the the vector atom model
25-L22	coupling schemes
26-L23	the Pauli exclusions exclusion principle
27-L24	Periodic classification of elements
28-L25	magnetic dipole moment due to orbital motion of the electronmagnetic dipole moment due to spin
29-L26	the Stern and Gerlach experiment
30-L27	quantum mechanical explanation of normal and anomoulous Zeeman effect.
31-L28	X-rays: Production of X-rays
32-L29	spacing between three dimensional lattice planes
33-L30	absorption of X-rays
34- P3	**Department Seminar**
35-L31	Problem Solving
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 20.07.2015
37- L33	Revision
38- IT-II	**Internal Test-II**
39-L34	X-ray absorption edges
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Bragg's law
42- L37	the Bragg's X-ray spectrometer
43- L38	the power crystal method
44- P4	**College level meeting/ function**
45-L39	X-ray spectra characteristic of X-ray spectrum – Moseley's law – Compton scattering
46-L40	Photoelectric effect and planck's quantum theory: Experimental investigations on the photoelectric effect
47-L41	failure of electromagnetic theory
48-L42	photoelectric cells – Planck's quantum theory-the distribution of energy in the spectrum of a black body
49-L43	Wien's displacement law-Planck's hypothesis-derivation of Planck's law of radiation
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 31.08.2015
51 L45	Class Test
52- L46	Problem Solving
53-IT-III	**Internal Test-III**
54-L47	Revision

55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins 05.10.2015
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 16.10.2015

Course Outcomes

Learning Outcomes	**COs** of the course “<Atomic Physics >”
CO1	The structure and dynamics of atoms and simple molecules.
CO2	The interaction between atoms, molecules and electromagnetic fields. collision processes involving atoms, charged particles and molecules..
CO3	The structure of the periodic system, many-electron and relativistic effects
CO4	Get the knowledge about forces help the students in their daily life.
CO5	The velocity and acceleration parameter give the knowledge about how the vehicles Move.
CO6	The information will teach the students about the rolling concept.
CO7	The course provide the students about the knowledge of M.I.
CO8	The course provide the students about the knowledge of hollow cylinder and solid cylinder
CO9	The course will give knowledge about the general parameter like velocity, acceleration
Experimental Learning	
EL1	Experimental nuclear physics is the practical investigation of the processes that occur at the heart of an atom.
EL2	This includes building a better fundamental understanding of fusion and fission, and harnessing them for sustained energy generation.
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2015-2016)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Electricity and Magnetism
Course Code	GMPH31
Class	II year (2015-2016)
Semester	Odd
Staff Name	Mrs. R. Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To learn electricity and magnetism
- To understand electric Current
- How to apply Transient Current
- To understand Alternating Current

Syllabus

ELECTRICITY AND MAGNETISM
Unit I
Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux – Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux – electric potential – relation connecting electric potential and electric field – potential at a point due to a point charge – potential due to an electric dipole – capacity – capacitance of a spherical and cylindrical
Capacitor – energy of a charged capacitor – Loss of energy due to sharing of charges.
Unit II
Chemical Effects of Electric Current: Faraday‘s Laws of Electrolysis – electrical Conductivity of an electrolyte – specific conductivity – Kohlrausch bridge – Thermoelectricity –

Seebeck effect – Peltier effect – Thomson effect – total e.m.f – thermodynamics of thermocouple
– thermoelectric power diagram – its uses – applications.
Unit III
Transient Current: Growth and decay of current in a circuit containing resistance and inductance – Growth and decay of charge in a circuit containing resistance and capacitance – Determination of high resistance by leakage – Growth and decay of charge in a LCR circuit – condition for the discharge to be oscillatory – Frequency of Oscillation.
672
Unit IV
Alternating Current: j operator – properties – use of j operator in the study of A.C Circuit With R only – inductance only – capacitance only – LCR series and parallel circuits – power in an AC circuit – Wattless current – choke coil – construction and working of AC generator, 1 phase and 3 phase AC generator – distribution of 3 phase AC – star connection – delta Connection.
Unit V
Magnetic Properties of Materials: Magnetic induction – Magnetism – Relation between B, H and M – Magnetic susceptibility – Magnetic permeability – Relation between them – Electron theory of dia, para and ferromagnetism – Determination of susceptibility – Curie balance method – Moving coil Ballistic galvanometer – construction – theory – correction for damping in B.G – Measurement of Charge sensitiveness – absolute capacity of a condenser.
Books for Study and reference:
1.Electricity and Magnetism - D.N. Vasudeva
2.Electricity and Magnetism - Brijlal and Subramanian
3.Electricity and Magnetism - R. Murugeshan
4.Electricity and Magnetism - K.K. Tewari
5.Halliday Rhesnick walker Ed 6 Wiley

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2015
1-L1	Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux
2-L2	Coulomb‘s law – electric field – electric dipole – electric flux – electric potential relation connecting electric potential and electric field
3- L3	potential at a point due to a point charge – potential due to an electric dipole
4-L4	potential due to an electric dipole – capacity
5-L5	capacitance of a spherical and cylindrical
6-L6	capacitor – energy of a charged capacitor – Loss of energy due to sharing of charges
7-L7	Unit II Chemical Effects of Electric Current: Faraday‘s Laws of Electrolysis
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Electrical conductivity of an electrolyte
10- L9	specific conductivity – Kohlrausch bridge – Thermoelectricity –
11-L10	See beck effect – Peltier effect – Thomson effect
12-L11	thermoelectric power diagram – its uses – applications
13-L12	Unit III Transient Current: Growth and decay of current in a circuit

14-L13	Growth and decay of charge in a circuit containing resistance and capacitance
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 20.07.2015
16-L15	Determination of high resistance by leakage
17-IT-1	Growth and decay of charge in a LCR circuit **Internal Test-I**
18-L16	condition for the discharge to be oscillatory – Frequency of Oscillation.
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Alternating Current: j operator – properties
21- L19	properties – use of j operator in the study of A.C Circuit
22- P2	**College level meeting/Cell function**
23-L20	inductance only – capacitance only – LCR series and parallel circuits – power in an AC circuit
24-L21	Wattless current – choke coil
25-L22	construction and working of AC generator, 1
26-L23	phase and 3 phase AC generator
27-L24	distribution of 3 phase AC
28-L25	star connection – delta connection.
29-L26	Magnetic Properties of Materials
30-L27	Magnetic induction – Magnetism
31-L28	Relation between B, H and M – Magnetic susceptibility
32-L29	Magnetic permeability
33-L30	Relation between them Electron theory of dia, para and ferromagnetism
34- P3	**Department Seminar**
35-L31	Determination of susceptibility
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 31.08.2015
37- L33	Curie balance method
38- IT-II	**Internal Test-II**
39-L34	Moving coil Ballistic galvanometer
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Moving coil Ballistic galvanometer – construction
42- L37	theory – correction for
43- L38	correction for damping in B.G
44- P4	**College level meeting/ function**
45-L39	Measurement of Charge sensitiveness
46-L40	absolute capacity of a condenser
47-L41	Solving Problems
48-L42	Curie balance method explanation
49-L43	.Determination of susceptibility
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 05.09.2015
51 L45	Practical explanation
52- L46	Measurement of Charge sensitiveness
53-IT-III	**Internal Test-III**
54-L47	Revision

55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins 24.10.2014
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 29.10.2015

Course Outcomes

Learning Outcomes	**COs** of the course “<Electricity and Magnetism>”
CO1	The use of Coulomb's law and Gauss' law for the electrostatic force
CO2	The relationship between electrostatic field and electrostatic potential
CO3	The use of the Lorentz force law for the magnetic force
CO4	The use of Ampere's law to calculate magnetic fields
CO5	The use of Faraday's law in induction problems
CO6	The basic laws that underlie the properties of electric circuit elements
Experimental Learning	
EL1	The abstraction from forces to fields using the examples of the electric and magnetic fields, with some applications
EL2	The connection between conservative forces and potential energy
EL3	How charges move through electric circuits -
EL4	The close connection between electricity and magnetism, leading to the discovery of electromagnetic waves.
EL5	the integral form of Maxwell's Equations
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2015-2016)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Electricity and Magnetism
Course Code	GMPH31
Class	II year (2015-2016)
Semester	Odd
Staff Name	Mrs. R. Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To learn electricity and magnetism
- To understand electric Current
- How to apply Transient Current
- To understand Alternating Current

Syllabus

ELECTRICITY AND MAGNETISM
Unit I
Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux – Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux – electric potential – relation connecting electric potential and electric field – potential at a point due to a point charge – potential due to an electric dipole – capacity – capacitance of a spherical and cylindrical
Capacitor – energy of a charged capacitor – Loss of energy due to sharing of charges.
Unit II
Chemical Effects of Electric Current: Faraday‘s Laws of Electrolysis – electrical Conductivity of an electrolyte – specific conductivity – Kohlrausch bridge – Thermoelectricity –

Seebeck effect – Peltier effect – Thomson effect – total e.m.f – thermodynamics of thermocouple
– thermoelectric power diagram – its uses – applications.

Unit III

Transient Current: Growth and decay of current in a circuit containing resistance and inductance – Growth and decay of charge in a circuit containing resistance and capacitance – Determination of high resistance by leakage – Growth and decay of charge in a LCR circuit – condition for the discharge to be oscillatory – Frequency of Oscillation.

672

Unit IV

Alternating Current: j operator – properties – use of j operator in the study of A.C Circuit With R only – inductance only – capacitance only – LCR series and parallel circuits – power in an AC circuit – Wattless current – choke coil – construction and working of AC generator, 1 phase and 3 phase AC generator – distribution of 3 phase AC – star connection – delta Connection.

Unit V

Magnetic Properties of Materials: Magnetic induction – Magnetism – Relation between B, H and M – Magnetic susceptibility – Magnetic permeability – Relation between them – Electron theory of dia, para and ferromagnetism – Determination of susceptibility – Curie balance method – Moving coil Ballistic galvanometer – construction – theory – correction for damping in B.G – Measurement of Charge sensitiveness – absolute capacity of a condenser.

Books for Study and reference:

1.Electricity and Magnetism - D.N. Vasudeva
2.Electricity and Magnetism - Brijlal and Subramanian
3.Electricity and Magnetism - R. Murugeshan
4.Electricity and Magnetism - K.K. Tewari
5.Halliday Rhesnick walker Ed 6 Wiley

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2015
1-L1	Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux
2-L2	Coulomb‘s law – electric field – electric dipole – electric flux – electric potential relation connecting electric potential and electric field
3- L3	potential at a point due to a point charge – potential due to an electric dipole
4-L4	potential due to an electric dipole – capacity
5-L5	capacitance of a spherical and cylindrical
6-L6	capacitor – energy of a charged capacitor – Loss of energy due to sharing of charges
7-L7	Unit II Chemical Effects of Electric Current: Faraday‘s Laws of Electrolysis
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Electrical conductivity of an electrolyte
10- L9	specific conductivity – Kohlrausch bridge – Thermoelectricity –
11-L10	See beck effect – Peltier effect – Thomson effect
12-L11	thermoelectric power diagram – its uses – applications
13-L12	Unit III Transient Current: Growth and decay of current in a circuit

14-L13	Growth and decay of charge in a circuit containing resistance and capacitance
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 20.07.2015
16-L15	Determination of high resistance by leakage
17-IT-1	Growth and decay of charge in a LCR circuit **Internal Test-I**
18-L16	condition for the discharge to be oscillatory – Frequency of Oscillation.
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Alternating Current: j operator – properties
21- L19	properties – use of j operator in the study of A.C Circuit
22- P2	**College level meeting/Cell function**
23-L20	inductance only – capacitance only – LCR series and parallel circuits – power in an AC circuit
24-L21	Wattless current – choke coil
25-L22	construction and working of AC generator, 1
26-L23	phase and 3 phase AC generator
27-L24	distribution of 3 phase AC
28-L25	star connection – delta connection.
29-L26	Magnetic Properties of Materials
30-L27	Magnetic induction – Magnetism
31-L28	Relation between B, H and M – Magnetic susceptibility
32-L29	Magnetic permeability
33-L30	Relation between them Electron theory of dia, para and ferromagnetism
34- P3	**Department Seminar**
35-L31	Determination of susceptibility
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 31.08.2015
37- L33	Curie balance method
38- IT-II	**Internal Test-II**
39-L34	Moving coil Ballistic galvanometer
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Moving coil Ballistic galvanometer – construction
42- L37	theory – correction for
43- L38	correction for damping in B.G
44- P4	**College level meeting/ function**
45-L39	Measurement of Charge sensitiveness
46-L40	absolute capacity of a condenser
47-L41	Solving Problems
48-L42	Curie balance method explanation
49-L43	.Determination of susceptibility
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 05.09.2015
51 L45	Practical explanation
52- L46	Measurement of Charge sensitiveness
53-IT-III	**Internal Test-III**
54-L47	Revision

55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins 24.10.2014
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 29.10.2015

Course Outcomes

Learning Outcomes	**COs** of the course "<Electricity and Magnetism>"
CO1	The use of Coulomb's law and Gauss' law for the electrostatic force
CO2	The relationship between electrostatic field and electrostatic potential
CO3	The use of the Lorentz force law for the magnetic force
CO4	The use of Ampere's law to calculate magnetic fields
CO5	The use of Faraday's law in induction problems
CO6	The basic laws that underlie the properties of electric circuit elements
Experimental Learning	
EL1	The abstraction from forces to fields using the examples of the electric and magnetic fields, with some applications
EL2	The connection between conservative forces and potential energy
EL3	How charges move through electric circuits -
EL4	The close connection between electricity and magnetism, leading to the discovery of electromagnetic waves.
EL5	the integral form of Maxwell's Equations
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2016-2017)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Computer Programming in C ++
Course Code	**GMPH41**
Class	II Year (2016-2017)
Semester	Even
Staff Name	Dr. A.Arul Gnanam Dr.R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To Learn about C++ Programme
- 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
- To discuss about operators.
- To learn about programme goading.

Syllabus

OBJECT ORIENTED PROGRAMMING WTH C++

UNIT-I: Evolution of C++ - applications of C++ - structure of C++ program. Tokens – keywords – identifiers and constants

– basic data types – user-defined data types – constant pointers and pointers to constants – symbolic constants –type compatibility – declaration of variables – dynamic

initialization of variables – reference variables – operators in C++ - scope resolution operator – memory management operators – manipulators – type cast operator – expressions and their types – special assignment expressions –

implicit conversions – operator precedence.

UNIT-II: Functions in C++ : The main function – function prototyping – call by reference – return by reference – inline functions – default arguments – const arguments – function overloading. Managing Console I/O Operations: C++ streams – C++ stream classes – unformatted console I/O operations – formatted console I/O operations –managing output with manipulators.

UNIT-III: Classes and Objects: Specifying a class – defining member functions – making an outside function inline – nesting of member functions – private member functions – arrays within a class – memory allocation for objects –arrays of objects – objects as function arguments – friend functions – returning objects – const member functions. Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class – constructors with default arguments – copy constructor.

UNIT-IV: Operator Overloading: Introduction – defining operator overloading – overloading unary operators – overloading binary operators - overloading binary operators using friends – rules for overloading operators. Inheritance: Introduction – defining derived classes – single inheritance – making a private member inheritable – multilevel inheritance – multiple inheritance – hierarchical inheritance – hybrid inheritance

UNIT-V: Working with Files: Introduction – Classes for File Stream Operations - Opening and Closing a File – Detecting End-of-file – More about open( ): File Modes – File Pointers and their Manipulations – Sequential Input and Output Operations – Updating a File: Random Access

Course Calendar

Hour allotment	**Class Schedule**
	EVEN Semester 01.12.2016
1-L1	UNIT-I: Evolution of C++ - applications of C++
2-L2	Tokens – keywords – identifiers and constants
3- L3	basic data types – user-defined data types

4-L4	constant pointers and pointers to constants – symbolic constants
5-L5	constant pointers and pointers to constants – symbolic constants
6-L6	type compatibility – declaration of variables – dynamic initialization of variables – reference variables
7-L7	operators in C++ - scope resolution operator – memory management operators
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	manipulators – type cast operator – expressions and their types – special assignment expressions
10- L9	implicit conversions – operator precedence
11-L10	Functions in C++ : The main function – function prototyping – call by reference
12-L11	return by reference – inline functions – default arguments – const arguments – function overloading
13-L12	Managing Console I/O Operations: C++ streams – C++ stream classes – unformatted console I/O operations – formatted console I/O
14-L13	formatted console I/O operations –managing output with manipulators.
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 24.01.2017
16-L15	Classes and Objects: Specifying a class – defining member functions – making an outside function inline – nesting of member functions
17-IT-1	**Internal Test-I**
18-L16	private member functions – arrays within a class – memory allocation for object
19-L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	arrays of objects – objects as function arguments – friend functions – returning objects – const member functions.
21- L19	Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class
22- P2	College level meeting/Cell function
23-L20	Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class
24-L21	Operator Overloading: Introduction
25-L22	defining operator overloading – overloading unary operators
26-L23	overloading binary operators - overloading binary operators using friends –
27-L24	overloading binary operators - overloading binary operators using friends –
28-L25	rules for overloading operators
29-L26	Inheritance: Introduction
30-L27	defining derived classes
31-L28	single inheritance
32-L29	making a private member inheritable
33-L30	multilevel inheritance
34- P3	**Department Seminar**
35-L31	**Rivision**
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 24.02.2017
37- L33	**hierarchical inheritance**
38- IT-II	**Internal Test-II**
39-L34	hybrid inheritance
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal

41-L36	**Working with Files: Introduction**
42- L37	Classes for File Stream Operations
43- L38	Opening and Closing a File
44- P4	College level meeting/ function
45-L39	Detecting End-of-file
46-L40	More about open
47-L41	**Revision**
48-L42	**Revision Class**
49-L43	**File Modes**
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 28.03.2017
51 L45	**File Pointers and their Manipulations**
52- L46	**Revision**
53-IT-III	**Internal Test-III**
54-L47	Sequential Input and Output Operations – Updating a File: Random Access
55-L48	Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
	Model Test begins 05.04.2017
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 21.4.2017

Course Outcomes

Learning Outcomes	**COs** of the course "<Computer Programming in C ++>"
CO1	Get insight knowledge about the language.
CO2	Get trained in writing small programs.
CO3	Capable of executes any programs and identifying errors in them
CO4	Design and implement C programs for any given problem
CO5	Work with existing programs and modify it as per the requirements.
CO6	Identify the errors in a C program.
CO7	Identify the output of a C program without actually executing it
Experimental Learning	
EL1	Capable coding any problem.
EL2	Capable of identifying errors in a coding
EL3	Capable handling any project assigned by a company.
Integrated Activity	
IA1	Individual and Team Work: Function effectively on teams to accomplish a common goal
IA2	Communication: Communicate effectively with a range of audiences and prepare technical documents and make effective oral

	presentations

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2016-2017)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Communication Electronics
Course Code	JMPH5C
Class	III year (2016-2017)
Semester	Odd
Staff Name	Dr.A.Arul Gnanam Mrs.D.Priscilla Koilpillai
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To understand operation of semiconductor devices
- To understand DC analysis and AC models of semiconductor devices.
- To apply concepts for the design of Regulators and Amplifiers 4.
- To verify the theoretical concepts through laboratory and simulation experiments.
- To implement mini projects based on concept of electronics circuit concepts.

Syllabus

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

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2016
1-L1	UNIT I: AMPLITUDE MODULATION AND TRANSMISSION
2-L2	amplitude Modulation – AM envelop – AM frequency spectrum and bandwidth
3- L3	Phase representation of AM with carrier
4-L4	coefficient of modulation or percentage modulation or modulation index
5-L5	degrees of modulation – AM power distribution -
6-L6	AM Current relation and efficiency - modulation by complex information signal
7-L7	Double side band suppressed carrier AM

8- P1	**single side band suppressed carrier AM**
9- L8	**Vestigal side band amplitude modulation**
10- L9	**AM modulator circuits – emitter modulations or low power AM**
11-L10	**collector modulator or medium and high power AM modulator**
12-L11	**AM transmitters – Broadcast AM transmitters**
13-L12	**Low level of AM transmitter – High level AM transmitter**
14-L13	**Welcoming of First year and Inauguration of Physics Association**
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 25.07.2016
16-L15	**UNIT II: AMPLITUDE MODULATION -RECEPTION**
17-IT-1	**Internal Test-I**
18-L16	**Comparison of AM system – Quadrature amplitude modulation**
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**principles of AM detection – AM receivers – receiver parameters**
21- L19	**Tuned radio frequency (TRF) receiver or straight receiver**
22- P2	**College level meeting/Cell function**
23-L20	**principles of super hetrodyne**
24-L21	**double frequency conversion AM receiver**
25-L22	**UNIT III:ANGLE MODULATION – TRANSMISSION**
26-L23	**Frequency modulation – Phase modulation**
27-L24	**Phase deviation and modulation index**
28-L25	**Multitone modulation**
29-L26	**Transmission band width of FM**
30-L27	**conversion of PM to FM or frequency modulator**
31-L28	**conversion of FM to PM / phase modulators**
32-L29	**commercial broadcast FM**
33-L30	**average power of an AM/FM wave**
34- P3	**Department Seminar**
35-L31	**generation of FM – direct method of FM generation**
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 22.08.2016
37- L33	**reactance tube modulator**
38- IT-II	**Internal Test-II**
39-L34	**indirect method of FM wave generation – FM transmitters**
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**Comparison of AM and FM.**
42- L37	**UNIT IV:FM RECEPTION FM**
43- L38	**detectors – Balanced slope detector**
44- P4	**College level meeting/ function**
45-L39	**Foster seely discriminator – ratio detector**
46-L40	**FM super heterodyne receiver – FM noise suppression**
47-L41	**threshold extension by FMFB technique**
48-L42	**UNIT – V: DIGITAL MODULATION TECHNIQUES**
49-L43	**BFSK – Binary phase shift keying**
50-L44	**Quadrature PSK – Differential PSK**
	Internal Test III begins

51 L45	**correlative coding – Duobinary encoding**
52- L46	**Performance comparison of digital modulation schemes - - M ary FSK**
53-IT-III	**Internal Test-III 03.10.2016**
54-L47	**correlative coding – Duobinary encoding**
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins 17.10.2016
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.11.2018

Course Outcomes

Learning Outcomes	**COs of the course** “<Communication Electronics >”
CO1	Ability to apply knowledge of mathematics & science in solving electronics related problems
CO2	Ability to design and conduct electronics experiments, as well as to analyze and interpret data
CO3	Ability to design and manage electronic systems or processes that conforms to a given specification within ethical and economic constraints
CO4	frequency domain parameter for given system Students will be able to predict stability of
CO5	Ability to identify, for mulate, solve and analyze the problems in various disciplines of electronics.
CO6	Ability to function as a member of a multidisciplinary team with sense of ethics, integrity and social responsibility
CO7	Recognize the need for, and be able to engage in lifelong learning.
CO8	Ability to communicate effectively in term of oral and written communication skills
CO9	Ability to use techniques, skills and modern technological/scientific/engineering software/tools for professional practices
Experimental Learning	
EL1	Given system using appropriate criteria.
EL2	To provide basic knowledge about the various sensors and data acquisition systems applied in Wireless sensor network
EL3	To provide fundamental concepts of control system

EL4	such as mathematical modelling, time response and frequency response. To develop concepts of stability and its assessment.3 criteria.
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2016-2017)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Electricity and Magnetism
Course Code	GMPH31
Class	II year (2016-2017)
Semester	Odd
Staff Name	Mrs. R. Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To learn electricity and magnetism
- To understand electric Current
- How to apply Transient Current
- To understand Alternating Current

Syllabus

ELECTRICITY AND MAGNETISM
Unit I
Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux – Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux – electric potential – relation connecting electric potential and electric field – potential at a point due to a point charge – potential due to an electric dipole – capacity – capacitance of a spherical and cylindrical
Capacitor – energy of a charged capacitor – Loss of energy due to sharing of charges.
Unit II
Chemical Effects of Electric Current: Faraday‘s Laws of Electrolysis – electrical Conductivity of an electrolyte – specific conductivity – Kohlrausch bridge – Thermoelectricity –

Seebeck effect – Peltier effect – Thomson effect – total e.m.f – thermodynamics of thermocouple
– thermoelectric power diagram – its uses – applications.

Unit III

Transient Current: Growth and decay of current in a circuit containing resistance and inductance – Growth and decay of charge in a circuit containing resistance and capacitance – Determination of high resistance by leakage – Growth and decay of charge in a LCR circuit – condition for the discharge to be oscillatory – Frequency of Oscillation.

672

Unit IV

Alternating Current: j operator – properties – use of j operator in the study of A.C Circuit With R only – inductance only – capacitance only – LCR series and parallel circuits – power in an AC circuit – Wattless current – choke coil – construction and working of AC generator, 1 phase and 3 phase AC generator – distribution of 3 phase AC – star connection – delta Connection.

Unit V

Magnetic Properties of Materials: Magnetic induction – Magnetism – Relation between B, H and M – Magnetic susceptibility – Magnetic permeability – Relation between them – Electron theory of dia, para and ferromagnetism – Determination of susceptibility – Curie balance method – Moving coil Ballistic galvanometer – construction – theory – correction for damping in B.G – Measurement of Charge sensitiveness – absolute capacity of a condenser.

Books for Study and reference:

1.Electricity and Magnetism - D.N. Vasudeva
2.Electricity and Magnetism - Brijlal and Subramanian
3.Electricity and Magnetism - R. Murugeshan
4.Electricity and Magnetism - K.K. Tewari
5.Halliday Rhesnick walker Ed 6 Wiley

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 16.06.2016
1-L1	Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux
2-L2	Coulomb‘s law – electric field – electric dipole – electric flux – electric potential relation connecting electric potential and electric field
3- L3	potential at a point due to a point charge – potential due to an electric dipole
4-L4	potential due to an electric dipole – capacity
5-L5	capacitance of a spherical and cylindrical
6-L6	capacitor – energy of a charged capacitor – Loss of energy due to sharing of charges
7-L7	Unit II Chemical Effects of Electric Current: Faraday‘s Laws of Electrolysis
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Electrical conductivity of an electrolyte
10- L9	specific conductivity – Kohlrausch bridge – Thermoelectricity –
11-L10	See beck effect – Peltier effect – Thomson effect
12-L11	thermoelectric power diagram – its uses – applications
13-L12	Unit III Transient Current: Growth and decay of current in a circuit

14-L13	Growth and decay of charge in a circuit containing resistance and capacitance
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 25.07.2016
16-L15	Determination of high resistance by leakage
17-IT-1	Growth and decay of charge in a LCR circuit **Internal Test-I**
18-L16	condition for the discharge to be oscillatory – Frequency of Oscillation.
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Alternating Current: j operator – properties
21- L19	properties – use of j operator in the study of A.C Circuit
22- P2	**College level meeting/Cell function**
23-L20	inductance only – capacitance only – LCR series and parallel circuits – power in an AC circuit
24-L21	Wattless current – choke coil
25-L22	construction and working of AC generator, 1
26-L23	phase and 3 phase AC generator
27-L24	distribution of 3 phase AC
28-L25	star connection – delta connection.
29-L26	Magnetic Properties of Materials
30-L27	Magnetic induction – Magnetism
31-L28	Relation between B, H and M – Magnetic susceptibility
32-L29	Magnetic permeability
33-L30	Relation between them Electron theory of dia, para and ferromagnetism
34- P3	**Department Seminar**
35-L31	Determination of susceptibility
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 31.08.2016
37- L33	Curie balance method
38- IT-II	**Internal Test-II**
39-L34	Moving coil Ballistic galvanometer
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Moving coil Ballistic galvanometer – construction
42- L37	theory – correction for
43- L38	correction for damping in B.G
44- P4	**College level meeting/ function**
45-L39	Measurement of Charge sensitiveness
46-L40	absolute capacity of a condenser
47-L41	Solving Problems
48-L42	Curie balance method explanation
49-L43	.Determination of susceptibility
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 03.10.2016
51 L45	Practical explanation
52- L46	Measurement of Charge sensitiveness
53-IT-III	**Internal Test-III**
54-L47	Revision

55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins 17.10.2016
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.11.2016

Course Outcomes

Learning Outcomes	**COs** of the course "<Electricity and Magnetism>"
CO1	The use of Coulomb's law and Gauss' law for the electrostatic force
CO2	The relationship between electrostatic field and electrostatic potential
CO3	The use of the Lorentz force law for the magnetic force
CO4	The use of Ampere's law to calculate magnetic fields
CO5	The use of Faraday's law in induction problems
CO6	The basic laws that underlie the properties of electric circuit elements
Experimental Learning	
EL1	The abstraction from forces to fields using the examples of the electric and magnetic fields, with some applications
EL2	The connection between conservative forces and potential energy
EL3	How charges move through electric circuits -
EL4	The close connection between electricity and magnetism, leading to the discovery of electromagnetic waves.
EL5	the integral form of Maxwell's Equations
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN 2017-2018

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Electromagnetism
Course Code	SMPH41
Class	II year (2017-2018)
Semester	Even
Staff Name	Dr.A.Arul Gnanam
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To learn electricity and magnetism
- To understand electric Current
- How to apply Transient Current
- To understand Alternating Current

Syllabus

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 couplingenergy
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 currentamperes

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 thempermeability 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.)

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on07.12.2017
1-L1	UNIT-1: ELECTROMAGNETIC INDUCTION Faraday’s laws of electromagnetic induction
2-L2	self induction- self inductance of a toroidal solenoid
3- L3	self inductance of a long solenoid
4-L4	determination of L by Anderson’s and Rayleigh’s methods
5-L5	Owen’s bridge
6-L6	mutual induction- experimental determination of mutual inductance between a pair of coils using BG
7-L7	co efficient of coupling energy stored in a coil
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	eddy currents-uses
10- L9	Magnetic flux and magnetic induction
11-L10	relation between them- Biot Savart law
12-L11	magnetic induction at a point on the axis of a circular coil carrying current

13-L12	Amperes circuital law
14-L13	magnetic field inside a long solenoid -toroid
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 22.01.2018
16-L15	Lorentz force on a moving charge- direction of force
17-IT-1	**Internal Test-I**
18-L16	Moving coil Ballistic galvanometer-theory
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	De sauté bridge
21- L19	torque on a current loop in a uniform magnetic field
22- P2	**College level meeting/Cell function**
23-L20	MAGNETIC FIELDS AND MAXWELL'S EQUATION
24-L21	relation between them permeability and susceptibility
25-L22	Hertz experiment for production and detection of EM waves.
26-L23	Wave equations for Electric field and Magnetic field
27-L24	EM waves in a matter
28-L25	Reflection and Transmission at normal incidence and oblique incidence
29-L26	The three magnetic vectors M, B, and H
30-L27	relation between them
31-L28	Hysteresis-Energy loss
32-L29	Maxwell's equations-Boundary conditions-Poynting vector
33-L30	Electromagnetic waves in free space
34- P3	**Department Seminar**
35-L31	monochromatic plane waves
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 26.02.2018
37- L33	B-H curve
38- IT-II	**Internal Test-II**
39-L34	Polarization by reflection
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Displacement current
42- L37	experiment to find charge sensitivity and absolute capacity of a capacitor
43- L38	experiment to find charge sensitivity and absolute capacity of a capacitor
44- P4	**College level meeting/ function**
45-L39	Class test
46-L40	measurement of horizontal component of Earth's Magnetic field
47-L41	calibration of BG
48-L42	induction coil and uses
49-L43	UNIT-V: APPLICATIONS OF ELECTROMAGNETISM

50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins01.04.2018
51 L45	Earth inductor-uses of Earth inductor
52- L46	measurement of vertical component of Earth's Magnetic field
53-IT-III	**Internal Test-III**
54-L47	measurement of intense magnetic field using search coil and BG
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins 12.04.2018
56- MT	component of the Earth's magnetic field
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on23.04.2018

Course Outcomes

Learning Outcomes	**COs** of the course "<Electromagnetism >"
CO1	The use of Coulomb's law and Gauss' law for the electrostatic force
CO2	The relationship between electrostatic field and electrostatic potential
CO3	The use of the Lorentz force law for the magnetic force
CO4	The use of Ampere's law to calculate magnetic fields
CO5	The use of Faraday's law in induction problems
CO6	The basic laws that underlie the properties of electric circuit elements
CO7	The integral form of Maxwell's Equations
Experimental Learning	
EL1	The abstraction from forces to fields using the examples of the electric and magnetic fields, with some applications
EL2	The connection between conservative forces and potential energy
EL3	How charges move through electric circuits -
EL4	The close connection between electricity and magnetism, leading to the discovery of electromagnetic waves.
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN(2017-2018)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Nuclear Physics
Course Code	SMPH63
Class	III Year (2017-2018)
Semester	Even
Staff Name	Dr.A.Arul Gnanam
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- Can use the units and dimensions
- Can tell a chronology of some of the major events in nuclear physics.
- Can identify some introductory terminology

SYLLABUS

NUCLEAR PHYSICS

UNIT – I Atomic Nucleus : General properties of nucleus - Binding energy - Mass defect - Proton - proton hypothesis - proton neutron hypothesis - Nuclear forces - Characteristics of nuclear forces - Liquid drop model - Weizsacker semi-empirical mass formula - Shell model - Magic Numbers

UNIT – II Natural radioactivity - alpha, beta and gamma rays - properties - Radioactive series - Laws of radioactive disintegration - Radio - Carbon dating - Alpha decay - Beta decay - Neutrino and its properties - Gamma decay - Internal Conversion - Nuclear energy levels - Nuclear isomerism

UNIT – III Particle accelerators: Cyclotron - Betatron – Synchrotron - Types of Nuclear reaction - Q value of Nuclear Reactions - The balance of mass and energy in Nuclear reactions - Nuclear transmutations.

UNIT – IV Energy from the Nucleus: Nuclear fission - Types of fission - P-E Curve for fission - Bohr Wheeler‘s Theory of Nuclear fission - Nuclear fusion and Thermonuclear reactions - Controlled thermonuclear reactions - Nuclear chain reaction - critical size of a reactor - radiation hazards

UNIT – V Detection and measurements of Nuclear radiations Elementary particles : G-M Counter - Scintillation Counter - Cloud Chamber Bubble Chamber - Cerenkov Counters - Classification of elementary particles - Particle interaction - Conservation Laws - Leptons - Hardons - The Quark model

Books for Reference: 1. Nuclear Physics by Irving Kaplan

2. Nuclear Physics by D.C Tayal

3. Halliday Rhesnick walker Ed 6 Wiley

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 07-12-2017
1-L1	UNIT – I Atomic Nucleus
2-L2	General properties of nucleus - Binding energy –mass defect
3- L3	Proton - proton hypothesis
4-L4	proton neutron hypothesis - Nuclear forces
5-L5	Characteristics of nuclear forces
6-L6	Liquid drop model
7-L7	Weizsacker semi-empirical mass formula -
8- P1	Shell model - Magic Numbers
9- L8	UNIT – II Natural radioactivity
10- L9	alpha, beta and gamma rays properties
11-L10	Radioactive series
12-L11	Laws of radioactive disintegration
13-L12	Radio - Carbon dating

14-L13	**Alpha decay - Beta decay - Neutrino and its properties - Gamma decay**
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 22.01.2018
16-L15	**Internal Conversion - Nuclear energy levels - Nuclear isomerism**
17-IT-1	**Internal Test-I**
18-L16	**UNIT – III Particle accelerators**
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**Cyclotron - Betatron**
21- L19	**Synchrotron - Types of Nuclear reaction -**
22- P2	**College level meeting/Cell function**
23-L20	**Q value of Nuclear Reactions -**
24-L21	**The balance of mass and energy in Nuclear reactions -**
25-L22	**Nuclear transmutations**
26-L23	**UNIT – IV Energy from the Nucleus**
27-L24	**Nuclear fission - Types of fission**
28-L25	**P-E Curve for fission -**
29-L26	**Bohr Wheeler's Theory of Nuclear fission**
30-L27	**Nuclear fusion and Thermonuclear reactions**
31-L28	**Controlled thermonuclear reactions**
32-L29	**Nuclear chain reaction**
33-L30	**critical size of a reactor**
34- P3	**Department Seminar**
35-L31	Revision
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 26.02.2018
37- L33	Class test
38- IT-II	**Internal Test-II**
39-L34	**UNIT – V Detection and measurements of Nuclear radiations Elementary particles**
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**G-M Counter**
42- L37	**Scintillation Counter**
43- L38	**Cloud Chamber Bubble Chamber -**
44- P4	**College level meeting/ function**
45-L39	**Cerenkov Counters**
46-L40	**Classification of elementary particles**
47-L41	**Particle interaction**
48-L42	**Conservation Laws**
49-L43	**Leptons - Hardons**
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 01.04.2018
51 L45	**The Quark model**
52- L46	**Revision**
53-IT-III	**Internal Test-III**
54-L47	Problems

55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins 12.04.2018
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working on 23-04-2018

Course Outcomes

Learning Outcomes	**COs** of the course “<Nuclear Physics >”
CO1	analyse production and decay reactions for fundamental particles, applying conservation principles to determine the type of reaction taking place and the possible outcomes
CO2	describe the role of colour in the strong force, and appreciate why going from strong interactions between quarks to nuclear structure is a currently unsolved problem
CO3	describe the role of spin-orbit coupling in the shell structure of atomic nuclei, and predict the properties of nuclear ground and excited states based on the shell model
CO4	apply quark mixing models to analyse weak interaction physics such as beta and keno decay
CO5	read, understand and explain scholarly journal articles in nuclear and particle physics
CO6	make relevant measurements of energy and decay spectra using basic experimental facilities and apply Poisson statistics to evaluate the uncertainties in the data.
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2017-2018)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Computer Programming in C ++
Course Code	**GMPH41**
Class	II Year (2017-2018)
Semester	Odd
Staff Name	Dr. A.Arul Gnanam Dr.R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To Learn about C++ Programme
- 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
- To discuss about operators.
- To learn about programme goading.

Syllabus

OBJECT ORIENTED PROGRAMMING WTH C++

UNIT-I: Evolution of C++ - applications of C++ - structure of C++ program. Tokens – keywords – identifiers and constants

– basic data types – user-defined data types – constant pointers and pointers to constants – symbolic constants –type compatibility – declaration of variables – dynamic initialization of variables – reference variables – operators in C++ - scope resolution

operator – memory management operators – manipulators – type cast operator – expressions and their types – special assignment expressions –

implicit conversions – operator precedence.

UNIT-II: Functions in C++ : The main function – function prototyping – call by reference – return by reference – inline functions – default arguments – const arguments – function overloading. Managing Console I/O Operations: C++ streams – C++ stream classes – unformatted console I/O operations – formatted console I/O operations –managing output with manipulators.

UNIT-III: Classes and Objects: Specifying a class – defining member functions – making an outside function inline – nesting of member functions – private member functions – arrays within a class – memory allocation for objects –arrays of objects – objects as function arguments – friend functions – returning objects – const member functions. Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class – constructors with default arguments – copy constructor.

UNIT-IV: Operator Overloading: Introduction – defining operator overloading – overloading unary operators – overloading binary operators - overloading binary operators using friends – rules for overloading operators. Inheritance: Introduction – defining derived classes – single inheritance – making a private member inheritable – multilevel inheritance – multiple inheritance – hierarchical inheritance – hybrid inheritance

UNIT-V: Working with Files: Introduction – Classes for File Stream Operations - Opening and Closing a File – Detecting End-of-file – More about open( ): File Modes – File Pointers and their Manipulations – Sequential Input and Output Operations – Updating a File: Random Access

Course Calendar

Hour allotment	**Class Schedule**
	ODD Semester 16.06.2017
1-L1	UNIT-I: Evolution of C++ - applications of C++
2-L2	Tokens – keywords – identifiers and constants
3- L3	basic data types – user-defined data types
4-L4	constant pointers and pointers to constants – symbolic constants

5-L5	constant pointers and pointers to constants – symbolic constants
6-L6	type compatibility – declaration of variables – dynamic initialization of variables – reference variables
7-L7	operators in C++ - scope resolution operator – memory management operators
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	manipulators – type cast operator – expressions and their types – special assignment expressions
10- L9	implicit conversions – operator precedence
11-L10	Functions in C++ : The main function – function prototyping – call by reference
12-L11	return by reference – inline functions – default arguments – const arguments – function overloading
13-L12	Managing Console I/O Operations: C++ streams – C++ stream classes – unformatted console I/O operations – formatted console I/O
14-L13	formatted console I/O operations –managing output with manipulators.
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 31.07.2017
16-L15	Classes and Objects: Specifying a class – defining member functions – making an outside function inline – nesting of member functions
17-IT-1	**Internal Test-I**
18-L16	private member functions – arrays within a class – memory allocation for object
19-L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	arrays of objects – objects as function arguments – friend functions – returning objects – const member functions.
21- L19	Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class
22- P2	College level meeting/Cell function
23-L20	Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class
24-L21	Operator Overloading: Introduction
25-L22	defining operator overloading – overloading unary operators
26-L23	overloading binary operators - overloading binary operators using friends –
27-L24	overloading binary operators - overloading binary operators using friends –
28-L25	rules for overloading operators
29-L26	Inheritance: Introduction
30-L27	defining derived classes
31-L28	single inheritance
32-L29	making a private member inheritable
33-L30	multilevel inheritance
34- P3	**Department Seminar**
35-L31	**Rivision**
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 30.08.2017
37- L33	**hierarchical inheritance**
38- IT-II	**Internal Test-II**
39-L34	hybrid inheritance
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	**Working with Files: Introduction**

42- L37	Classes for File Stream Operations
43- L38	Opening and Closing a File
44- P4	College level meeting/ function
45-L39	Detecting End-of-file
46-L40	More about open
47-L41	**Revision**
48-L42	**Revision Class**
49-L43	**File Modes**
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 03.10.2017
51 L45	**File Pointers and their Manipulations**
52- L46	**Revision**
53-IT-III	**Internal Test-III**
54-L47	Sequential Input and Output Operations – Updating a File: Random Access
55-L48	Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
	Model Test begins 19.10.2017
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 06.11.2017

Course Outcomes

Learning Outcomes	**COs** of the course “<Computer Programming in C ++>”
CO1	Get insight knowledge about the language.
CO2	Get trained in writing small programs.
CO3	Capable of executes any programs and identifying errors in them
CO4	Design and implement C programs for any given problem
CO5	Work with existing programs and modify it as per the requirements.
CO6	Identify the errors in a C program.
CO7	Identify the output of a C program without actually executing it
Experimental Learning	
EL1	Capable coding any problem.
EL2	Capable of identifying errors in a coding
EL3	Capable handling any project assigned by a company.
Integrated Activity	
IA1	Individual and Team Work: Function effectively on teams to accomplish a common goal
IA2	Communication: Communicate effectively with a range of audiences and prepare technical documents and make effective oral presentations

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2017 – 2018)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Electricity
Course Code	**SMPH31**
Class	II year (2017-2018)
Semester	Odd
Staff Name	Dr. A. Arul Gnanam
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- 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.

Syllabus

ELECTRICITY
Preamble:
UNIT-1: ELETRIC FIELD AND POTENTIAL
Introduction-electric charge- coulomb's law-electric field-lines of forceelectric 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
See beck 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-kirch off'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

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 16.06.2017
1-L1	Introduction-electric charge
2-L2	coulomb's law-electric field
3- L3	lines of force electric flux
4-L4	Gauss's law-applications
5-L5	coulomb's law from Gauss's law
6-L6	electric field at a point due to point charge
7-L7	line charge- spherically symmetric charge
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	distribution-sheet of charge
10- L9	electric potential
11-L10	relation connecting electric field and potential
12-L11	equipotential lines and surfaces
13-L12	potential at a point due to point charge

14-L13	dipole and charged spherical shell
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 31.07.2017
16-L15	electric potential Energy
17-IT-1	**Internal Test-I**
18-L16	UNIT-II: THERMO ELECTRICITY See beck effect
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	laws of thermo e.m.f
21- L19	measurement of thermo e.m.f using potentiometer
22- P2	**College level meeting/Cell function**
23-L20	Peltier effect-demonstration
24-L21	Thomson effect
25-L22	demonstration -thermodynamics of thermo couple
26-L23	thermo electric power diagram
27-L24	Uses applications
28-L25	CHEMICAL EFFECT OF ELECTRIC CURRENT Introduction
29-L26	Faradays laws of electrolysis
30-L27	electrical conductivity of an electrolyte
31-L28	specific conductivity
32-L29	Kohlrausch's bridge method
33-L30	specific conductivity of an electrolyte
34- P3	**Department Seminar**
35-L31	Arrhenius theory of electrolytic dissociation
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 30.08 .2017
37- L33	mobility of ions
38- IT-II	**Internal Test-II**
39-L34	Secondary cells- Gibbs
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Helmholtz equation
42- L37	Current and current density
43- L38	ohm's law in vector form
44- P4	**College level meeting/ function**
45-L39	conversion of galvanometer into voltmeter and ammeter-Kirchhoff's law
46-L40	application to wheat stone's network
47-L41	Growth and decay of current in a circuit containing L and R with d.c.voltages
48-L42	growth and decay of charge in a capacitance ,resistance circuit determination
49-L43	growth and decay of charge in LCR circuit-conditions for the discharge to be oscillatory
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 03.10.2017
51 L45	Alternating Current- j operator method –use of j operator in the study of AC circuits
52- L46	Capacitance and resistance in series

53-IT-III	**Internal Test-III**
54-L47	LCR series resonance circuit
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins 19.10.2017
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 06.11.2017

Course Outcomes

Learning Outcomes	**COs** of the course “<Electricity>”
CO1	A basic introduction to Smart Grid.
CO2	An understanding of the relevance of it in global perspective
CO3	Technology needed.
CO4	Reforms and restructuring in Indian power sector.
CO5	Knowledge about intelligent and Strategic issues related to growth & development of Indian Power Business
CO6	Understand issues, opportunities & challenges in Smart grid
CO7	Develop skills required for smart grid planning & formulation of regulations.
CO8	Understand Power distribution sector framework in India and its comparison globally.
CO9	Learn processes for execution and control of regulation in power distribution business in India.
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN 2018-2019

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Electromagnetism
Course Code	SMPH41
Class	II year (2018-2019)
Semester	Even
Staff Name	Dr.A.Arul Gnanam
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To learn electricity and magnetism
- To understand electric Current
- How to apply Transient Current
- To understand Alternating Current

Syllabus

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 couplingenergy
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 currentamperes

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 thempermeability 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.)

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 03.12.2018
1-L1	UNIT-1: ELECTROMAGNETIC INDUCTION Faraday's laws of electromagnetic induction
2-L2	self induction- self inductance of a toroidal solenoid
3- L3	self inductance of a long solenoid
4-L4	determination of L by Anderson's and Rayleigh's methods
5-L5	Owen's bridge
6-L6	mutual induction- experimental determination of mutual inductance between a pair of coils using BG
7-L7	co efficient of coupling energy stored in a coil
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	eddy currents-uses
10- L9	Magnetic flux and magnetic induction
11-L10	relation between them- Biot Savart law
12-L11	magnetic induction at a point on the axis of a circular coil carrying current

13-L12	Amperes circuital law
14-L13	magnetic field inside a long solenoid -toroid
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 18.01.2019
16-L15	Lorentz force on a moving charge- direction of force
17-IT-1	**Internal Test-I**
18-L16	Moving coil Ballistic galvanometer-theory
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	De sauté bridge
21- L19	torque on a current loop in a uniform magnetic field
22- P2	**College level meeting/Cell function**
23-L20	MAGNETIC FIELDS AND MAXWELL'S EQUATION
24-L21	relation between them permeability and susceptibility
25-L22	Hertz experiment for production and detection of EM waves.
26-L23	Wave equations for Electric field and Magnetic field
27-L24	EM waves in a matter
28-L25	Reflection and Transmission at normal incidence and oblique incidence
29-L26	The three magnetic vectors M, B, and H
30-L27	relation between them
31-L28	Hysteresis-Energy loss
32-L29	Maxwell's equations-Boundary conditions-Poynting vector
33-L30	Electromagnetic waves in free space
34- P3	**Department Seminar**
35-L31	monochromatic plane waves
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 25.02.2019
37- L33	B-H curve
38- IT-II	**Internal Test-II**
39-L34	Polarization by reflection
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Displacement current
42- L37	experiment to find charge sensitivity and absolute capacity of a capacitor
43- L38	experiment to find charge sensitivity and absolute capacity of a capacitor
44- P4	**College level meeting/ function**
45-L39	Class test
46-L40	measurement of horizontal component of Earth's Magnetic field
47-L41	calibration of BG
48-L42	induction coil and uses
49-L43	UNIT-V: APPLICATIONS OF ELECTROMAGNETISM

50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins22.03.2019
51 L45	Earth inductor-uses of Earth inductor
52- L46	measurement of vertical component of Earth's Magnetic field
53-IT-III	**Internal Test-III**
54-L47	measurement of intense magnetic field using search coil and BG
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins 08.04.2019
56- MT	component of the Earth's magnetic field
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on23.04.2019

Course Outcomes

Learning Outcomes	**COs** of the course "<Electromagnetism >"
CO1	The use of Coulomb's law and Gauss' law for the electrostatic force
CO2	The relationship between electrostatic field and electrostatic potential
CO3	The use of the Lorentz force law for the magnetic force
CO4	The use of Ampere's law to calculate magnetic fields
CO5	The use of Faraday's law in induction problems
CO6	The basic laws that underlie the properties of electric circuit elements
CO7	The integral form of Maxwell's Equations
Experimental Learning	
EL1	The abstraction from forces to fields using the examples of the electric and magnetic fields, with some applications
EL2	The connection between conservative forces and potential energy
EL3	How charges move through electric circuits -
EL4	The close connection between electricity and magnetism, leading to the discovery of electromagnetic waves.
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN(2018-2019)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Nuclear Physics
Course Code	SMPH63
Class	III Year (2018-2019)
Semester	Even
Staff Name	Dr.A.Arul Gnanam
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- Can use the units and dimensions
- Can tell a chronology of some of the major events in nuclear physics.
- Can identify some introductory terminology

SYLLABUS

NUCLEAR PHYSICS

UNIT – I Atomic Nucleus : General properties of nucleus - Binding energy - Mass defect - Proton - proton hypothesis - proton neutron hypothesis - Nuclear forces - Characteristics of nuclear forces - Liquid drop model - Weizsacker semi-empirical mass formula - Shell model - Magic Numbers

UNIT – II Natural radioactivity - alpha, beta and gamma rays - properties - Radioactive series - Laws of radioactive disintegration - Radio - Carbon dating - Alpha decay - Beta decay - Neutrino and its properties - Gamma decay - Internal Conversion - Nuclear energy levels - Nuclear isomerism

UNIT – III Particle accelerators: Cyclotron - Betatron – Synchrotron - Types of Nuclear reaction - Q value of Nuclear Reactions - The balance of mass and energy in Nuclear reactions - Nuclear transmutations.

UNIT – IV Energy from the Nucleus: Nuclear fission - Types of fission - P-E Curve for fission - Bohr Wheeler‘s Theory of Nuclear fission - Nuclear fusion and Thermonuclear reactions - Controlled thermonuclear reactions - Nuclear chain reaction - critical size of a reactor - radiation hazards

UNIT – V Detection and measurements of Nuclear radiations Elementary particles : G-M Counter - Scintillation Counter - Cloud Chamber Bubble Chamber - Cerenkov Counters - Classification of elementary particles - Particle interaction - Conservation Laws - Leptons - Hardons - The Quark model

Books for Reference: 1. Nuclear Physics by Irving Kaplan

2. Nuclear Physics by D.C Tayal

3. Halliday Rhesnick walker Ed 6 Wiley

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 03-12-2018
1-L1	UNIT – I Atomic Nucleus
2-L2	General properties of nucleus - Binding energy –mass defect
3- L3	Proton - proton hypothesis
4-L4	proton neutron hypothesis - Nuclear forces
5-L5	Characteristics of nuclear forces
6-L6	Liquid drop model
7-L7	Weizsacker semi-empirical mass formula -
8- P1	Shell model - Magic Numbers
9- L8	UNIT – II Natural radioactivity
10- L9	alpha, beta and gamma rays properties
11-L10	Radioactive series
12-L11	Laws of radioactive disintegration
13-L12	Radio - Carbon dating

14-L13	**Alpha decay - Beta decay - Neutrino and its properties - Gamma decay**
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 18.01.2019
16-L15	**Internal Conversion - Nuclear energy levels - Nuclear isomerism**
17-IT-1	**Internal Test-I**
18-L16	**UNIT – III Particle accelerators**
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**Cyclotron - Betatron**
21- L19	**Synchrotron - Types of Nuclear reaction -**
22- P2	**College level meeting/Cell function**
23-L20	**Q value of Nuclear Reactions -**
24-L21	**The balance of mass and energy in Nuclear reactions -**
25-L22	**Nuclear transmutations**
26-L23	**UNIT – IV Energy from the Nucleus**
27-L24	**Nuclear fission - Types of fission**
28-L25	**P-E Curve for fission -**
29-L26	**Bohr Wheeler's Theory of Nuclear fission**
30-L27	**Nuclear fusion and Thermonuclear reactions**
31-L28	**Controlled thermonuclear reactions**
32-L29	**Nuclear chain reaction**
33-L30	**critical size of a reactor**
34- P3	**Department Seminar**
35-L31	Revision
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 25.02.2019
37- L33	Class test
38- IT-II	**Internal Test-II**
39-L34	**UNIT – V Detection and measurements of Nuclear radiations Elementary particles**
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**G-M Counter**
42- L37	**Scintillation Counter**
43- L38	**Cloud Chamber Bubble Chamber -**
44- P4	**College level meeting/ function**
45-L39	**Cerenkov Counters**
46-L40	**Classification of elementary particles**
47-L41	**Particle interaction**
48-L42	**Conservation Laws**
49-L43	**Leptons - Hardons**
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 22.03.2019
51 L45	**The Quark model**
52- L46	**Revision**
53-IT-III	**Internal Test-III**
54-L47	Problems

55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins 08.04.2019
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working on23.04.2019

Course Outcomes

Learning Outcomes	**COs** of the course “<Nuclear Physics >”
CO1	analyse production and decay reactions for fundamental particles, applying conservation principles to determine the type of reaction taking place and the possible outcomes
CO2	describe the role of colour in the strong force, and appreciate why going from strong interactions between quarks to nuclear structure is a currently unsolved problem
CO3	describe the role of spin-orbit coupling in the shell structure of atomic nuclei, and predict the properties of nuclear ground and excited states based on the shell model
CO4	apply quark mixing models to analyse weak interaction physics such as beta and keno decay
CO5	read, understand and explain scholarly journal articles in nuclear and particle physics
CO6	make relevant measurements of energy and decay spectra using basic experimental facilities and apply Poisson statistics to evaluate the uncertainties in the data.
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Allied Physics I
Course Code	GAPH11
Class	I year (2014-2017)
Semester	Odd
Staff Name	M r. A. Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

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 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,

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2014
1-L1	**Unit I : Elasticity and bending moment**
2-L2	**Hooke's law – Elastic moduli**
3- L3	**Relation between elastic constants**
4-L4	**Work done in stretching a wire**
5-L5	**Expression for bending moment - uniform bending**
6-L6	**Experiment to determine Young's modulus using pin and microscope- Twisting couple of a wire**
7-L7	**Expression for couple per unit twist – Work done in twisting**
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	**Experimental determination of rigidity modulus of a wire using Torsion pendulum with theory**
10- L9	**Unit II: Surface tension and Viscosity**
11-L10	**Surface tension – Definition – Examples**
12-L11	**Molecular interpretation**
13-L12	**Application to spherical and cylindrical drops and bubbles**
14-L13	**Viscosity: Coefficient of viscosity – Rate of flow of liquid in a capillary tube (Poisueuille's formula)**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**Analogy between liquid flow and current flow**
17-IT-1	**Internal Test-I**
18-L16	**Stokes' formula for highly viscous liquids (Dimension method) – Experimental determination of viscosity of highly viscous liquid (stokes' method)**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**Unit III: Sound**
21- L19	**Simple harmonic motion – Free, damped ,forced vibrations and resonance**
22- P2	**College level meeting/Cell function**
23-L20	**Composition of two SHMs along a straight line and in perpendicular direction**
24-L21	**Melde's string experiment**
25-L22	**Determination of frequency of tuning fork** **Unit IV : Thermal physics**

26-L23	**Mean free path- Expression for mean free path**
27-L24	**Transport phenomena – Expression for viscosity and thermal conductivity**
28-L25	**Conduction in solids – coefficient of thermal conductivity**
29-L26	**Lee's disc method to determine thermal conductivity of a bad conductor**
30-L27	**Wiedmann – Franz's law – Convection : Newton's**
31-L28	**Unit V: Optics**
32-L29	**Interference: Condition for interference**
33-L30	**Air wedge**
34- P3	**Department Seminar**
35-L31	**determination of thickness of a thin wire by air wedge**
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**Diffraction: Fresnel diffraction**
38- IT-II	**Internal Test-II**
39-L34	**Fraunhofer diffraction**
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**Plane diffraction grating**
42- L37	**theory and experiment to determine wavelength (normal incidence)**
43- L38	**Polarization: Double refraction**
44- P4	**College level meeting/ function**
45-L39	**half wave and quarter wave plate**
46-L40	**Production and detection of plane, elliptically and circularly polarized light.**
47-L41	**Expression for excess of pressure inside a synclastic and anticlastic surface**
48-L42	**Expression for viscosity and thermal conductivity**
49-L43	**uniform bending**
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**Expression for bending moment**
52- L46	**Problem solving**
53-IT-III	**Internal Test-III**
54-L47	**Problem solving**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2014

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	

CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Allied Physics I
Course Code	GAPH11
Class	I year (2015-2018)
Semester	Odd
Staff Name	M r. A. Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

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 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

Page 8 of 17

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,

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2015
1-L1	**Unit I : Elasticity and bending moment**
2-L2	**Hooke's law – Elastic moduli**
3- L3	**Relation between elastic constants**
4-L4	**Work done in stretching a wire**
5-L5	**Expression for bending moment - uniform bending**
6-L6	**Experiment to determine Young's modulus using pin and microscope- Twisting couple of a wire**
7-L7	**Expression for couple per unit twist – Work done in twisting**
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	**Experimental determination of rigidity modulus of a wire using Torsion pendulum with theory**
10- L9	**Unit II: Surface tension and Viscosity**
11-L10	**Surface tension – Definition – Examples**
12-L11	**Molecular interpretation**
13-L12	**Application to spherical and cylindrical drops and bubbles**
14-L13	**Viscosity: Coefficient of viscosity – Rate of flow of liquid in a capillary tube (Poisueuille's formula)**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**Analogy between liquid flow and current flow**
17-IT-1	**Internal Test-I**
18-L16	**Stokes' formula for highly viscous liquids (Dimension method) – Experimental determination of viscosity of highly viscous liquid (stokes' method)**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**Unit III: Sound**
21- L19	**Simple harmonic motion – Free, damped ,forced vibrations and resonance**
22- P2	**College level meeting/Cell function**
23-L20	**Composition of two SHMs along a straight line and in perpendicular direction**
24-L21	**Melde's string experiment**
25-L22	**Determination of frequency of tuning fork** **Unit IV : Thermal physics**

26-L23	**Mean free path- Expression for mean free path**
27-L24	**Transport phenomena – Expression for viscosity and thermal conductivity**
28-L25	**Conduction in solids – coefficient of thermal conductivity**
29-L26	**Lee's disc method to determine thermal conductivity of a bad conductor**
30-L27	**Wiedmann – Franz's law – Convection : Newton's**
31-L28	**Unit V: Optics**
32-L29	**Interference: Condition for interference**
33-L30	**Air wedge**
34- P3	**Department Seminar**
35-L31	**determination of thickness of a thin wire by air wedge**
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**Diffraction: Fresnel diffraction**
38- IT-II	**Internal Test-II**
39-L34	**Fraunhofer diffraction**
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**Plane diffraction grating**
42- L37	**theory and experiment to determine wavelength (normal incidence)**
43- L38	**Polarization: Double refraction**
44- P4	**College level meeting/ function**
45-L39	**half wave and quarter wave plate**
46-L40	**Production and detection of plane, elliptically and circularly polarized light.**
47-L41	**Expression for excess of pressure inside a synclastic and anticlastic surface**
48-L42	**Expression for viscosity and thermal conductivity**
49-L43	**uniform bending**
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**Expression for bending moment**
52- L46	**Problem solving**
53-IT-III	**Internal Test-III**
54-L47	**Problem solving**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 29.10.2015

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	

CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Allied Physics I
Course Code	JAPH11
Class	I year (2016-2019)
Semester	Odd
Staff Name	M r. A. Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

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 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,

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2016
1-L1	**Unit I : Elasticity and bending moment**
2-L2	**Hooke's law – Elastic moduli**
3- L3	**Relation between elastic constants**
4-L4	**Work done in stretching a wire**
5-L5	**Expression for bending moment - uniform bending**
6-L6	**Experiment to determine Young's modulus using pin and microscope- Twisting couple of a wire**
7-L7	**Expression for couple per unit twist – Work done in twisting**
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	**Experimental determination of rigidity modulus of a wire using Torsion pendulum with theory**
10- L9	**Unit II: Surface tension and Viscosity**
11-L10	**Surface tension – Definition – Examples**
12-L11	**Molecular interpretation**
13-L12	**Application to spherical and cylindrical drops and bubbles**
14-L13	**Viscosity: Coefficient of viscosity – Rate of flow of liquid in a capillary tube (Poisueuille's formula)**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**Analogy between liquid flow and current flow**
17-IT-1	**Internal Test-I**
18-L16	**Stokes' formula for highly viscous liquids (Dimension method) – Experimental determination of viscosity of highly viscous liquid (stokes' method)**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**Unit III: Sound**
21- L19	**Simple harmonic motion – Free, damped ,forced vibrations and resonance**
22- P2	**College level meeting/Cell function**
23-L20	**Composition of two SHMs along a straight line and in perpendicular direction**
24-L21	**Melde's string experiment**
25-L22	**Determination of frequency of tuning fork** **Unit IV : Thermal physics**

26-L23	**Mean free path- Expression for mean free path**
27-L24	**Transport phenomena – Expression for viscosity and thermal conductivity**
28-L25	**Conduction in solids – coefficient of thermal conductivity**
29-L26	**Lee's disc method to determine thermal conductivity of a bad conductor**
30-L27	**Wiedmann – Franz's law – Convection : Newton's**
31-L28	**Unit V: Optics**
32-L29	**Interference: Condition for interference**
33-L30	**Air wedge**
34- P3	**Department Seminar**
35-L31	**determination of thickness of a thin wire by air wedge**
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**Diffraction: Fresnel diffraction**
38- IT-II	**Internal Test-II**
39-L34	**Fraunhofer diffraction**
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**Plane diffraction grating**
42- L37	**theory and experiment to determine wavelength (normal incidence)**
43- L38	**Polarization: Double refraction**
44- P4	**College level meeting/ function**
45-L39	**half wave and quarter wave plate**
46-L40	**Production and detection of plane, elliptically and circularly polarized light.**
47-L41	**Expression for excess of pressure inside a synclastic and anticlastic surface**
48-L42	**Expression for viscosity and thermal conductivity**
49-L43	**uniform bending**
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**Expression for bending moment**
52- L46	**Problem solving**
53-IT-III	**Internal Test-III**
54-L47	**Problem solving**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.11.2016

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	

CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Allied Physics I
Course Code	SAPH11
Class	I year (2017-2020)
Semester	Odd
Staff Name	MISS.D..PRISCILLA KOVILPILLAI& MISS.P.JUSTINA ANGELIN
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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-
-
-

Syllabus
ALLIED PHYSICS – PAPER I
UNIT I ELASTICITY AND BENDING MOMENT: Hooke's law - Elastic modulli - Work done in
stretching and work done in twisting a wire - Twisting couple on a wire - Determination of rigidity
modulus of a wire using torsion pendulum - Expression for bending moment - Uniform bending -
Experiment to determine young's modulus using pin and microscope method.
UNIT II FLUIDS: Surface Tension: Synclastic and anticlastic surface - Excess of pressure - Viscosity:
Poiseuille's formula for rate of flow of liquid in a capillary tube by dimensional analysis - Analogy
between current flow and liquid flow - streamlined motion – Stoke's formula
UNIT III THERMAL PHYSICS: Conduction in solids: Thermal conductivity - Lee's disc method -

Wiedmann-Franz law - Convection: Newton's law of cooling – Radiation: Distribution of energy in
the spectrum of a black body - results – Planck's law of radiation (no derivation) and its deduction
to wiens and Raleigh Jeans law
UNIT IV SOUND: Simple harmonic motion: free, damped, forced vibrations and resonance - Intensity and loudness of sound - Decibels – Melde's string experiment – Determination of frequency of tuning fork - Acoustics of buildings: Reverberation time - Sabine's formula and derrivation
UNIT V ELECTRICITY: Current and Current density – Ohm's law - Resistors - I-V characteristics -
colour coding- conversion of galvanometer into an ammeter and voltmeter – Kirchhoff's laws –
Balance condition of Whetstone's bridge - Potentiometer – Measurement of potential difference
and current

Books for study

1. Properties of Matter: R. Murugeshan, S Chand & Co. Pvt. Ltd., New Delhi
2. Heat and thermodynamics: D S Mathur, S Chand & Co., New Delhi
3. Text book of Sound by M N Srinivasan – Himalaya Publications, 1991
4. Electricity & Magnetism by K K Tewari, S Chand & Co., 3rd Edition, 2001

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2017
1-L1	**UNIT I ELASTICITY AND BENDING MOMENT**
2-L2	Hooke's law - Elastic modulli
3- L3	Work done in stretching and work done in twisting a wire
4-L4	Twisting couple on a wire
5-L5	Determination of rigidity modulus of a wire using torsion pendulum
6-L6	Expression for bending moment- Uniform bending
7-L7	Experiment to determine young's modulus using pin and microscope method
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	**UNIT II FLUIDS**
10- L9	Surface Tension
11-L10	Synclastic and anticlastic surface
12-L11	Excess of pressure
13-L12	Viscosity
14-L13	Poiseuille's formula for rate of flow of liquid in a capillary tube by dimensional analysis
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins

16-L15	Analogy between current flow and liquid flow
17-IT-1	**Internal Test-I**
18-L16	streamlined motion
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Stoke's formula
21- L19	**UNIT III THERMAL PHYSICS**
22- P2	**College level meeting/Cell function**
23-L20	Conduction in solids
24-L21	Thermal conductivity
25-L22	Lee's disc method
26-L23	Wiedmann-Franz law -
27-L24	Convection: : Newton's law of cooling
28-L25	Radiation: Distribution of energy in the spectrum of a black body- results
29-L26	– Planck's law of radiation (no derivation) and its deduction to wiens
30-L27	Raleigh Jeans law
31-L28	**UNIT IV SOUND**
32-L29	Simple harmonic motion: free, damped, forced vibrations and resonance
33-L30	Intensity and loudness of sound
34- P3	**Department Seminar**
35-L31	Decibels
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Melde's string experiment
38- IT-II	**Internal Test-II**
39-L34	Determination of frequency of tuning fork
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Acoustics of buildings: Reverberation time
42- L37	Sabine's formula and derrivation
43- L38	**UNIT V ELECTRICITY**
44- P4	**College level meeting/ function**
45-L39	Current and Current density
46-L40	Ohm's law - Resistors - I-V characteristics
47-L41	colour coding- conversion of galvanometer into an ammeter and voltmeter
48-L42	Kirchhoff's laws
49-L43	Balance condition of Whetstone's bridge
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Balance condition of Whetstone's bridge
52- L46	Potentiometer
53-IT-III	**Internal Test-III**

54-L47	Measurement of potential difference and current
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 06.11.2017

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Allied PhysicsII
Course Code	SAPH12
Class	I year (2017-2019)
Semester	EVEN
Staff Name	MISS.PRISCILLA KOVILPILLAI&MISS.JUSTINA ANGELIN
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

ALLIED PHYSICS – PAPER II
UNIT I OPTICS: Interference: Air wedge - determination of diameter of a thin wire by air wedge –
Diffraction: Fresnel diffraction & Fraunhofer diffraction - plane diffraction grating - theory and
experiment to determine wavelength (normal incidence) –
Polarization: Double refraction – half
wave and quarter wave plate, plane, elliptically and circularly polarized light – production
(theory)
UNIT II MAGNETISM AND ELECTROMAGNETISM: Magnetism: Susceptibility - permeability -
intensity of magnetization - properties of dia, para and ferro magnetic materials –

461
Electromagnetism: Faraday’s laws of electromagnetic induction, Lenz’s law – self-inductance -
self-inductance of a toroid – mutual inductance – coefficient of coupling-determination of
mutual inductance using a ballastic galvanometer
UNIT III ELECTRONICS: Diodes, transistors and ICs: - Zener diode – characteristics - transistor
configuration CE mode - IC – Pin diagram of 741 – Digital electronics: binary numbers –
conversion of decimal number to binary number - binary number to decimal number – binary
addition, subtraction and basic logic gates (OR, AND, NOT. NOR & NAND) – EXOR gate – De
Morgan’s theorem.
UNIT IV NUCLEAR PHYSICS AND RADIATION PHYSICS: Nuclear Physics: Nuclear constituents, size,
mass, spin and charge - binding energy - binding energy curve - nuclear fission - chain reaction –
nuclear reactor - Radiation Physics: radioactive disintegration – half-life period - radiation hazards
UNIT V RELATIVITY AND QUANTUM MECHANICS: Relativity: Frames of references - postulates of
special theory of relativity - Lorentz transformation equations - Wave mechanics: matter waves -
de Broglie wavelength - properties of wave functions - Quantum mechanics: postulates of
quantum mechanics -Schrödinger equation - time dependent form
Books for study
1. Optics: Brij Lal & Subramaniam, S Chand & Co., New Delhi
2 Electricity and magnetism: R Murugeshan , 8th Edn, 2006, S Chand & Co., New Delhi
3. Principles of Electronics: V K Mehta, 5th edition 2001, S Chand & Co., New Delhi,
4. Atomic and Nuclear Physics: Brij Lal & Subramaniam, S Chand & Co., 2000
5. Quantum Mechanics :V. Devanathan, Narosa, Chennai, 2005.
6. Modern Physics: R Murugeshan, Kiruthiga, Sivaprasath S Chand & Co. 2007
7. Physics of Radiation Therapy : FM Khan - Williamd and Wilkins, Third edition , 2003
Books for Reference
1. Fundamentals of Physics, 6th Edition by D Halliday, R Resnick and J Walker, Wiley NY
2001.
2. Physics, 4th Edition vols. I, II & II Extended by D Halliday, R Resnick and K S Krane,
Wiley NY 1994.
3. Nuclear Medicine Physics: Chandra , Lippincot Williams and Wilkins, 1998

Course Calendar

Hour allotment	Class Schedule
	EVEN SEMESTER BEGINS(07.12.2017)
1-L1	Interference: Air wedge
2-L2	determination of diameter of a thin wire by air wedge –
3- L3	Diffraction: Fresnel diffraction & Fraunhofer diffraction -
4-L4	plane diffraction grating - theory
5-L5	experiment to determine wavelength (normal incidence) -
6-L6	half wave and quarter wave plate, plane, elliptically and circularly polarized light – production
7-L7	**UNIT II MAGNETISM AND ELECTROMAGNETISM**
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	Magnetism: Susceptibility - permeability -
10- L9	intensity of magnetization
11-L10	properties of dia, para and ferro magnetic materials
12-L11	Electromagnetism: Faraday's laws of electromagnetic induction,
13-L12	Lenz's law – self-inductance
14-L13	self-inductance of a toroid – mutual inductance
15-L14	____ - **Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	coefficient of coupling
17-IT-1	**Internal Test-I**
18-L16	determination of mutual inductance using a ballastic galvanometer
19-L17	____ -**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**UNIT III ELECTRONICS**
21- L19	Diodes, transistors and ICs: - Zener diode – characteristics - transistor
22- P2	**College level meeting/Cell function**
23-L20	configuration CE mode - IC – Pin diagram of 741
24-L21	Digital electronics: binary numbers
25-L22	conversion of decimal number to binary number - binary number to decimal number
26-L23	binary addition, subtraction and basic logic gates (OR, AND, NOT. NOR & NAND)
27-L24	EXOR gate – De Morgan's theorem.

28-L25	**UNIT IV NUCLEAR PHYSICS AND RADIATION PHYSICS**
29-L26	Nuclear Physics: Nuclear constituents, size, mass, spin and charge
30-L27	binding energy - binding energy curve
31-L28	nuclear fission - chain reaction –
32-L29	- Radiation Physics: radioactive disintegration – half-life period - radiation hazards
33-L30	**UNIT V RELATIVITY AND QUANTUM MECHANICS**
34- P3	**Department Seminar**
35-L31	
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Relativity: Frames of references - postulates of special theory of relativity
38- IT-II	**Internal Test-II**
39-L34	Lorentz transformation equations
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	de Broglie wavelength
42- L37	properties of wave functions
43- L38	Quantum mechanics: postulates of quantum mechanics
44- P4	**College level meeting/ function**
45-L39	Wave mechanics: matter waves
46-L40	Schrödinger equation
47-L41	quantum mechanics
48-L42	Schrödinger equation -
49-L43	
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	time dependent form
52- L46	PROBLEM SOLVING
53-IT-III	**Internal Test-III**
54-L47	PROBLEM SOLVING
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on (23.04.2018)

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Allied Physics I
Course Code	SAPH11
Class	I year (2018-2021)
Semester	Odd
Staff Name	MISS.D..PRISCILLA KOVILPILLAI& MISS.P.JUSTINA ANGELIN
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

ALLIED PHYSICS – PAPER I

UNIT I ELASTICITY AND BENDING MOMENT: Hooke's law - Elastic modulli - Work done in
stretching and work done in twisting a wire - Twisting couple on a wire - Determination of rigidity
modulus of a wire using torsion pendulum - Expression for bending moment - Uniform bending -
Experiment to determine young's modulus using pin and microscope method.
UNIT II FLUIDS: Surface Tension: Synclastic and anticlastic surface - Excess of pressure -Viscosity:
Poiseuille's formula for rate of flow of liquid in a capillary tube by dimensional analysis - Analogy
between current flow and liquid flow - streamlined motion – Stoke's formula

UNIT III THERMAL PHYSICS: Conduction in solids: Thermal conductivity - Lee’s disc method -
Wiedmann-Franz law - Convection: Newton’s law of cooling – Radiation: Distribution of energy in
the spectrum of a black body - results – Planck’s law of radiation (no derivation) and its deduction
to wiens and Raleigh Jeans law
UNIT IV SOUND: Simple harmonic motion: free, damped, forced vibrations and resonance -
Intensity and loudness of sound - Decibels – Melde’s string experiment – Determination of
frequency of tuning fork - Acoustics of buildings: Reverberation time - Sabine’s formula and
derrivation
UNIT V ELECTRICITY: Current and Current density – Ohm’s law - Resistors - I-V characteristics -
colour coding- conversion of galvanometer into an ammeter and voltmeter – Kirchhoff’s laws –
Balance condition of Whetstone’s bridge - Potentiometer – Measurement of potential difference
and current

Books for study

1. Properties of Matter: R. Murugeshan, S Chand & Co. Pvt. Ltd., New Delhi
2. Heat and thermodynamics: D S Mathur, S Chand & Co., New Delhi
3. Text book of Sound by M N Srinivasan – Himalaya Publications, 1991
4. Electricity & Magnetism by K K Tewari, S Chand & Co., 3rd Edition, 2001

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2018
1-L1	**UNIT I ELASTICITY AND BENDING MOMENT**
2-L2	Hooke’s law - Elastic modulli
3- L3	Work done in stretching and work done in twisting a wire
4-L4	Twisting couple on a wire
5-L5	Determination of rigidity modulus of a wire using torsion pendulum
6-L6	Expression for bending moment- Uniform bending
7-L7	Experiment to determine young’s modulus using pin and microscope method
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	**UNIT II FLUIDS**
10- L9	Surface Tension
11-L10	Synclastic and anticlastic surface

12-L11	Excess of pressure
13-L12	Viscosity
14-L13	Poiseuille's formula for rate of flow of liquid in a capillary tube by dimensional analysis
15-L14	____ - **Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Analogy between current flow and liquid flow
17-IT-1	**Internal Test-I**
18-L16	streamlined motion
19-L17	____ -**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Stoke's formula
21- L19	**UNIT III THERMAL PHYSICS**
22- P2	**College level meeting/Cell function**
23-L20	Conduction in solids
24-L21	Thermal conductivity
25-L22	Lee's disc method
26-L23	Wiedmann-Franz law -
27-L24	Convection: : Newton's law of cooling
28-L25	Radiation: Distribution of energy in the spectrum of a black body- results
29-L26	– Planck's law of radiation (no derivation) and its deduction to wiens
30-L27	Raleigh Jeans law
31-L28	**UNIT IV SOUND**
32-L29	Simple harmonic motion: free, damped, forced vibrations and resonance
33-L30	Intensity and loudness of sound
34- P3	**Department Seminar**
35-L31	Decibels
36-L32	____ - **Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Melde's string experiment
38- IT-II	**Internal Test-II**
39-L34	Determination of frequency of tuning fork
40-L35	____ -**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Acoustics of buildings: Reverberation time
42- L37	Sabine's formula and derrivation
43- L38	**UNIT V ELECTRICITY**
44- P4	**College level meeting/ function**
45-L39	Current and Current density
46-L40	Ohm's law - Resistors - I-V characteristics
47-L41	colour coding- conversion of galvanometer into an ammeter and voltmeter
48-L42	Kirchhoff's laws

49-L43	Balance condition of Whetstone's bridge
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Balance condition of Whetstone's bridge
52- L46	Potentiometer
53-IT-III	**Internal Test-III**
54-L47	Measurement of potential difference and current
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.11.2018

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Allied PhysicsII
Course Code	SAPH12
Class	I year (2018-2020)
Semester	EVEN
Staff Name	MISS.PRISCILLA KOVILPILLAI&MISS.JUSTINA ANGELIN
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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-
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Syllabus

ALLIED PHYSICS – PAPER II
UNIT I OPTICS: Interference: Air wedge - determination of diameter of a thin wire by air wedge –
Diffraction: Fresnel diffraction & Fraunhofer diffraction - plane diffraction grating - theory and
experiment to determine wavelength (normal incidence) –
Polarization: Double refraction – half
wave and quarter wave plate, plane, elliptically and circularly polarized light – production
(theory)
UNIT II MAGNETISM AND ELECTROMAGNETISM: Magnetism: Susceptibility - permeability -
intensity of magnetization - properties of dia, para and ferro magnetic materials –

461
Electromagnetism: Faraday's laws of electromagnetic induction, Lenz's law – self-inductance -
self-inductance of a toroid – mutual inductance – coefficient of coupling-determination of
mutual inductance using a ballastic galvanometer
UNIT III ELECTRONICS: Diodes, transistors and ICs: - Zener diode – characteristics - transistor
configuration CE mode - IC – Pin diagram of 741 – Digital electronics: binary numbers –
conversion of decimal number to binary number - binary number to decimal number – binary
addition, subtraction and basic logic gates (OR, AND, NOT. NOR & NAND) – EXOR gate – De
Morgan's theorem.
UNIT IV NUCLEAR PHYSICS AND RADIATION PHYSICS: Nuclear Physics: Nuclear constituents, size,
mass, spin and charge - binding energy - binding energy curve - nuclear fission - chain reaction –
nuclear reactor - Radiation Physics: radioactive disintegration – half-life period - radiation hazards
UNIT V RELATIVITY AND QUANTUM MECHANICS: Relativity: Frames of references - postulates of
special theory of relativity - Lorentz transformation equations - Wave mechanics: matter waves -
de Broglie wavelength - properties of wave functions - Quantum mechanics: postulates of
quantum mechanics -Schrödinger equation - time dependent form
Books for study
1. Optics: Brij Lal & Subramaniam, S Chand & Co., New Delhi
2 Electricity and magnetism: R Murugeshan , 8th Edn, 2006, S Chand & Co., New Delhi
3. Principles of Electronics: V K Mehta, 5th edition 2001, S Chand & Co., New Delhi,
4. Atomic and Nuclear Physics: Brij Lal & Subramaniam, S Chand & Co., 2000
5. Quantum Mechanics :V. Devanathan, Narosa, Chennai, 2005.
6. Modern Physics: R Murugeshan, Kiruthiga, Sivaprasath S Chand & Co. 2007
7. Physics of Radiation Therapy : FM Khan - Williamd and Wilkins, Third edition , 2003
Books for Reference
1. Fundamentals of Physics, 6th Edition by D Halliday, R Resnick and J Walker, Wiley NY
2001.
2. Physics, 4th Edition vols. I, II & II Extended by D Halliday, R Resnick and K S Krane,
Wiley NY 1994.
3. Nuclear Medicine Physics: Chandra , Lippincot Williams and Wilkins, 1998

Course Calendar

Hour allotment	Class Schedule
	EVEN SEMESTER BEGINS(03.12.2018)
1-L1	Interference: Air wedge
2-L2	determination of diameter of a thin wire by air wedge –
3- L3	Diffraction: Fresnel diffraction & Fraunhofer diffraction -
4-L4	plane diffraction grating - theory
5-L5	experiment to determine wavelength (normal incidence) -
6-L6	half wave and quarter wave plate, plane, elliptically and circularly polarized light – production
7-L7	**UNIT II MAGNETISM AND ELECTROMAGNETISM**
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	Magnetism: Susceptibility - permeability -
10- L9	intensity of magnetization
11-L10	properties of dia, para and ferro magnetic materials
12-L11	Electromagnetism: Faraday's laws of electromagnetic induction,
13-L12	Lenz's law – self-inductance
14-L13	self-inductance of a toroid – mutual inductance
15-L14	____ - **Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	coefficient of coupling
17-IT-1	**Internal Test-I**
18-L16	determination of mutual inductance using a ballastic galvanometer
19-L17	____ **-Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**UNIT III ELECTRONICS**
21- L19	Diodes, transistors and ICs: - Zener diode – characteristics - transistor
22- P2	**College level meeting/Cell function**
23-L20	configuration CE mode - IC – Pin diagram of 741
24-L21	Digital electronics: binary numbers
25-L22	conversion of decimal number to binary number - binary number to decimal number
26-L23	binary addition, subtraction and basic logic gates (OR, AND, NOT. NOR & NAND)
27-L24	EXOR gate – De Morgan's theorem.

28-L25	**UNIT IV NUCLEAR PHYSICS AND RADIATION PHYSICS**
29-L26	Nuclear Physics: Nuclear constituents, size, mass, spin and charge
30-L27	binding energy - binding energy curve
31-L28	nuclear fission - chain reaction –
32-L29	- Radiation Physics: radioactive disintegration – half-life period - radiation hazards
33-L30	**UNIT V RELATIVITY AND QUANTUM MECHANICS**
34- P3	**Department Seminar**
35-L31	
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Relativity: Frames of references - postulates of special theory of relativity
38- IT-II	**Internal Test-II**
39-L34	Lorentz transformation equations
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	de Broglie wavelength
42- L37	properties of wave functions
43- L38	Quantum mechanics: postulates of quantum mechanics
44- P4	**College level meeting/ function**
45-L39	Wave mechanics: matter waves
46-L40	Schrödinger equation
47-L41	quantum mechanics
48-L42	Schrödinger equation -
49-L43	
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	time dependent form
52- L46	PROBLEM SOLVING
53-IT-III	**Internal Test-III**
54-L47	PROBLEM SOLVING
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on (23.04.2019)

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Allied Physics I
Course Code	SAPH11
Class	I year (2019-2022)
Semester	Odd
Staff Name	MISS.D..PRISCILLA KOVILPILLAI& MISS.P.JUSTINA ANGELIN
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

ALLIED PHYSICS – PAPER I

UNIT I ELASTICITY AND BENDING MOMENT: Hooke's law - Elastic modulli - Work done in
stretching and work done in twisting a wire - Twisting couple on a wire - Determination of rigidity
modulus of a wire using torsion pendulum - Expression for bending moment - Uniform bending -
Experiment to determine young's modulus using pin and microscope method.
UNIT II FLUIDS: Surface Tension: Synclastic and anticlastic surface - Excess of pressure -Viscosity:
Poiseuille's formula for rate of flow of liquid in a capillary tube by dimensional analysis - Analogy
between current flow and liquid flow - streamlined motion – Stoke's formula

UNIT III THERMAL PHYSICS: Conduction in solids: Thermal conductivity - Lee's disc method -
Wiedmann-Franz law - Convection: Newton's law of cooling – Radiation: Distribution of energy in
the spectrum of a black body - results – Planck's law of radiation (no derivation) and its deduction
to wiens and Raleigh Jeans law
UNIT IV SOUND: Simple harmonic motion: free, damped, forced vibrations and resonance -
Intensity and loudness of sound - Decibels – Melde's string experiment – Determination of
frequency of tuning fork - Acoustics of buildings: Reverberation time - Sabine's formula and
derrivation
UNIT V ELECTRICITY: Current and Current density – Ohm's law - Resistors - I-V characteristics -
colour coding- conversion of galvanometer into an ammeter and voltmeter – Kirchhoff's laws –
Balance condition of Whetstone's bridge - Potentiometer – Measurement of potential difference
and current

Books for study

1. Properties of Matter: R. Murugeshan, S Chand & Co. Pvt. Ltd., New Delhi
2. Heat and thermodynamics: D S Mathur, S Chand & Co., New Delhi
3. Text book of Sound by M N Srinivasan – Himalaya Publications, 1991
4. Electricity & Magnetism by K K Tewari, S Chand & Co., 3rd Edition, 2001

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 17.06.2019
1-L1	**UNIT I ELASTICITY AND BENDING MOMENT**
2-L2	Hooke's law - Elastic modulli
3- L3	Work done in stretching and work done in twisting a wire
4-L4	Twisting couple on a wire
5-L5	Determination of rigidity modulus of a wire using torsion pendulum
6-L6	Expression for bending moment- Uniform bending
7-L7	Experiment to determine young's modulus using pin and microscope method
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	**UNIT II FLUIDS**
10- L9	Surface Tension
11-L10	Synclastic and anticlastic surface

12-L11	Excess of pressure
13-L12	Viscosity
14-L13	Poiseuille's formula for rate of flow of liquid in a capillary tube by dimensional analysis
15-L14	____ - **Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Analogy between current flow and liquid flow
17-IT-1	**Internal Test-I**
18-L16	streamlined motion
19-L17	____ -**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Stoke's formula
21- L19	**UNIT III THERMAL PHYSICS**
22- P2	**College level meeting/Cell function**
23-L20	Conduction in solids
24-L21	Thermal conductivity
25-L22	Lee's disc method
26-L23	Wiedmann-Franz law -
27-L24	Convection: : Newton's law of cooling
28-L25	Radiation: Distribution of energy in the spectrum of a black body- results
29-L26	– Planck's law of radiation (no derivation) and its deduction to wiens
30-L27	Raleigh Jeans law
31-L28	**UNIT IV SOUND**
32-L29	Simple harmonic motion: free, damped, forced vibrations and resonance
33-L30	Intensity and loudness of sound
34- P3	**Department Seminar**
35-L31	Decibels
36-L32	____ - **Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Melde's string experiment
38- IT-II	**Internal Test-II**
39-L34	Determination of frequency of tuning fork
40-L35	____ -**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Acoustics of buildings: Reverberation time
42- L37	Sabine's formula and derrivation
43- L38	**UNIT V ELECTRICITY**
44- P4	**College level meeting/ function**
45-L39	Current and Current density
46-L40	Ohm's law - Resistors - I-V characteristics
47-L41	colour coding- conversion of galvanometer into an ammeter and voltmeter
48-L42	Kirchhoff's laws

49-L43	Balance condition of Whetstone's bridge
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Balance condition of Whetstone's bridge
52- L46	Potentiometer
53-IT-III	**Internal Test-III**
54-L47	Measurement of potential difference and current
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.10.2019

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Allied PhysicsII
Course Code	SAPH12
Class	I year (2019-2022)
Semester	EVEN
Staff Name	MISS.PRISCILLA KOVILPILLAI&MISS.JUSTINA ANGELIN
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

ALLIED PHYSICS – PAPER II
UNIT I OPTICS: Interference: Air wedge - determination of diameter of a thin wire by air wedge –
Diffraction: Fresnel diffraction & Fraunhofer diffraction - plane diffraction grating - theory and
experiment to determine wavelength (normal incidence) –
Polarization: Double refraction – half
wave and quarter wave plate, plane, elliptically and circularly polarized light – production
(theory)
UNIT II MAGNETISM AND ELECTROMAGNETISM: Magnetism: Susceptibility - permeability -
intensity of magnetization - properties of dia, para and ferro magnetic materials –

461
Electromagnetism: Faraday's laws of electromagnetic induction, Lenz's law – self-inductance -
self-inductance of a toroid – mutual inductance – coefficient of coupling-determination of
mutual inductance using a ballastic galvanometer
UNIT III ELECTRONICS: Diodes, transistors and ICs: - Zener diode – characteristics - transistor
configuration CE mode - IC – Pin diagram of 741 – Digital electronics: binary numbers –
conversion of decimal number to binary number - binary number to decimal number – binary
addition, subtraction and basic logic gates (OR, AND, NOT. NOR & NAND) – EXOR gate – De
Morgan's theorem.
UNIT IV NUCLEAR PHYSICS AND RADIATION PHYSICS: Nuclear Physics: Nuclear constituents, size,
mass, spin and charge - binding energy - binding energy curve - nuclear fission - chain reaction –
nuclear reactor - Radiation Physics: radioactive disintegration – half-life period - radiation hazards
UNIT V RELATIVITY AND QUANTUM MECHANICS: Relativity: Frames of references - postulates of
special theory of relativity - Lorentz transformation equations - Wave mechanics: matter waves -
de Broglie wavelength - properties of wave functions - Quantum mechanics: postulates of
quantum mechanics -Schrödinger equation - time dependent form
Books for study
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3. Principles of Electronics: V K Mehta, 5th edition 2001, S Chand & Co., New Delhi,
4. Atomic and Nuclear Physics: Brij Lal & Subramaniam, S Chand & Co., 2000
5. Quantum Mechanics :V. Devanathan, Narosa, Chennai, 2005.
6. Modern Physics: R Murugeshan, Kiruthiga, Sivaprasath S Chand & Co. 2007
7. Physics of Radiation Therapy : FM Khan - Williamd and Wilkins, Third edition , 2003
Books for Reference
1. Fundamentals of Physics, 6th Edition by D Halliday, R Resnick and J Walker, Wiley NY
2001.
2. Physics, 4th Edition vols. I, II & II Extended by D Halliday, R Resnick and K S Krane,
Wiley NY 1994.
3. Nuclear Medicine Physics: Chandra , Lippincot Williams and Wilkins, 1998

Course Calendar

Hour allotment	Class Schedule
	EVEN SEMESTER BEGINS(02.12.2019)
1-L1	Interference: Air wedge
2-L2	determination of diameter of a thin wire by air wedge –
3- L3	Diffraction: Fresnel diffraction & Fraunhofer diffraction -
4-L4	plane diffraction grating - theory
5-L5	experiment to determine wavelength (normal incidence) -
6-L6	half wave and quarter wave plate, plane, elliptically and circularly polarized light – production
7-L7	**UNIT II MAGNETISM AND ELECTROMAGNETISM**
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	Magnetism: Susceptibility - permeability -
10- L9	intensity of magnetization
11-L10	properties of dia, para and ferro magnetic materials
12-L11	Electromagnetism: Faraday's laws of electromagnetic induction,
13-L12	Lenz's law – self-inductance
14-L13	self-inductance of a toroid – mutual inductance
15-L14	____ - **Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	coefficient of coupling
17-IT-1	**Internal Test-I**
18-L16	determination of mutual inductance using a ballastic galvanometer
19-L17	____ **-Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**UNIT III ELECTRONICS**
21- L19	Diodes, transistors and ICs: - Zener diode – characteristics - transistor
22- P2	**College level meeting/Cell function**
23-L20	configuration CE mode - IC – Pin diagram of 741
24-L21	Digital electronics: binary numbers
25-L22	conversion of decimal number to binary number - binary number to decimal number
26-L23	binary addition, subtraction and basic logic gates (OR, AND, NOT. NOR & NAND)
27-L24	EXOR gate – De Morgan's theorem.

28-L25	**UNIT IV NUCLEAR PHYSICS AND RADIATION PHYSICS**
29-L26	Nuclear Physics: Nuclear constituents, size, mass, spin and charge
30-L27	binding energy - binding energy curve
31-L28	nuclear fission - chain reaction –
32-L29	- Radiation Physics: radioactive disintegration – half-life period - radiation hazards
33-L30	**UNIT V RELATIVITY AND QUANTUM MECHANICS**
34- P3	**Department Seminar**
35-L31	
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Relativity: Frames of references - postulates of special theory of relativity
38- IT-II	**Internal Test-II**
39-L34	Lorentz transformation equations
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	de Broglie wavelength
42- L37	properties of wave functions
43- L38	Quantum mechanics: postulates of quantum mechanics
44- P4	**College level meeting/ function**
45-L39	Wave mechanics: matter waves
46-L40	Schrödinger equation
47-L41	quantum mechanics
48-L42	Schrödinger equation -
49-L43	
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	time dependent form
52- L46	PROBLEM SOLVING
53-IT-III	**Internal Test-III**
54-L47	PROBLEM SOLVING
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on (27.04.2020)

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

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For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Atomic and Nuclear Physics
Course Code	JMPH62
Class	III year (2018-2019)
Semester	Even
Staff Name	Dr.A.Arul Gnanam Mrs.R.Nithya Agnes
Credits	6
L. Hours /P. Hours	6 / WK
Total 90 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 80 Hrs (5 units; 5×16=80; 16Hrs /unit)	

Course Objectives

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-
-
-

Syllabus

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 mode

l **Book for study**

1. Modern Physics- R.Murugesan, S. chand & Co

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 03.12.2018
1-L1	**Unit I :Atomic Structure :**Introduction
2-L2	Quantum numbers associated with vector atom model
3- L3	coupling schemes –L-S- and J-J couplings
4-L4	magnetic dipole moment due to orbital motion of the electron
5-L5	spectral notation-selection rules
6-L6	Stern and Gerlach experiment
7-L7	Zeeman effect
8-L8	Quantum mechanical explanation of the normal Zeeman effect
9-L9	Anomalous Zeeman effect
10-P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
11-L10	stark effect
12-L11	magnetic dipole moment due to spin
13-L12	Pauli‟s exclusion principle
14-L13	application to periodic table

15-L14	fine structure of sodium D line
16-L15	experimental arrangement for the normal Zeeman effect
17-L16	Vector atom model
18-L17	optical spectra
19-L18	**Unit II Introduction to the Nucleus**
20-L19	BE/A curve and its significance
21-L20	mass defect
22-L21	packing fraction
23-L22	____ - **Allotting portion for Internal Test-I**
	Internal Test I begins
24-L23	General properties of the nucleus
25-L24	proton neutron hypothesis
26-IT-1	**Internal Test-I**
27-L25	proton electron hypothesis
28-L26	Models of Nuclear structure
29-L27	Binding Energy formula
30-L28	____ **-Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
31- L29	Nuclear forces –charecteristics
32- L30	Meson theory of nuclear forces
33- L31	nuclar reactions-Q-value of nuclar reactions .
34-P2	**College level meeting/Cell function**
35- L32	Shell Model
36- L33	Liquid drop model
37- L34	**Unit III Radio activity**
38- L35	alpha,beta and gamma rays
39- L36	alpha,beta and gamma rays -properties
40- L37	Soddy Fajan's displacement law
41- L38	natural radio active series
42- L39	law of radio active disintegration
43- L40	half life period
44- L41	mean life period
45- L42	Radio carbon dating
46- L43	law of successive disintegration
47- L44	range of α particle
48- L45	Geiger Nuttal law
49- L46	theory of α decay
50- L47	β decay- β- ray spectra
51- P3	**Department Seminar**
52- L48	neutrino theory of β decay
53- L49	neutrino and its properties
54- L50	electron capture
55- L51	Natural radio activity
56-L52	____ - **Allotting portion for Internal Test-II**
	Internal Test II begins
57-L53	Class test
58-L54	Interaction class
59-IT-II	**Internal Test-II**

60- L55	Internal test preparation
61- L56	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
62- L57	wilson cloud chamber
63- L58	fusion reactor
64- L59	uses of reactor- Nuclear fusion
65- L60	energy released in fission
66- L61	ϒ decay-nuclear isomers
67- L62	radio isotopes and their uses
68- L63	Mossabauer effect and its applications.
69- L64	**Unit IV :Nuclear reactors,Particle accelerators and detectors** Nuclear fission
70- L65	Nuclear reactor
71- L66	Thermo nuclear reactions
72- L67	controlled thermo nuclear reaction
73- L68	Principle and action of atom bomb and hydrogen bomb
74-P4	**College level meeting/ function**
75- L69	Detectors-G.M.Counter-scintillation counter-bubble chamber
76- L70	Accelerators-cyclotron-synchrocyclotron-betatron-synchrotrons
77- L71	**Unit V :Cosmic rays and elementary particles** Cosmic rays-introduction-discovery-lattitude,altitude and azimuth effects
78- L72	Longitudinal effect-north –south effect-.
79- L73	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
80- L74	seasonal and diurnal changes
81- L75	primary and secondary cosmic rays-nature of Cosmic rays- Cosmic ray showers-van allen belt- origin of Cosmic radiation
82-IT-III	**Internal Test-III**
83- L76	Elementary particles-introduction-particles and antiparticles-antimatter-the fundamental interaction
84- L77	**____ - Test Paper distribution and result analysis**
85- L78	elementary particle quantum numbers-conservation laws and symmetry-the quark mode
	Entering Internal Test-III Marks into University portal
	Model Test begins
86- L79	**Model Test**
87-MT	**Model Test**
88-MT	**Model Test**
89-MT	**Model test paper distribution and previous year university question paper discussion**
90-L-80	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2019

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	

CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Atomic Physics
Course Code	GMPH51
Class	III year (2014-2015)
Semester	Odd
Staff Name	Mr.A.Arul Gnanam
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

ATOMIC PHYSICS

UNIT I

The electron ,band theory of solids and positive rays : The free Electron Theory of metals –
Expression for electrical conductivity – expressions for thermal conductivity – Determination of the electronic charge : Millikan's oil drop method-electron microscope – band theory of solids – classification of solids on the basis of band theory – optical properties of solids - - energy bands Brillouin zones-origin of forbidden bands

UNIT II

Properties of positive rays – positive ray analysis – Thomson's parabola method- Aston's mass spectrograph – Bainbridge's mass spectrograph – Dempster's mass spectrograph – mass defect and packing fraction- Dunnington's method of determining e/m

UNIT III

Structure of atom : The vector atom model – quantum numbers associated with the the vector atom model – coupling schemes – the Pauli exclusions exclusion principle – the periodic
classification of elements – magnetic dipole moment due to orbital motion of the electronmagnetic dipole moment due to spin-the Stern and Gerlach experiment- quantum mechanical explanation of normal and anomoulous Zeeman effect.

UNIT IV

X-rays: Production of X-rays – spacing between three dimensional lattice planes – the absorption of X-rays – X-ray absorption edges – Bragg‘s law – the Bragg‘s X-ray spectrometer – the power crystal method –(a) the Laue method - (b) rotating crystal method – X-ray spectra – characteristic of X-ray spectrum – Moseley‘s law – Compton scattering

UNIT V

Photoelectric effect and planck‘s quantum theory: Experimental investigations on the photoelectric effect – failure of electromagnetic theory-Einstein‘s photoelectric equation – photoelectric cells – Planck‘s quantum theory-the distribution of energy in the spectrum of a black body-Wien‘s displacement law-Planck‘s hypothesis-derivation of Planck‘s law of radiation

Books for reference:

1. MODERN PHYSICS - By R.Murugeshan and Kiruthiga Sivaprasath (14th Revised multicolour edition) ,S.Chand & Company Ltd. Ram nagar ,New Delhi-110055
2. MODERN PHYSICS - By B.S.Agarwal,Kedarnath Ramnath,Meerut,Delhi
3. ATOMIC AND NUCLEAR PHYSICS- N.Subrahmanyam Brijlal, S.Chand & Company Ltd. Ram nagar ,New Delhi-110055
4. MODERN PHYSICS – B.V.N. Rao,Wiley Eastern Ltd,New Delhi
5. An Introduction to MODERN PHYSICS- P.Mahendru,16/7698 New market,New Rohtak road, Satyaprakashan ,New Delhi-11
6. Halliday Rhesnick walker Ed 6 Wiley

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2014
1-L1	The electron ,band theory of solids and positive rays
2-L2	The free Electron Theory of metals
3- L3	Expression for electrical conductivity – expressions for thermal conductivity
4-L4	expressions for thermal conductivity
5-L5	Determination of the electronic charge
6-L6	Millikan‘s oil drop method-electron microscope
7-L7	band theory of solids
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	classification of solids on the basis of band theory
10- L9	optical properties of solids
11-L10	energy bands Brillouin zones-origin of forbidden bands
12-L11	Properties of positive rays – positive ray analysis
13-L12	Thomson‘s parabola method
14-L13	Aston‘s mass spectrograph
15-L14	**____ - Allotting portion for Internal Test-I**

	Internal Test I begins
16-L15	Bainbridge's mass spectrograph
17-IT-1	**Internal Test-I**
18-L16	Dempster's mass spectrograph
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	mass defect and packing fraction
21- L19	Dunnington's method of determining e/m
22- P2	**College level meeting/Cell function**
23-L20	Structure of atom : The vector atom model
24-L21	quantum numbers associated with the the vector atom model
25-L22	coupling schemes
26-L23	the Pauli exclusions exclusion principle
27-L24	Periodic classification of elements
28-L25	magnetic dipole moment due to orbital motion of the electronmagnetic dipole moment due to spin
29-L26	the Stern and Gerlach experiment
30-L27	quantum mechanical explanation of normal and anomoulous Zeeman effect.
31-L28	X-rays: Production of X-rays
32-L29	spacing between three dimensional lattice planes
33-L30	absorption of X-rays
34- P3	**Department Seminar**
35-L31	Problem Solving
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Revision
38- IT-II	**Internal Test-II**
39-L34	X-ray absorption edges
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Bragg's law
42- L37	the Bragg's X-ray spectrometer
43- L38	the power crystal method
44- P4	**College level meeting/ function**
45-L39	X-ray spectra characteristic of X-ray spectrum – Moseley's law – Compton scattering
46-L40	Photoelectric effect and planck's quantum theory: Experimental investigations on the photoelectric effect
47-L41	failure of electromagnetic theory
48-L42	photoelectric cells – Planck's quantum theory-the distribution of energy in the spectrum of a black body
49-L43	Wien's displacement law-Planck's hypothesis-derivation of Planck's law of radiation
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Class Test
52- L46	Problem Solving

53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2014

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

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HOD Signature | Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Atomic Physics
Course Code	GMPH51
Class	III year (2015-2016)
Semester	Odd
Staff Name	Mr.A.Arul Gnanam
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

ATOMIC PHYSICS

UNIT I

The electron ,band theory of solids and positive rays : The free Electron Theory of metals –
Expression for electrical conductivity – expressions for thermal conductivity – Determination of the electronic charge : Millikan's oil drop method-electron microscope – band theory of solids – classification of solids on the basis of band theory – optical properties of solids - - energy bands Brillouin zones-origin of forbidden bands

UNIT II

Properties of positive rays – positive ray analysis – Thomson‘s parabola method- Aston‘s mass spectrograph – Bainbridge‘s mass spectrograph – Dempster‘s mass spectrograph – mass defect and packing fraction- Dunnington‘s method of determining e/m

UNIT III

Structure of atom : The vector atom model – quantum numbers associated with the the vector atom model – coupling schemes – the Pauli exclusions exclusion principle – the periodic
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X-rays: Production of X-rays – spacing between three dimensional lattice planes – the absorption of X-rays – X-ray absorption edges – Bragg‘s law – the Bragg‘s X-ray spectrometer – the power crystal method –(a) the Laue method - (b) rotating crystal method – X-ray spectra – characteristic of X-ray spectrum – Moseley‘s law – Compton scattering

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Photoelectric effect and planck‘s quantum theory: Experimental investigations on the photoelectric effect – failure of electromagnetic theory-Einstein‘s photoelectric equation – photoelectric cells – Planck‘s quantum theory-the distribution of energy in the spectrum of a black body-Wien‘s displacement law-Planck‘s hypothesis-derivation of Planck‘s law of radiation

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6. Halliday Rhesnick walker Ed 6 Wiley

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2015
1-L1	The electron ,band theory of solids and positive rays
2-L2	The free Electron Theory of metals
3- L3	Expression for electrical conductivity – expressions for thermal conductivity
4-L4	expressions for thermal conductivity
5-L5	Determination of the electronic charge
6-L6	Millikan‘s oil drop method-electron microscope
7-L7	band theory of solids
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	classification of solids on the basis of band theory
10- L9	optical properties of solids
11-L10	energy bands Brillouin zones-origin of forbidden bands

12-L11	Properties of positive rays – positive ray analysis
13-L12	Thomson's parabola method
14-L13	Aston's mass spectrograph
15-L14	**____ - Allotting portion for Internal Test-I**
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17-IT-1	**Internal Test-I**
18-L16	Dempster's mass spectrograph
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	mass defect and packing fraction
21- L19	Dunnington's method of determining e/m
22- P2	**College level meeting/Cell function**
23-L20	Structure of atom : The vector atom model
24-L21	quantum numbers associated with the the vector atom model
25-L22	coupling schemes
26-L23	the Pauli exclusions exclusion principle
27-L24	Periodic classification of elements
28-L25	magnetic dipole moment due to orbital motion of the electronmagnetic dipole moment due to spin
29-L26	the Stern and Gerlach experiment
30-L27	quantum mechanical explanation of normal and anomoulous Zeeman effect.
31-L28	X-rays: Production of X-rays
32-L29	spacing between three dimensional lattice planes
33-L30	absorption of X-rays
34- P3	**Department Seminar**
35-L31	Problem Solving
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Revision
38- IT-II	**Internal Test-II**
39-L34	X-ray absorption edges
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
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42- L37	the Bragg's X-ray spectrometer
43- L38	the power crystal method
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48-L42	photoelectric cells – Planck's quantum theory-the distribution of energy in the spectrum of a black body
49-L43	Wien's displacement law-Planck's hypothesis-derivation of Planck's law of radiation

50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Class Test
52- L46	Problem Solving
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 29.10.2015

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

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HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Atomic Physics
Course Code	GMPH51
Class	III year (2016-2017)
Semester	Odd
Staff Name	Mr.A.Arul Gnanam
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

➢

Syllabus

ATOMIC PHYSICS

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The electron ,band theory of solids and positive rays : The free Electron Theory of metals –
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classification of elements – magnetic dipole moment due to orbital motion of the electronmagnetic dipole moment due to spin-the Stern and Gerlach experiment- quantum mechanical explanation of normal and anomoulous Zeeman effect.

UNIT IV

X-rays: Production of X-rays – spacing between three dimensional lattice planes – the absorption of X-rays – X-ray absorption edges – Bragg's law – the Bragg's X-ray spectrometer – the power crystal method –(a) the Laue method - (b) rotating crystal method – X-ray spectra – characteristic of X-ray spectrum – Moseley's law – Compton scattering

UNIT V

Photoelectric effect and planck's quantum theory: Experimental investigations on the photoelectric effect – failure of electromagnetic theory-Einstein's photoelectric equation – photoelectric cells – Planck's quantum theory-the distribution of energy in the spectrum of a black body-Wien's displacement law-Planck's hypothesis-derivation of Planck's law of radiation

Books for reference:

1. MODERN PHYSICS - By R.Murugeshan and Kiruthiga Sivaprasath (14th Revised multicolour edition) ,S.Chand & Company Ltd. Ram nagar ,New Delhi-110055
2. MODERN PHYSICS - By B.S.Agarwal,Kedarnath Ramnath,Meerut,Delhi
3. ATOMIC AND NUCLEAR PHYSICS- N.Subrahmanyam Brijlal, S.Chand & Company Ltd. Ram nagar ,New Delhi-110055
4. MODERN PHYSICS – B.V.N. Rao,Wiley Eastern Ltd,New Delhi
5. An Introduction to MODERN PHYSICS- P.Mahendru,16/7698 New market,New Rohtak road, Satyaprakashan ,New Delhi-11
6. Halliday Rhesnick walker Ed 6 Wiley

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 16.06.2016
1-L1	The electron ,band theory of solids and positive rays
2-L2	The free Electron Theory of metals
3- L3	Expression for electrical conductivity – expressions for thermal conductivity
4-L4	expressions for thermal conductivity
5-L5	Determination of the electronic charge
6-L6	Millikan's oil drop method-electron microscope
7-L7	band theory of solids
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	classification of solids on the basis of band theory
10- L9	optical properties of solids
11-L10	energy bands Brillouin zones-origin of forbidden bands
12-L11	Properties of positive rays – positive ray analysis
13-L12	Thomson's parabola method
14-L13	Aston's mass spectrograph
15-L14	**____ - Allotting portion for Internal Test-I**

	Internal Test I begins
16-L15	Bainbridge‘s mass spectrograph
17-IT-1	**Internal Test-I**
18-L16	Dempster‘s mass spectrograph
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	mass defect and packing fraction
21- L19	Dunnington‘s method of determining e/m
22- P2	**College level meeting/Cell function**
23-L20	Structure of atom : The vector atom model
24-L21	quantum numbers associated with the the vector atom model
25-L22	coupling schemes
26-L23	the Pauli exclusions exclusion principle
27-L24	Periodic classification of elements
28-L25	magnetic dipole moment due to orbital motion of the electronmagnetic dipole moment due to spin
29-L26	the Stern and Gerlach experiment
30-L27	quantum mechanical explanation of normal and anomoulous Zeeman effect.
31-L28	X-rays: Production of X-rays
32-L29	spacing between three dimensional lattice planes
33-L30	absorption of X-rays
34- P3	**Department Seminar**
35-L31	Problem Solving
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Revision
38- IT-II	**Internal Test-II**
39-L34	X-ray absorption edges
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Bragg‘s law
42- L37	the Bragg‘s X-ray spectrometer
43- L38	the power crystal method
44- P4	**College level meeting/ function**
45-L39	X-ray spectra characteristic of X-ray spectrum – Moseley‘s law – Compton scattering
46-L40	Photoelectric effect and planck‘s quantum theory: Experimental investigations on the photoelectric effect
47-L41	failure of electromagnetic theory
48-L42	photoelectric cells – Planck‘s quantum theory-the distribution of energy in the spectrum of a black body
49-L43	Wien‘s displacement law-Planck‘s hypothesis-derivation of Planck‘s law of radiation
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Class Test
52- L46	Problem Solving

53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.11.2016

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Atomic Physics
Course Code	GMPH51
Class	III year (2017-2018)
Semester	Odd
Staff Name	Mr.A.Arul Gnanam
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-

Syllabus

ATOMIC PHYSICS

UNIT I

The electron ,band theory of solids and positive rays : The free Electron Theory of metals –
Expression for electrical conductivity – expressions for thermal conductivity – Determination of the electronic charge : Millikan‘s oil drop method-electron microscope – band theory of solids – classification of solids on the basis of band theory – optical properties of solids - - energy bands Brillouin zones-origin of forbidden bands

UNIT II

Properties of positive rays – positive ray analysis – Thomson‘s parabola method- Aston‘s mass spectrograph – Bainbridge‘s mass spectrograph – Dempster‘s mass spectrograph – mass defect and packing fraction- Dunnington‘s method of determining e/m

UNIT III

Structure of atom : The vector atom model – quantum numbers associated with the the vector atom model – coupling schemes – the Pauli exclusions exclusion principle – the periodic

classification of elements – magnetic dipole moment due to orbital motion of the electronmagnetic dipole moment due to spin-the Stern and Gerlach experiment- quantum mechanical explanation of normal and anomoulous Zeeman effect.

UNIT IV

X-rays: Production of X-rays – spacing between three dimensional lattice planes – the absorption of X-rays – X-ray absorption edges – Bragg‘s law – the Bragg‘s X-ray spectrometer – the power crystal method –(a) the Laue method - (b) rotating crystal method – X-ray spectra – characteristic of X-ray spectrum – Moseley‘s law – Compton scattering

UNIT V

Photoelectric effect and planck‘s quantum theory: Experimental investigations on the photoelectric effect – failure of electromagnetic theory-Einstein‘s photoelectric equation – photoelectric cells – Planck‘s quantum theory-the distribution of energy in the spectrum of a black body-Wien‘s displacement law-Planck‘s hypothesis-derivation of Planck‘s law of radiation

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6. Halliday Rhesnick walker Ed 6 Wiley

Course Calendar

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	Odd Semester Begin on 16.06.2017
1-L1	The electron ,band theory of solids and positive rays
2-L2	The free Electron Theory of metals
3- L3	Expression for electrical conductivity – expressions for thermal conductivity
4-L4	expressions for thermal conductivity
5-L5	Determination of the electronic charge
6-L6	Millikan‘s oil drop method-electron microscope
7-L7	band theory of solids
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	classification of solids on the basis of band theory
10- L9	optical properties of solids
11-L10	energy bands Brillouin zones-origin of forbidden bands
12-L11	Properties of positive rays – positive ray analysis
13-L12	Thomson‘s parabola method
14-L13	Aston‘s mass spectrograph
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Bainbridge‘s mass spectrograph
17-IT-1	**Internal Test-I**

18-L16	Dempster‘s mass spectrograph
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	mass defect and packing fraction
21- L19	Dunnington‘s method of determining e/m
22- P2	**College level meeting/Cell function**
23-L20	Structure of atom : The vector atom model
24-L21	quantum numbers associated with the the vector atom model
25-L22	coupling schemes
26-L23	the Pauli exclusions exclusion principle
27-L24	Periodic classification of elements
28-L25	magnetic dipole moment due to orbital motion of the electronmagnetic dipole moment due to spin
29-L26	the Stern and Gerlach experiment
30-L27	quantum mechanical explanation of normal and anomoulous Zeeman effect.
31-L28	X-rays: Production of X-rays
32-L29	spacing between three dimensional lattice planes
33-L30	absorption of X-rays
34- P3	**Department Seminar**
35-L31	Problem Solving
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Revision
38- IT-II	**Internal Test-II**
39-L34	X-ray absorption edges
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Bragg‘s law
42- L37	the Bragg‘s X-ray spectrometer
43- L38	the power crystal method
44- P4	**College level meeting/ function**
45-L39	X-ray spectra characteristic of X-ray spectrum – Moseley‘s law – Compton scattering
46-L40	Photoelectric effect and planck‘s quantum theory: Experimental investigations on the photoelectric effect
47-L41	failure of electromagnetic theory
48-L42	photoelectric cells – Planck‘s quantum theory-the distribution of energy in the spectrum of a black body
49-L43	Wien‘s displacement law-Planck‘s hypothesis-derivation of Planck‘s law of radiation
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Class Test
52- L46	Problem Solving
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**

	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 06.11.2017

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Atomic Physics
Course Code	SMPH53
Class	III year (2019-2020)
Semester	Odd
Staff Name	Dr.S.John Kennedy Vedhanatan
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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-
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Syllabus

Unit I: **BAND THEORY OF SOLIDS**
The free electron theory of metals – expressions for electrical conductivity – thermal conductivity – Wiedman-Franz's law-Hall effect magnetoresistancedetermination of electronic charge – Millikan' s oil drop method – electronmicroscope – Band theory of solids – classification of solids on the basis of bandtheory. (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 – periodicclassification 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 spectracharacteristicspectra-Moseley's law -importance–width of spectral lines-Doppler broadening-collision broadening-X-ray Detectors-scintillation detectorsemiconductor detectors (12L)

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 17.06.2019
1-L1	Unit I: **BAND THEORY OF SOLIDS**-Introduction
2-L2	The free electron theory of metals
3- L3	expressions for electrical conductivity
4-L4	thermal conductivity
5-L5	Wiedman-Franz's law
6-L6	Hall effect magnetoresistance
7-L7	determination of electronic charge
8- P1	**Welcoming of First year and Inauguration of Mathematics Association**
9- L8	Millikan' s oil drop method
10- L9	electronmicroscope
11-L10	classification of solids on the basis of band theory
12-L11	Band theory of solids
13-L12	Discovery-properties- analysis
14-L13	Dunnington's method of determining e/m
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins

16-L15	Dempster's mass spectrograph
17-IT-1	**Internal Test-I**
18-L16	Thomson's parabola method
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Bainbridge's mass spectrograph
21- L19	Aston's mass spectrograph
22- P2	**College level meeting/Cell function**
23-L20	Normal Zeeman effect-theory and experiment
24-L21	quantum mechanical explanation -Larmor's theorem
25-L22	Anomalous Zeeman effect-Paschen –Bach effect-Stark effect
26-L23	Early atomic spectra-Thomson model-Alpha particle scattering
27-L24	Rutherford 's nuclear model-drawbacks
28-L25	correction for nuclear motion-evidences in favour of Bohr's theory
29-L26	Bohr atom model –Bohr's interpretation of the Hydrogen spectrum-
30-L27	Ritz combination principle-correspondence principle
31-L28	Sommerfield's relativistic atom model-drawbacks- the vector atom model
32-L29	Quantum numbers associated with the vector atom model — the Pauli's exclusion principle – periodic classification of elements
33-L30	Coupling schemes-L-S Coupling-j-j Coupling
34- P3	**Department Seminar**
35-L31	Hund rules- magnetic dipole moment due to orbital motion of the electron-due to spin of the electron
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Stern and Gerlach experiment-spin-orbit coupling
38- IT-II	**Internal Test-II**
39-L34	optical spectra-spectral terms-spectral notation-selection rules intensity rules-interval rule
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	fine structure of sodium D line-hyperfine structure
42- L37	Production of X-rays – properties-absorption of X-rays – X-ray absorption edges
43- L38	Bragg's law
44- P4	**College level meeting/ function**
45-L39	the powder crystal method–
46-L40	Rotating crystal method
47-L41	Laue's method
48-L42	Bragg's X-ray spectrometer
49-L43	X-ray spectra -continuous spectra characteristic spectra-
50-L44	**____ - Allotting portion for Internal Test-III**

	Internal Test III begins
51 L45	Moseley's law -importance–width of spectral lines
52- L46	Doppler broadening-collision broadening
53-IT-III	**Internal Test-III**
54-L47	X-ray detectors-scintillation detector semiconductor detectors
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.10.2019

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Basic Electronics
Course Code	GMPH52
Class	III year (2014 – 2015)
Semester	Odd
Staff Name	Dr.M.Daniel Sweetlin
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

BASIC ELECTRONICS

Unit I
Linear Circuits and Semiconductors: Voltage source – Constant Voltage source – Constant current source – Conversion of voltage source into current source – Maximum power transfer theorem- Thevenin‘s theorem – Norton‘s theorem - Semiconductor – bonds in semiconductors –
Commonly used semiconductors – effect of temperature in semiconductors – intrinsic and extrinsic semiconductors – P and N type semiconductors.
679

Unit II Diodes and Transistors: PN junction diode – diode characteristics – Zenar diode – Zener as
voltage regulator - transistor – transistor action – three modes of connection – common emitter

characteristics – transistor biasing methods – stability factor –CE amplifier.

Unit III

Oscillators and Modulation: Feedback – principles – gain – advantage –sinusoidal oscillators –
tank circuit – Colpitt‘s Oscillator – Hartley Oscillator – Wien‘s Oscillator – modulation – AM –
modulation index – analysis – modulator – FM – Demodulation

Unit IV

FET and Electronic Instruments: FET – working – importance – Difference between FET and transistor – FET as amplifier – output characteristic – important terms – expression for drain current – advantages – FET parameters – UJT – equivalent circuit – Characteristic – advantages
– applications – Multimeter – applications – merits and demerits – CRO and its applications.

Unit V
Operational amplifier: Op amp – Schematic symbol – output voltage – AC analysis – band width
– slew rate – frequency response – op amp with negative feedback – applications – inverting amplifier – input and output – impedence of inverting amplifier – Non inverting amplifier – voltage foller – summing amplifier – adder – subtracter – integrator – diffrentiator – comparator

Book for Study:
Principles of Electronics - .K.Mehta and Rohit Mehta, S.Chand and Company ltd. New edition
Electronic principles – Malvino Ed 6

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2014
1-L1	Voltage source – Constant Voltage source
2-L2	Constant current source – Conversion of voltage source into current source
3- L3	Maximum power transfer theorem – Thevenin‘s theorem
4-L4	Problems solved
5-L5	Norton‘s theorem - Semiconductor
6-L6	Problems solved
7-L7	bonds in semiconductors – Commonly used semiconductors
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	effect of temperature in semiconductors
10- L9	intrinsic and extrinsic semiconductors
11-L10	P and N type semiconductors
12-L11	PN junction diode – diode characteristics

13-L12	Zenar diode – Zener as voltage regulator
14-L13	transistor – transistor action
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	three modes of connection – common emitter
17-IT-1	**Internal Test-I**
18-L16	characteristics – transistor biasing methods
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	stability factor –CE amplifier
21- L19	Feedback – principles
22- P2	**College level meeting/Cell function**
23-L20	gain – advantage –sinusoidal oscillators
24-L21	tank circuit – Colpitt‘s Oscillator
25-L22	Hartley Oscillator
26-L23	Wien‘s Oscillator
27-L24	modulation – AM – modulation index
28-L25	analysis – modulator – FM – Demodulation
29-L26	FET – working – importance
30-L27	Difference between FET and transistor – FET as amplifier
31-L28	FET as amplifier – output characteristic – important terms
32-L29	expression for draincurrent – advantages
33-L30	FET parameters – UJT
34- P3	**Department Seminar**
35-L31	equivalent circuit – Characteristic – advantages – applications
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Multimeter – applications – merits and demerits
38- IT-II	**Internal Test-II**
39-L34	CRO and its applications
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Op amp – Schematic symbol
42- L37	output voltage – AC analysis
43- L38	band width – slew rate
44- P4	**College level meeting/ function**
45-L39	frequency response – op amp with negative feedback
46-L40	applications – inverting amplifier
47-L41	input and output – impedence of inverting amplifier
48-L42	Non inverting amplifier
49-L43	
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	voltage foller – summing amplifier
52- L46	adder – subtracter
53-IT-III	**Internal Test-III**

54-L47	integrator – diffrentiator – comparator
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2014

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

\# Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

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\# Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Basic Electronics
Course Code	GMPH52
Class	III year (2015 – 2016)
Semester	Odd
Staff Name	Dr.M.Daniel Sweetlin
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

BASIC ELECTRONICS

Unit I
Linear Circuits and Semiconductors: Voltage source – Constant Voltage source – Constant current source – Conversion of voltage source into current source – Maximum power transfer theorem- Thevenin‘s theorem – Norton‘s theorem - Semiconductor – bonds in semiconductors –
Commonly used semiconductors – effect of temperature in semiconductors – intrinsic and extrinsic semiconductors – P and N type semiconductors.
679

Unit II Diodes and Transistors: PN junction diode – diode characteristics – Zenar diode – Zener as
voltage regulator - transistor – transistor action – three modes of connection – common emitter

characteristics – transistor biasing methods – stability factor –CE amplifier.

Unit III

Oscillators and Modulation: Feedback – principles – gain – advantage –sinusoidal oscillators –
tank circuit – Colpitt‘s Oscillator – Hartley Oscillator – Wien‘s Oscillator – modulation – AM –
modulation index – analysis – modulator – FM – Demodulation

Unit IV

FET and Electronic Instruments: FET – working – importance – Difference between FET and transistor – FET as amplifier – output characteristic – important terms – expression for drain current – advantages – FET parameters – UJT – equivalent circuit – Characteristic – advantages
– applications – Multimeter – applications – merits and demerits – CRO and its applications.

Unit V
Operational amplifier: Op amp – Schematic symbol – output voltage – AC analysis – band width
– slew rate – frequency response – op amp with negative feedback – applications – inverting amplifier – input and output – impedence of inverting amplifier – Non inverting amplifier – voltage foller – summing amplifier – adder – subtracter – integrator – diffrentiator – comparator

Book for Study:
Principles of Electronics - .K.Mehta and Rohit Mehta, S.Chand and Company ltd. New edition
Electronic principles – Malvino Ed 6

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2015
1-L1	Voltage source – Constant Voltage source
2-L2	Constant current source – Conversion of voltage source into current source
3- L3	Maximum power transfer theorem – Thevenin‘s theorem
4-L4	Problems solved
5-L5	Norton‘s theorem - Semiconductor
6-L6	Problems solved
7-L7	bonds in semiconductors – Commonly used semiconductors
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	effect of temperature in semiconductors
10- L9	intrinsic and extrinsic semiconductors
11-L10	P and N type semiconductors
12-L11	PN junction diode – diode characteristics

13-L12	Zenar diode – Zener as voltage regulator
14-L13	transistor – transistor action
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	three modes of connection – common emitter
17-IT-1	**Internal Test-I**
18-L16	characteristics – transistor biasing methods
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	stability factor –CE amplifier
21- L19	Feedback – principles
22- P2	**College level meeting/Cell function**
23-L20	gain – advantage –sinusoidal oscillators
24-L21	tank circuit – Colpitt's Oscillator
25-L22	Hartley Oscillator
26-L23	Wien's Oscillator
27-L24	modulation – AM – modulation index
28-L25	analysis – modulator – FM – Demodulation
29-L26	FET – working – importance
30-L27	Difference between FET and transistor – FET as amplifier
31-L28	FET as amplifier – output characteristic – important terms
32-L29	expression for draincurrent – advantages
33-L30	FET parameters – UJT
34- P3	**Department Seminar**
35-L31	equivalent circuit – Characteristic – advantages – applications
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Multimeter – applications – merits and demerits
38- IT-II	**Internal Test-II**
39-L34	CRO and its applications
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Op amp – Schematic symbol
42- L37	output voltage – AC analysis
43- L38	band width – slew rate
44- P4	**College level meeting/ function**
45-L39	frequency response – op amp with negative feedback
46-L40	applications – inverting amplifier
47-L41	input and output – impedence of inverting amplifier
48-L42	Non inverting amplifier
49-L43	
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	voltage foller – summing amplifier
52- L46	adder – subtracter
53-IT-III	**Internal Test-III**

54-L47	integrator – diffrentiator – comparator
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 29.10.2015

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Basic Electronics
Course Code	GMPH52
Class	III year (2016 – 2017)
Semester	Odd
Staff Name	Dr.M.Daniel Sweetlin
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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-
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Syllabus

BASIC ELECTRONICS

Unit I
Linear Circuits and Semiconductors: Voltage source – Constant Voltage source – Constant current source – Conversion of voltage source into current source – Maximum power transfer theorem- Thevenin's theorem – Norton's theorem - Semiconductor – bonds in semiconductors –
Commonly used semiconductors – effect of temperature in semiconductors – intrinsic and extrinsic semiconductors – P and N type semiconductors.
679

Unit II Diodes and Transistors: PN junction diode – diode characteristics – Zenar diode – Zener as
voltage regulator - transistor – transistor action – three modes of connection – common emitter

characteristics – transistor biasing methods – stability factor –CE amplifier.

Unit III

Oscillators and Modulation: Feedback – principles – gain – advantage –sinusoidal oscillators – tank circuit – Colpitt‘s Oscillator – Hartley Oscillator – Wien‘s Oscillator – modulation – AM – modulation index – analysis – modulator – FM – Demodulation

Unit IV

FET and Electronic Instruments: FET – working – importance – Difference between FET and transistor – FET as amplifier – output characteristic – important terms – expression for drain current – advantages – FET parameters – UJT – equivalent circuit – Characteristic – advantages – applications – Multimeter – applications – merits and demerits – CRO and its applications.

Unit V
Operational amplifier: Op amp – Schematic symbol – output voltage – AC analysis – band width – slew rate – frequency response – op amp with negative feedback – applications – inverting amplifier – input and output – impedence of inverting amplifier – Non inverting amplifier – voltage foller – summing amplifier – adder – subtracter – integrator – diffrentiator – comparator

Book for Study:
Principles of Electronics - .K.Mehta and Rohit Mehta, S.Chand and Company ltd. New edition
Electronic principles – Malvino Ed 6

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 16.06.2016
1-L1	Voltage source – Constant Voltage source
2-L2	Constant current source – Conversion of voltage source into current source
3- L3	Maximum power transfer theorem – Thevenin‘s theorem
4-L4	Problems solved
5-L5	Norton‘s theorem - Semiconductor
6-L6	Problems solved
7-L7	bonds in semiconductors – Commonly used semiconductors
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	effect of temperature in semiconductors
10- L9	intrinsic and extrinsic semiconductors
11-L10	P and N type semiconductors
12-L11	PN junction diode – diode characteristics

13-L12	Zenar diode – Zener as voltage regulator
14-L13	transistor – transistor action
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	three modes of connection – common emitter
17-IT-1	**Internal Test-I**
18-L16	characteristics – transistor biasing methods
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	stability factor –CE amplifier
21- L19	Feedback – principles
22- P2	**College level meeting/Cell function**
23-L20	gain – advantage –sinusoidal oscillators
24-L21	tank circuit – Colpitt‘s Oscillator
25-L22	Hartley Oscillator
26-L23	Wien‘s Oscillator
27-L24	modulation – AM – modulation index
28-L25	analysis – modulator – FM – Demodulation
29-L26	FET – working – importance
30-L27	Difference between FET and transistor – FET as amplifier
31-L28	FET as amplifier – output characteristic – important terms
32-L29	expression for draincurrent – advantages
33-L30	FET parameters – UJT
34- P3	**Department Seminar**
35-L31	equivalent circuit – Characteristic – advantages – applications
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Multimeter – applications – merits and demerits
38- IT-II	**Internal Test-II**
39-L34	CRO and its applications
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Op amp – Schematic symbol
42- L37	output voltage – AC analysis
43- L38	band width – slew rate
44- P4	**College level meeting/ function**
45-L39	frequency response – op amp with negative feedback
46-L40	applications – inverting amplifier
47-L41	input and output – impedence of inverting amplifier
48-L42	Non inverting amplifier
49-L43	
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	voltage foller – summing amplifier
52- L46	adder – subtracter
53-IT-III	**Internal Test-III**

54-L47	integrator – diffrentiator – comparator
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.11.2016

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Basic Electronics
Course Code	GMPH51
Class	III year (2017 – 2018)
Semester	Odd
Staff Name	Dr.M.Daniel Sweetlin
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

BASIC ELECTRONICS

Unit I
Linear Circuits and Semiconductors: Voltage source – Constant Voltage source – Constant current source – Conversion of voltage source into current source – Maximum power transfer theorem- Thevenin's theorem – Norton's theorem - Semiconductor – bonds in semiconductors –
Commonly used semiconductors – effect of temperature in semiconductors – intrinsic and extrinsic semiconductors – P and N type semiconductors.
679

Unit II Diodes and Transistors: PN junction diode – diode characteristics – Zenar diode – Zener as
voltage regulator - transistor – transistor action – three modes of connection – common emitter

characteristics – transistor biasing methods – stability factor –CE amplifier.

Unit III

Oscillators and Modulation: Feedback – principles – gain – advantage –sinusoidal oscillators – tank circuit – Colpitt's Oscillator – Hartley Oscillator – Wien's Oscillator – modulation – AM – modulation index – analysis – modulator – FM – Demodulation

Unit IV

FET and Electronic Instruments: FET – working – importance – Difference between FET and transistor – FET as amplifier – output characteristic – important terms – expression for drain current – advantages – FET parameters – UJT – equivalent circuit – Characteristic – advantages – applications – Multimeter – applications – merits and demerits – CRO and its applications.

Unit V

Operational amplifier: Op amp – Schematic symbol – output voltage – AC analysis – band width – slew rate – frequency response – op amp with negative feedback – applications – inverting amplifier – input and output – impedence of inverting amplifier – Non inverting amplifier – voltage foller – summing amplifier – adder – subtracter – integrator – diffrentiator – comparator

Book for Study:

Principles of Electronics - .K.Mehta and Rohit Mehta, S.Chand and Company ltd. New edition

Electronic principles – Malvino Ed 6

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 16.06.2017
1-L1	Voltage source – Constant Voltage source
2-L2	Constant current source – Conversion of voltage source into current source
3- L3	Maximum power transfer theorem – Thevenin's theorem
4-L4	Problems solved
5-L5	Norton's theorem - Semiconductor
6-L6	Problems solved
7-L7	bonds in semiconductors – Commonly used semiconductors
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	effect of temperature in semiconductors
10- L9	intrinsic and extrinsic semiconductors
11-L10	P and N type semiconductors
12-L11	PN junction diode – diode characteristics

13-L12	Zenar diode – Zener as voltage regulator
14-L13	transistor – transistor action
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	three modes of connection – common emitter
17-IT-1	**Internal Test-I**
18-L16	characteristics – transistor biasing methods
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	stability factor –CE amplifier
21- L19	Feedback – principles
22- P2	**College level meeting/Cell function**
23-L20	gain – advantage –sinusoidal oscillators
24-L21	tank circuit – Colpitt‘s Oscillator
25-L22	Hartley Oscillator
26-L23	Wien‘s Oscillator
27-L24	modulation – AM – modulation index
28-L25	analysis – modulator – FM – Demodulation
29-L26	FET – working – importance
30-L27	Difference between FET and transistor – FET as amplifier
31-L28	FET as amplifier – output characteristic – important terms
32-L29	expression for draincurrent – advantages
33-L30	FET parameters – UJT
34- P3	**Department Seminar**
35-L31	equivalent circuit – Characteristic – advantages – applications
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Multimeter – applications – merits and demerits
38- IT-II	**Internal Test-II**
39-L34	CRO and its applications
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Op amp – Schematic symbol
42- L37	output voltage – AC analysis
43- L38	band width – slew rate
44- P4	**College level meeting/ function**
45-L39	frequency response – op amp with negative feedback
46-L40	applications – inverting amplifier
47-L41	input and output – impedence of inverting amplifier
48-L42	Non inverting amplifier
49-L43	
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	voltage foller – summing amplifier
52- L46	adder – subtracter
53-IT-III	**Internal Test-III**

54-L47	integrator – diffrentiator – comparator
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 06.11.2017

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Basic Electronics
Course Code	JMPH51
Class	III year (2018 – 2019)
Semester	Odd
Staff Name	Dr.M.Daniel Sweetlin
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

BASIC ELECTRONICS

Unit I
Linear Circuits and Semiconductors: Voltage source – Constant Voltage source – Constant current source – Conversion of voltage source into current source – Maximum power transfer theorem- Thevenin‘s theorem – Norton‘s theorem - Semiconductor – bonds in semiconductors –
Commonly used semiconductors – effect of temperature in semiconductors – intrinsic and extrinsic semiconductors – P and N type semiconductors.
679

Unit II Diodes and Transistors: PN junction diode – diode characteristics – Zenar diode – Zener as
voltage regulator - transistor – transistor action – three modes of connection – common emitter

characteristics – transistor biasing methods – stability factor –CE amplifier.

Unit III

Oscillators and Modulation: Feedback – principles – gain – advantage –sinusoidal oscillators –
tank circuit – Colpitt‘s Oscillator – Hartley Oscillator – Wien‘s Oscillator – modulation – AM –
modulation index – analysis – modulator – FM – Demodulation

Unit IV

FET and Electronic Instruments: FET – working – importance – Difference between FET and transistor – FET as amplifier – output characteristic – important terms – expression for drain current – advantages – FET parameters – UJT – equivalent circuit – Characteristic – advantages
– applications – Multimeter – applications – merits and demerits – CRO and its applications.

Unit V
Operational amplifier: Op amp – Schematic symbol – output voltage – AC analysis – band width
– slew rate – frequency response – op amp with negative feedback – applications – inverting amplifier – input and output – impedence of inverting amplifier – Non inverting amplifier – voltage foller – summing amplifier – adder – subtracter – integrator – diffrentiator – comparator

Book for Study:
Principles of Electronics - .K.Mehta and Rohit Mehta, S.Chand and Company ltd. New edition
Electronic principles – Malvino Ed 6

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2018
1-L1	Voltage source – Constant Voltage source
2-L2	Constant current source – Conversion of voltage source into current source
3- L3	Maximum power transfer theorem – Thevenin‘s theorem
4-L4	Problems solved
5-L5	Norton‘s theorem - Semiconductor
6-L6	Problems solved
7-L7	bonds in semiconductors – Commonly used semiconductors
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	effect of temperature in semiconductors
10- L9	intrinsic and extrinsic semiconductors
11-L10	P and N type semiconductors
12-L11	PN junction diode – diode characteristics

13-L12	Zenar diode – Zener as voltage regulator
14-L13	transistor – transistor action
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	three modes of connection – common emitter
17-IT-1	**Internal Test-I**
18-L16	characteristics – transistor biasing methods
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	stability factor –CE amplifier
21- L19	Feedback – principles
22- P2	**College level meeting/Cell function**
23-L20	gain – advantage –sinusoidal oscillators
24-L21	tank circuit – Colpitt‘s Oscillator
25-L22	Hartley Oscillator
26-L23	Wien‘s Oscillator
27-L24	modulation – AM – modulation index
28-L25	analysis – modulator – FM – Demodulation
29-L26	FET – working – importance
30-L27	Difference between FET and transistor – FET as amplifier
31-L28	FET as amplifier – output characteristic – important terms
32-L29	expression for draincurrent – advantages
33-L30	FET parameters – UJT
34- P3	**Department Seminar**
35-L31	equivalent circuit – Characteristic – advantages – applications
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Multimeter – applications – merits and demerits
38- IT-II	**Internal Test-II**
39-L34	CRO and its applications
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Op amp – Schematic symbol
42- L37	output voltage – AC analysis
43- L38	band width – slew rate
44- P4	**College level meeting/ function**
45-L39	frequency response – op amp with negative feedback
46-L40	applications – inverting amplifier
47-L41	input and output – impedence of inverting amplifier
48-L42	Non inverting amplifier
49-L43	
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	voltage foller – summing amplifier
52- L46	adder – subtracter
53-IT-III	**Internal Test-III**

54-L47	integrator – diffrentiator – comparator
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.11.2018

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Basic Electronics
Course Code	SMPH51
Class	III year (2019 – 2020)
Semester	Odd
Staff Name	Dr.M.Daniel Sweetlin
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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-
-
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Syllabus

BASIC ELECTRONICS

Unit I
Linear Circuits and Semiconductors: Voltage source – Constant Voltage source – Constant current source – Conversion of voltage source into current source – Maximum power transfer theorem- Thevenin‘s theorem – Norton‘s theorem - Semiconductor – bonds in semiconductors –
Commonly used semiconductors – effect of temperature in semiconductors – intrinsic and extrinsic semiconductors – P and N type semiconductors.
679

Unit II Diodes and Transistors: PN junction diode – diode characteristics – Zener diode – Zener as
voltage regulator - transistor – transistor action – three modes of connection – common emitter

characteristics – transistor biasing methods – stability factor –CE amplifier.

Unit III

Oscillators and Modulation: Feedback – principles – gain – advantage –sinusoidal oscillators –
tank circuit – Colpitt‘s Oscillator – Hartley Oscillator – Wien‘s Oscillator – modulation – AM –
modulation index – analysis – modulator – FM – Demodulation

Unit IV

FET and Electronic Instruments: FET – working – importance – Difference between FET and transistor – FET as amplifier – output characteristic – important terms – expression for drain current – advantages – FET parameters – UJT – equivalent circuit – Characteristic – advantages
– applications – Multimeter – applications – merits and demerits – CRO and its applications.

Unit V
Operational amplifier: Op amp – Schematic symbol – output voltage – AC analysis – band width
– slew rate – frequency response – op amp with negative feedback – applications – inverting amplifier – input and output – impedence of inverting amplifier – Non inverting amplifier – voltage foller – summing amplifier – adder – subtracter – integrator – diffrentiator – comparator

Book for Study:
Principles of Electronics - .K.Mehta and Rohit Mehta, S.Chand and Company ltd. New edition
Electronic principles – Malvino Ed 6

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 17.06.2019
1-L1	Voltage source – Constant Voltage source
2-L2	Constant current source – Conversion of voltage source into current source
3- L3	Maximum power transfer theorem – Thevenin‘s theorem
4-L4	Problems solved
5-L5	Norton‘s theorem - Semiconductor
6-L6	Problems solved
7-L7	bonds in semiconductors – Commonly used semiconductors
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	effect of temperature in semiconductors
10- L9	intrinsic and extrinsic semiconductors
11-L10	P and N type semiconductors
12-L11	PN junction diode – diode characteristics

13-L12	Zenar diode – Zener as voltage regulator
14-L13	transistor – transistor action
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	three modes of connection – common emitter
17-IT-1	**Internal Test-I**
18-L16	characteristics – transistor biasing methods
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	stability factor –CE amplifier
21- L19	Feedback – principles
22- P2	**College level meeting/Cell function**
23-L20	gain – advantage –sinusoidal oscillators
24-L21	tank circuit – Colpitt's Oscillator
25-L22	Hartley Oscillator
26-L23	Wien's Oscillator
27-L24	modulation – AM – modulation index
28-L25	analysis – modulator – FM – Demodulation
29-L26	FET – working – importance
30-L27	Difference between FET and transistor – FET as amplifier
31-L28	FET as amplifier – output characteristic – important terms
32-L29	expression for draincurrent – advantages
33-L30	FET parameters – UJT
34- P3	**Department Seminar**
35-L31	equivalent circuit – Characteristic – advantages – applications
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Multimeter – applications – merits and demerits
38- IT-II	**Internal Test-II**
39-L34	CRO and its applications
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Op amp – Schematic symbol
42- L37	output voltage – AC analysis
43- L38	band width – slew rate
44- P4	**College level meeting/ function**
45-L39	frequency response – op amp with negative feedback
46-L40	applications – inverting amplifier
47-L41	input and output – impedence of inverting amplifier
48-L42	Non inverting amplifier
49-L43	
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	voltage foller – summing amplifier
52- L46	adder – subtracter
53-IT-III	**Internal Test-III**

54-L47	integrator – diffrentiator – comparator
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.10.2019

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

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Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	BASIC PHYSICS
Course Code	GMPH 4A
Class	2 Year (2014-2015)
Semester	EVEN
Staff Name	Miss.D.Nithya Agnes, Miss.D.Priskilla Koilpillai
Credits	2
L. Hours /P. Hours	2 / WK
Total 30Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 20 Hrs (5 units; 5×4=20; 4Hrs /unit)	

Course Objectives

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-
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Syllabus

Unit-I

Temperature, Quantity of heat, Conversion of heat to work, heat engine 2 stroke, refrigerator

Unit-II

Rainbows, colors of thin films, convex, concave lens, focal length, telescope and microscope

Unit-III

Magnet pole strength, dipole moment, dia para ferro ferri magnetic substances, compass

dipole moment, dia para ferro ferri magnetic substances, compass

Unit-IV

Matter, states of matter, crystalline, amorphous materials, good and bad conductors, superconductors

Unit-V

LASER –He Neon LASER , application in communications

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begins With 03.12.2014
1-L1	**Unit-I**
2-L2	**Temperature, Quantity of heat, Conversion of heat to work, heat engine 2 stroke, refrigerator**
3- P1	**Unit-II**
4-L3	**Rainbows, colors of thin films, convex, concave lens, focal length**
5-L4	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
6-IT-I	**Internal Test-I**
7-L5	**____ -Test Paper distribution and result analysis**

	Entering Internal Test-I Marks into University portal
8-L6	**telescope and** microscope
9-L7	**Unit-III** **Magnet pole strength dipole moment, dia para ferro ferri magnetic substances, compass**
10-P2	**College level meeting/Cell function**
11-L8	**Unit-IV**
12-L9	**Matter, states of matter, crystalline, amorphous materials, good and bad conductors, superconductors**
13-P3	**Department Seminar**
14-L10	**Problem solving**
15-L11	Unit-V
16-L12	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
17-IT-1	**Internal Test-II**
18-L13	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
19-L14	**Problem solving**
20- P2	**College level meeting/ function**
21-L15	**LASER –He Neon LASER**
22-L16	**application in communications**
23- L17	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
24- IT-III	**Internal Test-III**
25-L18	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
26-MT	**Model Test**
27-MT	**Model Test**
28-MT	**Model Test**
29-L19	**Model test paper distribution and previous year university question paper discussion**
30-L20	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2015

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	

CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

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Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	BASIC PHYSICS
Course Code	GMPH 4A
Class	2 Year (2015-2016)
Semester	EVEN
Staff Name	Miss.D.Nithya Agnes, Miss.D.Priskilla Koilpillai
Credits	2
L. Hours /P. Hours	2 / WK
Total 30Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 20 Hrs (5 units; 5×4=20; 4Hrs /unit)	

Course Objectives

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-
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Syllabus

Unit-I

Temperature, Quantity of heat, Conversion of heat to work, heat engine 2 stroke, refrigerator

Unit-II

Rainbows, colors of thin films, convex, concave lens, focal length, telescope and microscope

Unit-III

Magnet pole strength, dipole moment, dia para ferro ferri magnetic substances, compass

dipole moment, dia para ferro ferri magnetic substances, compass

Unit-IV

Matter, states of matter, crystalline, amorphous materials, good and bad conductors, superconductors

Unit-V

LASER –He Neon LASER , application in communications

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begins With 02.12.2015
1-L1	**Unit-I**
2-L2	**Temperature, Quantity of heat, Conversion of heat to work, heat engine 2 stroke, refrigerator**
3- P1	**Unit-II**
4-L3	**Rainbows, colors of thin films, convex, concave lens, focal length**
5-L4	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
6-IT-I	**Internal Test-I**
7-L5	**____ -Test Paper distribution and result analysis**

	Entering Internal Test-I Marks into University portal
8-L6	**telescope and** microscope
9-L7	**Unit-III** **Magnet pole strength dipole moment, dia para ferro ferri magnetic substances, compass**
10-P2	**College level meeting/Cell function**
11-L8	**Unit-IV**
12-L9	**Matter, states of matter, crystalline, amorphous materials, good and bad conductors, superconductors**
13-P3	**Department Seminar**
14-L10	**Problem solving**
15-L11	Unit-V
16-L12	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
17-IT-1	**Internal Test-II**
18-L13	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
19-L14	**Problem solving**
20- P2	**College level meeting/ function**
21-L15	**LASER –He Neon LASER**
22-L16	**application in communications**
23- L17	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
24- IT-III	**Internal Test-III**
25-L18	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
26-MT	**Model Test**
27-MT	**Model Test**
28-MT	**Model Test**
29-L19	**Model test paper distribution and previous year university question paper discussion**
30-L20	**Feedback of the Course, analysis and report preparation**
	Last Working day on 22.04.2016

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	

CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

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HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	BASIC PHYSICS
Course Code	GMPH 4A
Class	2 Year (2016-2017)
Semester	EVEN
Staff Name	Miss.D.Nithya Agnes, Miss.D.Priskilla Koilpillai
Credits	2
L. Hours /P. Hours	2 / WK
Total 30Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 20 Hrs (5 units; 5×4=20; 4Hrs /unit)	

Course Objectives

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Syllabus

Unit-I

Temperature, Quantity of heat, Conversion of heat to work, heat engine 2 stroke, refrigerator

Unit-II

Rainbows, colors of thin films, convex, concave lens, focal length, telescope and microscope

Unit-III

Magnet pole strength, dipole moment, dia para ferro ferri magnetic substances, compass

dipole moment, dia para ferro ferri magnetic substances, compass

Unit-IV

Matter, states of matter, crystalline, amorphous materials, good and bad conductors, superconductors

Unit-V

LASER –He Neon LASER , application in communications

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begins With 01.12.2016
1-L1	**Unit-I**
2-L2	**Temperature, Quantity of heat, Conversion of heat to work, heat engine 2 stroke, refrigerator**
3- P1	**Unit-II**
4-L3	**Rainbows, colors of thin films, convex, concave lens, focal length**
5-L4	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
6-IT-I	**Internal Test-I**
7-L5	**____ -Test Paper distribution and result analysis**

	Entering Internal Test-I Marks into University portal
8-L6	**telescope and** microscope
9-L7	**Unit-III** **Magnet pole strength dipole moment, dia para ferro ferri magnetic substances, compass**
10-P2	**College level meeting/Cell function**
11-L8	**Unit-IV**
12-L9	**Matter, states of matter, crystalline, amorphous materials, good and bad conductors, superconductors**
13-P3	**Department Seminar**
14-L10	**Problem solving**
15-L11	Unit-V
16-L12	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
17-IT-1	**Internal Test-II**
18-L13	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
19-L14	**Problem solving**
20- P2	**College level meeting/ function**
21-L15	**LASER –He Neon LASER**
22-L16	**application in communications**
23- L17	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
24- IT-III	**Internal Test-III**
25-L18	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
26-MT	**Model Test**
27-MT	**Model Test**
28-MT	**Model Test**
29-L19	**Model test paper distribution and previous year university question paper discussion**
30-L20	**Feedback of the Course, analysis and report preparation**
	Last Working day on 21.04.2017

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	

CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

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Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	BASIC PHYSICS
Course Code	JMPH 4A
Class	2 Year (2017-2018)
Semester	EVEN
Staff Name	Miss.D.Priskilla Koilpillai
Credits	2
L. Hours /P. Hours	2 / WK
Total 30Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 20 Hrs (5 units; 5×4=20; 4Hrs /unit)	

Course Objectives

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Syllabus

Unit-I

Temperature, Quantity of heat, Conversion of heat to work, heat engine 2 stroke, refrigerator

Unit-II

Rainbows, colors of thin films, convex, concave lens, focal length, telescope and microscope

Unit-III

Magnet pole strength, dipole moment, dia para ferro ferri magnetic substances, compass

dipole moment, dia para ferro ferri magnetic substances, compass

Unit-IV

Matter, states of matter, crystalline, amorphous materials, good and bad conductors, superconductors

Unit-V

LASER –He Neon LASER , application in communications

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begins With 07.12.2017
1-L1	**Unit-I**
2-L2	**Temperature, Quantity of heat, Conversion of heat to work, heat engine 2 stroke, refrigerator**
3- P1	**Unit-II**
4-L3	**Rainbows, colors of thin films, convex, concave lens, focal length**
5-L4	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
6-IT-I	**Internal Test-I**
7-L5	**____ -Test Paper distribution and result analysis**

	Entering Internal Test-I Marks into University portal
8-L6	**telescope and** microscope
9-L7	**Unit-III** **Magnet pole strength dipole moment, dia para ferro ferri magnetic substances, compass**
10-P2	**College level meeting/Cell function**
11-L8	**Unit-IV**
12-L9	**Matter, states of matter, crystalline, amorphous materials, good and bad conductors, superconductors**
13-P3	**Department Seminar**
14-L10	**Problem solving**
15-L11	Unit-V
16-L12	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
17-IT-1	**Internal Test-II**
18-L13	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
19-L14	**Problem solving**
20- P2	**College level meeting/ function**
21-L15	**LASER –He Neon LASER**
22-L16	**application in communications**
23- L17	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
24- IT-III	**Internal Test-III**
25-L18	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
26-MT	**Model Test**
27-MT	**Model Test**
28-MT	**Model Test**
29-L19	**Model test paper distribution and previous year university question paper discussion**
30-L20	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2018

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	

CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

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HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	BASIC PHYSICS
Course Code	SMPH 4A
Class	2 Year (2018-2019)
Semester	EVEN
Staff Name	Miss.D.Priscilla Koilpillai
Credits	2
L. Hours /P. Hours	2 / WK
Total 30Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 20 Hrs (5 units; 5×4=20; 4Hrs /unit)	

Course Objectives

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-
-

Syllabus

Unit-I

Temperature, Quantity of heat, Conversion of heat to work, heat engine 2 stroke, refrigerator

Unit-II

Rainbows, colors of thin films, convex, concave lens, focal length, telescope and microscope

Unit-III

Magnet pole strength, dipole moment, dia para ferro ferri magnetic substances, compass

dipole moment, dia para ferro ferri magnetic substances, compass

Unit-IV

Matter, states of matter, crystalline, amorphous materials, good and bad conductors, superconductors

Unit-V

LASER –He Neon LASER , application in communications

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begins With 03.12.2018
1-L1	**Unit-I**
2-L2	**Temperature, Quantity of heat, Conversion of heat to work, heat engine 2 stroke, refrigerator**
3- P1	**Unit-II**
4-L3	**Rainbows, colors of thin films, convex, concave lens, focal length**
5-L4	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
6-IT-I	**Internal Test-I**
7-L5	**____ -Test Paper distribution and result analysis**

	Entering Internal Test-I Marks into University portal
8-L6	**telescope and** microscope
9-L7	**Unit-III** **Magnet pole strength dipole moment, dia para ferro ferri magnetic substances, compass**
10-P2	**College level meeting/Cell function**
11-L8	**Unit-IV**
12-L9	**Matter, states of matter, crystalline, amorphous materials, good and bad conductors, superconductors**
13-P3	**Department Seminar**
14-L10	**Problem solving**
15-L11	Unit-V
16-L12	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
17-IT-1	**Internal Test-II**
18-L13	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
19-L14	**Problem solving**
20- P2	**College level meeting/ function**
21-L15	**LASER –He Neon LASER**
22-L16	**application in communications**
23- L17	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
24- IT-III	**Internal Test-III**
25-L18	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
26-MT	**Model Test**
27-MT	**Model Test**
28-MT	**Model Test**
29-L19	**Model test paper distribution and previous year university question paper discussion**
30-L20	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2019

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	

CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

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Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	BASIC PHYSICS
Course Code	SMPH 4A
Class	2 Year (2019-2020)
Semester	EVEN
Staff Name	Miss.D.Priscilla Koilpillai
Credits	2
L. Hours /P. Hours	2 / WK
Total 30Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 20 Hrs (5 units; 5×4=20; 4Hrs /unit)	

Course Objectives

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-
-

Syllabus

Unit-I

Temperature, Quantity of heat, Conversion of heat to work, heat engine 2 stroke, refrigerator

Unit-II

Rainbows, colors of thin films, convex, concave lens, focal length, telescope and microscope

Unit-III

Magnet pole strength, dipole moment, dia para ferro ferri magnetic substances, compass

dipole moment, dia para ferro ferri magnetic substances, compass

Unit-IV

Matter, states of matter, crystalline, amorphous materials, good and bad conductors, superconductors

Unit-V

LASER –He Neon LASER , application in communications

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begins With 02.12.2019
1-L1	**Unit-I**
2-L2	**Temperature, Quantity of heat, Conversion of heat to work, heat engine 2 stroke, refrigerator**
3- P1	**Unit-II**
4-L3	**Rainbows, colors of thin films, convex, concave lens, focal length**
5-L4	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
6-IT-I	**Internal Test-I**
7-L5	**____ -Test Paper distribution and result analysis**

	Entering Internal Test-I Marks into University portal
8-L6	**telescope and** microscope
9-L7	**Unit-III** **Magnet pole strength dipole moment, dia para ferro ferri magnetic substances, compass**
10-P2	**College level meeting/Cell function**
11-L8	**Unit-IV**
12-L9	**Matter, states of matter, crystalline, amorphous materials, good and bad conductors, superconductors**
13-P3	**Department Seminar**
14-L10	**Problem solving**
15-L11	Unit-V
16-L12	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
17-IT-1	**Internal Test-II**
18-L13	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
19-L14	**Problem solving**
20- P2	**College level meeting/ function**
21-L15	**LASER –He Neon LASER**
22-L16	**application in communications**
23- L17	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
24- IT-III	**Internal Test-III**
25-L18	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
26-MT	**Model Test**
27-MT	**Model Test**
28-MT	**Model Test**
29-L19	**Model test paper distribution and previous year university question paper discussion**
30-L20	**Feedback of the Course, analysis and report preparation**
	Last Working day on 27.04.2020

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	

CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

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HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Computer Programming in C ++
Course Code	**GMPH41**
Class	II Year (2014-2015)
Semester	Even
Staff Name	Dr. A.Arul Gnanam Dr.R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To Learn about C++ Programme
- 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
- To discuss about operators.
- To learn about programme goading.

Syllabus

OBJECT ORIENTED PROGRAMMING WTH C++

UNIT-I: Evolution of C++ - applications of C++ - structure of C++ program. Tokens – keywords – identifiers and constants

– basic data types – user-defined data types – constant pointers and pointers to constants – symbolic constants –type compatibility – declaration of variables – dynamic initialization of variables – reference variables – operators in C++ - scope resolution operator – memory management operators – manipulators – type cast operator – expressions and their types – special assignment expressions –

Implicit conversions – operator precedence.

UNIT-II: Functions in C++: The main function – function prototyping – call by reference – return by reference – inline functions – default arguments – const arguments – function overloading. Managing Console I/O Operations: C++ streams – C++ stream classes – unformatted console I/O operations – formatted console I/O operations –managing output with manipulators.

UNIT-III: Classes and Objects: Specifying a class – defining member functions – making an outside function inline – nesting of member functions – private member functions – arrays within a class – memory allocation for objects –arrays of objects – objects as function arguments – friend functions – returning objects – const member functions. Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class – constructors with default arguments – copy constructor.

UNIT-IV: Operator Overloading: Introduction – defining operator overloading – overloading unary operators – overloading binary operators - overloading binary operators using friends – rules for overloading operators. Inheritance: Introduction – defining derived classes – single inheritance – making a private member inheritable – multilevel inheritance – multiple inheritance – hierarchical inheritance – hybrid inheritance

UNIT-V: Working with Files: Introduction – Classes for File Stream Operations - Opening and Closing a File – Detecting End-of-file – More about open( ): File Modes – File Pointers and their Manipulations – Sequential Input and Output Operations – Updating a File: Random Access

Course Calendar

Hour allotment	**Class Schedule**
	EVEN Semester 03.12.2014
1-L1	UNIT-I: Evolution of C++ - applications of C++

2-L2	Tokens – keywords – identifiers and constants
3- L3	basic data types – user-defined data types
4-L4	constant pointers and pointers to constants – symbolic constants
5-L5	constant pointers and pointers to constants – symbolic constants
6-L6	type compatibility – declaration of variables – dynamic initialization of variables – reference variables
7-L7	operators in C++ - scope resolution operator – memory management operators
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	manipulators – type cast operator – expressions and their types – special assignment expressions
10- L9	implicit conversions – operator precedence
11-L10	Functions in C++ : The main function – function prototyping – call by reference
12-L11	return by reference – inline functions – default arguments – const arguments – function overloading
13-L12	Managing Console I/O Operations: C++ streams – C++ stream classes – unformatted console I/O operations – formatted console I/O
14-L13	formatted console I/O operations –managing output with manipulators.
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 25.01.2015
16-L15	Classes and Objects: Specifying a class – defining member functions – making an outside function inline – nesting of member functions
17-IT-1	**Internal Test-I**
18-L16	private member functions – arrays within a class – memory allocation for object
19-L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	arrays of objects – objects as function arguments – friend functions – returning objects – const member functions.
21- L19	Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class
22- P2	College level meeting/Cell function
23-L20	Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class
24-L21	Operator Overloading: Introduction
25-L22	defining operator overloading – overloading unary operators
26-L23	overloading binary operators - overloading binary operators using friends –
27-L24	overloading binary operators - overloading binary operators using friends –
28-L25	rules for overloading operators
29-L26	Inheritance: Introduction
30-L27	defining derived classes
31-L28	single inheritance
32-L29	making a private member inheritable
33-L30	multilevel inheritance
34- P3	**Department Seminar**
35-L31	**Rivision**
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 16.02.2015
37- L33	**hierarchical inheritance**
38- IT-II	**Internal Test-II**
39-L34	hybrid inheritance

40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	**Working with Files: Introduction**
42- L37	Classes for File Stream Operations
43- L38	Opening and Closing a File
44- P4	College level meeting/ function
45-L39	Detecting End-of-file
46-L40	More about open
47-L41	**Revision**
48-L42	**Revision Class**
49-L43	**File Modes**
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 16.03.2015
51 L45	**File Pointers and their Manipulations**
52- L46	**Revision**
53-IT-III	**Internal Test-III**
54-L47	Sequential Input and Output Operations – Updating a File: Random Access
55-L48	Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
	Model Test begins 16.04.2015
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.4.2015

Course Outcomes

Learning Outcomes	**COs** of the course “<Computer Programming in C ++>”
CO1	Get insight knowledge about the language.
CO2	Get trained in writing small programs.
CO3	Capable of executes any programs and identifying errors in them
CO4	Design and implement C programs for any given problem
CO5	Work with existing programs and modify it as per the requirements.
CO6	Identify the errors in a C program.
CO7	Identify the output of a C program without actually executing it
Experimental Learning	
EL1	Capable coding any problem.
EL2	Capable of identifying errors in a coding
EL3	Capable handling any project assigned by a company.
Integrated Activity	
IA1	Individual and Team Work: Function effectively on teams to accomplish a common goal

IA2	Communication: Communicate effectively with a range of audiences and prepare technical documents and make effective oral presentations

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Computer Programming in C ++
Course Code	**GMPH41**
Class	II Year (2014-2015)
Semester	Even
Staff Name	Dr. A.Arul Gnanam Dr.R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To Learn about C++ Programme
- 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
- To discuss about operators.
- To learn about programme goading.

Syllabus

OBJECT ORIENTED PROGRAMMING WTH C++

UNIT-I: Evolution of C++ - applications of C++ - structure of C++ program. Tokens – keywords – identifiers and constants

– basic data types – user-defined data types – constant pointers and pointers to constants – symbolic constants –type compatibility – declaration of variables – dynamic initialization of variables – reference variables – operators in C++ - scope resolution

operator – memory management operators – manipulators – type cast operator – expressions and their types – special assignment expressions –

implicit conversions – operator precedence.

UNIT-II: Functions in C++ : The main function – function prototyping – call by reference – return by reference – inline functions – default arguments – const arguments – function overloading. Managing Console I/O Operations: C++ streams – C++ stream classes – unformatted console I/O operations – formatted console I/O operations –managing output with manipulators.

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UNIT-V: Working with Files: Introduction – Classes for File Stream Operations - Opening and Closing a File – Detecting End-of-file – More about open( ): File Modes – File Pointers and their Manipulations – Sequential Input and Output Operations – Updating a File: Random Access

Course Calendar

Hour allotment	**Class Schedule**
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1-L1	UNIT-I: Evolution of C++ - applications of C++
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3- L3	basic data types – user-defined data types
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6-L6	type compatibility – declaration of variables – dynamic initialization of variables – reference variables
7-L7	operators in C++ - scope resolution operator – memory management operators
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	manipulators – type cast operator – expressions and their types – special assignment expressions
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13-L12	Managing Console I/O Operations: C++ streams – C++ stream classes – unformatted console I/O operations – formatted console I/O
14-L13	formatted console I/O operations –managing output with manipulators.
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 19.01.2015
16-L15	Classes and Objects: Specifying a class – defining member functions – making an outside function inline – nesting of member functions
17-IT-1	**Internal Test-I**
18-L16	private member functions – arrays within a class – memory allocation for object
19-L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	arrays of objects – objects as function arguments – friend functions – returning objects – const member functions.
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22- P2	College level meeting/Cell function
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30-L27	defining derived classes
31-L28	single inheritance
32-L29	making a private member inheritable
33-L30	multilevel inheritance
34- P3	**Department Seminar**
35-L31	**Rivision**
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 16.02.2015
37- L33	**hierarchical inheritance**
38- IT-II	**Internal Test-II**
39-L34	hybrid inheritance
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	**Working with Files: Introduction**

42- L37	Classes for File Stream Operations
43- L38	Opening and Closing a File
44- P4	College level meeting/ function
45-L39	Detecting End-of-file
46-L40	More about open
47-L41	**Revision**
48-L42	**Revision Class**
49-L43	**File Modes**
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 16.03.2015
51 L45	**File Pointers and their Manipulations**
52- L46	**Revision**
53-IT-III	**Internal Test-III**
54-L47	Sequential Input and Output Operations – Updating a File: Random Access
55-L48	Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
	Model Test begins 16.04.2015
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.4.2015

Course Outcomes

Learning Outcomes	**COs** of the course “<Computer Programming in C ++>”
CO1	Get insight knowledge about the language.
CO2	Get trained in writing small programs.
CO3	Capable of executes any programs and identifying errors in them
CO4	Design and implement C programs for any given problem
CO5	Work with existing programs and modify it as per the requirements.
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# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Computer Programming in C ++
Course Code	GMPH41
Class	II Year (2015-2016)
Semester	Even
Staff Name	Dr.A.Arul Gnanam Dr.R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

OBJECT ORIENTED PROGRAMMING WTH C++

UNIT-I: Evolution of C++ - applications of C++ - structure of C++ program. Tokens – keywords – identifiers and constants

– basic data types – user-defined data types – constant pointers and pointers to constants – symbolic constants –type compatibility – declaration of variables – dynamic initialization of variables – reference variables – operators in C++ - scope resolution operator – memory management operators – manipulators – type cast operator – expressions and their types – special assignment expressions –

implicit conversions – operator precedence.

UNIT-II: Functions in C++ : The main function – function prototyping – call by reference – return by reference – inline functions – default arguments – const arguments – function overloading. Managing Console I/O Operations: C++ streams – C++ stream classes – unformatted console I/O operations – formatted console I/O operations –managing output with manipulators.

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UNIT-V: Working with Files: Introduction – Classes for File Stream Operations - Opening and Closing a File – Detecting End-of-file – More about open( ): File Modes – File Pointers and their Manipulations – Sequential Input and Output Operations – Updating a File: Random Access

Course Calendar

Hour allotment	**Class Schedule**
	EVEN Semester 02.12.2015
1-L1	**UNIT-I: Evolution of C++ - applications of C++**
2-L2	**Tokens – keywords – identifiers and constants**
3- L3 –	**basic data types – user-defined data types**
4-L4	**constant pointers and pointers to constants – symbolic constants**
5-L5	**constant pointers and pointers to constants – symbolic constants**
6-L6	**type compatibility – declaration of variables – dynamic initialization of variables – reference variables**
7-L7	**– operators in C++ - scope resolution operator – memory management operators**

8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	**manipulators – type cast operator – expressions and their types – special assignment expressions**
10- L9	**. implicit conversions – operator precedence**
11-L10	**Functions in C++ : The main function – function prototyping – call by reference**
12-L11	**return by reference – inline functions – default arguments – const arguments – function overloading**
13-L12	**. Managing Console I/O Operations: C++ streams – C++ stream classes – unformatted console I/O operations – formatted console I/O**
14-L13	**formatted console I/O operations –managing output with manipulators.**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**Classes and Objects: Specifying a class – defining member functions – making an outside function inline – nesting of member functions**
17-IT-1	**Internal Test-I**
18-L16	**private member functions – arrays within a class – memory allocation for object**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**arrays of objects – objects as function arguments – friend functions – returning objects – const member functions.**
21- L19	**Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class**
22- P2	**College level meeting/Cell function**
23-L20	**Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class**
24-L21	**Operator Overloading: Introduction**
25-L22	**– defining operator overloading – overloading unary operators**
26-L23	**overloading binary operators - overloading binary operators using friends –**
27-L24	**overloading binary operators - overloading binary operators using friends –**
28-L25	**rules for overloading operators**
29-L26	**Inheritance: Introduction**
30-L27	**defining derived classes**
31-L28	**single inheritance**
32-L29	**making a private member inheritable**
33-L30	**multilevel inheritance**
34- P3	**Department Seminar**
35-L31	Rivision
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**hierarchical inheritance**
38- IT-II	**Internal Test-II**
39-L34	**hybrid inheritance**
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**Working with Files: Introduction**

42- L37	**Classes for File Stream Operations**
43- L38	**Opening and Closing a File**
44- P4	**College level meeting/ function**
45-L39	**Detecting End-of-file**
46-L40	**– More about open**
47-L41	Rivision
48-L42	**Rivision Class**
49-L43	**File Modes**
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**File Pointers and their Manipulations**
52- L46	Rivision
53-IT-III	**Internal Test-III**
54-L47	**– Sequential Input and Output Operations – Updating a File: Random Access**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 22.4.2016

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	

IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

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St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2015-2016)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Computer Programming in C ++
Course Code	**GMPH41**
Class	II Year (2015-2016)
Semester	Even
Staff Name	Dr. A.Arul Gnanam Dr.R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To Learn about C++ Programme
- 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
- To discuss about operators.
- To learn about programme goading.

Syllabus

OBJECT ORIENTED PROGRAMMING WTH C++

UNIT-I: Evolution of C++ - applications of C++ - structure of C++ program. Tokens – keywords – identifiers and constants

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Hour allotment	**Class Schedule**
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7-L7	operators in C++ - scope resolution operator – memory management operators
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9- L8	manipulators – type cast operator – expressions and their types – special assignment expressions
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14-L13	formatted console I/O operations –managing output with manipulators.
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 25.01.2015
16-L15	Classes and Objects: Specifying a class – defining member functions – making an outside function inline – nesting of member functions
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31-L28	single inheritance
32-L29	making a private member inheritable
33-L30	multilevel inheritance
34- P3	**Department Seminar**
35-L31	**Rivision**
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 22.02.2016
37- L33	**hierarchical inheritance**
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39-L34	hybrid inheritance
40-L35	Test Paper distribution and result analysis
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42- L37	Classes for File Stream Operations
43- L38	Opening and Closing a File
44- P4	College level meeting/ function
45-L39	Detecting End-of-file
46-L40	More about open
47-L41	**Revision**
48-L42	**Revision Class**
49-L43	**File Modes**
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 28.03.2016
51 L45	**File Pointers and their Manipulations**
52- L46	**Revision**
53-IT-III	**Internal Test-III**
54-L47	Sequential Input and Output Operations – Updating a File: Random Access
55-L48	Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
	Model Test begins 11.04.2016
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 22.4.2016

Course Outcomes

Learning Outcomes	**COs** of the course “<Computer Programming in C ++>”
CO1	Get insight knowledge about the language.
CO2	Get trained in writing small programs.
CO3	Capable of executes any programs and identifying errors in them
CO4	Design and implement C programs for any given problem
CO5	Work with existing programs and modify it as per the requirements.
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CO7	Identify the output of a C program without actually executing it
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Staff Name	Dr.A.Arul Gnanam Dr.R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

OBJECT ORIENTED PROGRAMMING WTH C++

UNIT-I: Evolution of C++ - applications of C++ - structure of C++ program. Tokens – keywords – identifiers and constants

– basic data types – user-defined data types – constant pointers and pointers to constants – symbolic constants –type compatibility – declaration of variables – dynamic initialization of variables – reference variables – operators in C++ - scope resolution operator – memory management operators – manipulators – type cast operator – expressions and their types – special assignment expressions –

implicit conversions – operator precedence.

UNIT-II: Functions in C++ : The main function – function prototyping – call by reference – return by reference – inline functions – default arguments – const arguments – function overloading. Managing Console I/O Operations: C++ streams – C++ stream classes – unformatted console I/O operations – formatted console I/O operations –managing output with manipulators.

UNIT-III: Classes and Objects: Specifying a class – defining member functions – making an outside function inline – nesting of member functions – private member functions – arrays within a class – memory allocation for objects –arrays of objects – objects as function arguments – friend functions – returning objects – const member functions. Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class – constructors with default arguments – copy constructor.

UNIT-IV: Operator Overloading: Introduction – defining operator overloading – overloading unary operators – overloading binary operators - overloading binary operators using friends – rules for overloading operators. Inheritance: Introduction – defining derived classes – single inheritance – making a private member inheritable – multilevel inheritance – multiple inheritance – hierarchical inheritance – hybrid inheritance

UNIT-V: Working with Files: Introduction – Classes for File Stream Operations - Opening and Closing a File – Detecting End-of-file – More about open( ): File Modes – File Pointers and their Manipulations – Sequential Input and Output Operations – Updating a File: Random Access

Course Calendar

Hour allotment	**Class Schedule**
	EVEN Semester 01.12.2016
1-L1	**UNIT-I: Evolution of C++ - applications of C++**
2-L2	**Tokens – keywords – identifiers and constants**
3- L3 –	**basic data types – user-defined data types**
4-L4	**constant pointers and pointers to constants – symbolic constants**
5-L5	**constant pointers and pointers to constants – symbolic constants**
6-L6	**type compatibility – declaration of variables – dynamic initialization of variables – reference variables**
7-L7	**– operators in C++ - scope resolution operator – memory management operators**

8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	**manipulators – type cast operator – expressions and their types – special assignment expressions**
10- L9	**. implicit conversions – operator precedence**
11-L10	**Functions in C++ : The main function – function prototyping – call by reference**
12-L11	**return by reference – inline functions – default arguments – const arguments – function overloading**
13-L12	**. Managing Console I/O Operations: C++ streams – C++ stream classes – unformatted console I/O operations – formatted console I/O**
14-L13	**formatted console I/O operations –managing output with manipulators.**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**Classes and Objects: Specifying a class – defining member functions – making an outside function inline – nesting of member functions**
17-IT-1	**Internal Test-I**
18-L16	**private member functions – arrays within a class – memory allocation for object**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**arrays of objects – objects as function arguments – friend functions – returning objects – const member functions.**
21- L19	**Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class**
22- P2	**College level meeting/Cell function**
23-L20	**Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class**
24-L21	**Operator Overloading: Introduction**
25-L22	**– defining operator overloading – overloading unary operators**
26-L23	**overloading binary operators - overloading binary operators using friends –**
27-L24	**overloading binary operators - overloading binary operators using friends –**
28-L25	**rules for overloading operators**
29-L26	**Inheritance: Introduction**
30-L27	**defining derived classes**
31-L28	**single inheritance**
32-L29	**making a private member inheritable**
33-L30	**multilevel inheritance**
34- P3	**Department Seminar**
35-L31	Rivision
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**hierarchical inheritance**
38- IT-II	**Internal Test-II**
39-L34	**hybrid inheritance**
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**Working with Files: Introduction**

42- L37	**Classes for File Stream Operations**
43- L38	**Opening and Closing a File**
44- P4	**College level meeting/ function**
45-L39	**Detecting End-of-file**
46-L40	**– More about open**
47-L41	Rivision
48-L42	**Rivision Class**
49-L43	**File Modes**
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**File Pointers and their Manipulations**
52- L46	Rivision
53-IT-III	**Internal Test-III**
54-L47	**– Sequential Input and Output Operations – Updating a File: Random Access**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 21.4.2017

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	

IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2016-2017)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Computer Programming in C ++
Course Code	**GMPH41**
Class	II Year (2016-2017)
Semester	Even
Staff Name	Dr. A.Arul Gnanam Dr.R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To Learn about C++ Programme
- 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
- To discuss about operators.
- To learn about programme goading.

Syllabus

OBJECT ORIENTED PROGRAMMING WTH C++

UNIT-I: Evolution of C++ - applications of C++ - structure of C++ program. Tokens – keywords – identifiers and constants

– basic data types – user-defined data types – constant pointers and pointers to constants – symbolic constants –type compatibility – declaration of variables – dynamic initialization of variables – reference variables – operators in C++ - scope resolution

operator – memory management operators – manipulators – type cast operator – expressions and their types – special assignment expressions –

implicit conversions – operator precedence.

UNIT-II: Functions in C++ : The main function – function prototyping – call by reference – return by reference – inline functions – default arguments – const arguments – function overloading. Managing Console I/O Operations: C++ streams – C++ stream classes – unformatted console I/O operations – formatted console I/O operations –managing output with manipulators.

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UNIT-IV: Operator Overloading: Introduction – defining operator overloading – overloading unary operators – overloading binary operators - overloading binary operators using friends – rules for overloading operators. Inheritance: Introduction – defining derived classes – single inheritance – making a private member inheritable – multilevel inheritance – multiple inheritance – hierarchical inheritance – hybrid inheritance

UNIT-V: Working with Files: Introduction – Classes for File Stream Operations - Opening and Closing a File – Detecting End-of-file – More about open( ): File Modes – File Pointers and their Manipulations – Sequential Input and Output Operations – Updating a File: Random Access

Course Calendar

Hour allotment	**Class Schedule**
	EVEN Semester 01.12.2016
1-L1	UNIT-I: Evolution of C++ - applications of C++
2-L2	Tokens – keywords – identifiers and constants
3- L3	basic data types – user-defined data types
4-L4	constant pointers and pointers to constants – symbolic constants

5-L5	constant pointers and pointers to constants – symbolic constants
6-L6	type compatibility – declaration of variables – dynamic initialization of variables – reference variables
7-L7	operators in C++ - scope resolution operator – memory management operators
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	manipulators – type cast operator – expressions and their types – special assignment expressions
10- L9	implicit conversions – operator precedence
11-L10	Functions in C++ : The main function – function prototyping – call by reference
12-L11	return by reference – inline functions – default arguments – const arguments – function overloading
13-L12	Managing Console I/O Operations: C++ streams – C++ stream classes – unformatted console I/O operations – formatted console I/O
14-L13	formatted console I/O operations –managing output with manipulators.
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 24.01.2017
16-L15	Classes and Objects: Specifying a class – defining member functions – making an outside function inline – nesting of member functions
17-IT-1	**Internal Test-I**
18-L16	private member functions – arrays within a class – memory allocation for object
19-L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	arrays of objects – objects as function arguments – friend functions – returning objects – const member functions.
21- L19	Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class
22- P2	College level meeting/Cell function
23-L20	Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class
24-L21	Operator Overloading: Introduction
25-L22	defining operator overloading – overloading unary operators
26-L23	overloading binary operators - overloading binary operators using friends –
27-L24	overloading binary operators - overloading binary operators using friends –
28-L25	rules for overloading operators
29-L26	Inheritance: Introduction
30-L27	defining derived classes
31-L28	single inheritance
32-L29	making a private member inheritable
33-L30	multilevel inheritance
34- P3	**Department Seminar**
35-L31	**Rivision**
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 24.02.2017
37- L33	**hierarchical inheritance**
38- IT-II	**Internal Test-II**
39-L34	hybrid inheritance
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	**Working with Files: Introduction**

42- L37	Classes for File Stream Operations
43- L38	Opening and Closing a File
44- P4	College level meeting/ function
45-L39	Detecting End-of-file
46-L40	More about open
47-L41	**Revision**
48-L42	**Revision Class**
49-L43	**File Modes**
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 28.03.2017
51 L45	**File Pointers and their Manipulations**
52- L46	**Revision**
53-IT-III	**Internal Test-III**
54-L47	Sequential Input and Output Operations – Updating a File: Random Access
55-L48	Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
	Model Test begins 05.04.2017
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 21.4.2017

Course Outcomes

Learning Outcomes	**COs** of the course “<Computer Programming in C ++>”
CO1	Get insight knowledge about the language.
CO2	Get trained in writing small programs.
CO3	Capable of executes any programs and identifying errors in them
CO4	Design and implement C programs for any given problem
CO5	Work with existing programs and modify it as per the requirements.
CO6	Identify the errors in a C program.
CO7	Identify the output of a C program without actually executing it
Experimental Learning	
EL1	Capable coding any problem.
EL2	Capable of identifying errors in a coding
EL3	Capable handling any project assigned by a company.
Integrated Activity	
IA1	Individual and Team Work: Function effectively on teams to accomplish a common goal
IA2	Communication: Communicate effectively with a range of audiences and prepare technical documents and make effective oral presentations

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Computer Programing in c++
Course Code	JMPH41
Class	II BSc Physics(2017-2018)
Semester	Even
Staff Name	Dr.A.Arul Gnanam
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

➢

Syllabus

COMPUTER PROGRAMMING IN C++

.

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 ofarrays-array of

stringsFunctions-introduction-function with no argument and no return valuesfunction
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 membersfriend
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

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 07.12.2017
1-L1	Introduction - tokens - keywords
2-L2	identifiers and constants - declaration of variables
3- L3	basic data types - user defined data types

4-L4	derived data types – symbolic constants
5-L5	operators in C++ -expressions and their type-hierarchy of arithmetic operators
6-L6	scope resolution operator – declaring, initializing and modifying variables
7-L7	special assignment operators
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	all control structures
10- L9	structure of a simple
11-L10	Introduction - one dimensional
12-L11	two dimensional arrays
13-L12	initialization of arrays-array of strings
14-L13	Functions-introduction-function with no argument and no return valuesfunction with no argument but return value
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Revision
17-IT-1	**Internal Test-I**
18-L16	function with argument and no return values
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	function with argument and return values
21- L19	call by reference
22- P2	**College level meeting/Cell function**
23-L20	return by reference
24-L21	function prototyping - inline functions
25-L22	local, -global and static variables
26-L23	function overloading
27-L24	virtual functions-main function-math library functions. (13L)
28-L25	Introduction - specifying a class
29-L26	defining member functions-C++ program with class
30-L27	nesting of member functions - private member functions
31-L28	objects as function arguments - arrays within a class-array of objects-static class membersfriend
32-L29	functions-constructors
33-L30	parameterized constructors
34- P3	**Department Seminar**

35-L31	multiple constructors - constructors with default arguments - copy constructor. (15L)
36-L32	____ - **Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Revision
38- IT-II	**Internal Test-II**
39-L34	Introduction -defining operator overloading
40-L35	____ **-Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	overloading unary operators
42- L37	binary operators
43- L38	Inheritance - single inheritance
44- P4	**College level meeting/ function**
45-L39	multiple inheritance - multilevel inheritance
46-L40	hybrid inheritance - hierarchial inheritance
47-L41	virtual base class-abstract class Pointers- definition-declaration-arithmetic operations. (12L)
48-L42	Introduction - C++ stream
49-L43	C++ stream classes - unformatted I/O Operations
50-L44	____ - **Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	formatted console I/O operations - working with files - classes for file steam operations
52- L46	opening and closing a file - file pointers and their manipulations. (9L)
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	____ - **Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2018

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	

CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2017-2018)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Computer Programming in C ++
Course Code	**GMPH41**
Class	II Year (2017-2018)
Semester	Even
Staff Name	Dr. A.Arul Gnanam Dr.R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To Learn about C++ Programme
- 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
- To discuss about operators.
- To learn about programme goading.

Syllabus

OBJECT ORIENTED PROGRAMMING WTH C++

UNIT-I: Evolution of C++ - applications of C++ - structure of C++ program. Tokens – keywords – identifiers and constants

– basic data types – user-defined data types – constant pointers and pointers to constants – symbolic constants –type compatibility – declaration of variables – dynamic initialization of variables – reference variables – operators in C++ - scope resolution

operator – memory management operators – manipulators – type cast operator – expressions and their types – special assignment expressions –

implicit conversions – operator precedence.

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UNIT-V: Working with Files: Introduction – Classes for File Stream Operations - Opening and Closing a File – Detecting End-of-file – More about open( ): File Modes – File Pointers and their Manipulations – Sequential Input and Output Operations – Updating a File: Random Access

Course Calendar

Hour allotment	**Class Schedule**
	EVEN Semester 07.12.2017
1-L1	UNIT-I: Evolution of C++ - applications of C++
2-L2	Tokens – keywords – identifiers and constants
3- L3	basic data types – user-defined data types
4-L4	constant pointers and pointers to constants – symbolic constants

5-L5	constant pointers and pointers to constants – symbolic constants
6-L6	type compatibility – declaration of variables – dynamic initialization of variables – reference variables
7-L7	operators in C++ - scope resolution operator – memory management operators
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	manipulators – type cast operator – expressions and their types – special assignment expressions
10- L9	implicit conversions – operator precedence
11-L10	Functions in C++ : The main function – function prototyping – call by reference
12-L11	return by reference – inline functions – default arguments – const arguments – function overloading
13-L12	Managing Console I/O Operations: C++ streams – C++ stream classes – unformatted console I/O operations – formatted console I/O
14-L13	formatted console I/O operations –managing output with manipulators.
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 22.01.2018
16-L15	Classes and Objects: Specifying a class – defining member functions – making an outside function inline – nesting of member functions
17-IT-1	**Internal Test-I**
18-L16	private member functions – arrays within a class – memory allocation for object
19-L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	arrays of objects – objects as function arguments – friend functions – returning objects – const member functions.
21- L19	Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class
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25-L22	defining operator overloading – overloading unary operators
26-L23	overloading binary operators - overloading binary operators using friends –
27-L24	overloading binary operators - overloading binary operators using friends –
28-L25	rules for overloading operators
29-L26	Inheritance: Introduction
30-L27	defining derived classes
31-L28	single inheritance
32-L29	making a private member inheritable
33-L30	multilevel inheritance
34- P3	**Department Seminar**
35-L31	**Rivision**
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 26.02.2018
37- L33	**hierarchical inheritance**
38- IT-II	**Internal Test-II**
39-L34	hybrid inheritance
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	**Working with Files: Introduction**

42- L37	Classes for File Stream Operations
43- L38	Opening and Closing a File
44- P4	College level meeting/ function
45-L39	Detecting End-of-file
46-L40	More about open
47-L41	**Revision**
48-L42	**Revision Class**
49-L43	**File Modes**
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 01.04.2018
51 L45	**File Pointers and their Manipulations**
52- L46	**Revision**
53-IT-III	**Internal Test-III**
54-L47	Sequential Input and Output Operations – Updating a File: Random Access
55-L48	Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
	Model Test begins 12.04.2018
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2018

Course Outcomes

Learning Outcomes	**COs** of the course “<Computer Programming in C ++>”
CO1	Get insight knowledge about the language.
CO2	Get trained in writing small programs.
CO3	Capable of executes any programs and identifying errors in them
CO4	Design and implement C programs for any given problem
CO5	Work with existing programs and modify it as per the requirements.
CO6	Identify the errors in a C program.
CO7	Identify the output of a C program without actually executing it
Experimental Learning	
EL1	Capable coding any problem.
EL2	Capable of identifying errors in a coding
EL3	Capable handling any project assigned by a company.
Integrated Activity	
IA1	Individual and Team Work: Function effectively on teams to accomplish a common goal
IA2	Communication: Communicate effectively with a range of audiences and prepare technical documents and make effective oral presentations

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Computer Programing in c++
Course Code	SMPH53
Class	III BSc Physics(2019-2020)
Semester	Odd
Staff Name	Dr.A.Arul Gnanam
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

➢

Syllabus

COMPUTER PROGRAMMING IN C++

.

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 ofarrays-array of

stringsFunctions-introduction-function with no argument and no return valuesfunction
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 membersfriend
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

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 17.06.2019
1-L1	Introduction - tokens - keywords
2-L2	identifiers and constants - declaration of variables
3- L3	basic data types - user defined data types

4-L4	derived data types – symbolic constants
5-L5	operators in C++ -expressions and their type-hierarchy of arithmetic operators
6-L6	scope resolution operator – declaring, initializing and modifying variables
7-L7	special assignment operators
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	all control structures
10- L9	structure of a simple
11-L10	Introduction - one dimensional
12-L11	two dimensional arrays
13-L12	initialization of arrays-array of strings
14-L13	Functions-introduction-function with no argument and no return valuesfunction with no argument but return value
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Revision
17-IT-1	**Internal Test-I**
18-L16	function with argument and no return values
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	function with argument and return values
21- L19	call by reference
22- P2	**College level meeting/Cell function**
23-L20	return by reference
24-L21	function prototyping - inline functions
25-L22	local, -global and static variables
26-L23	function overloading
27-L24	virtual functions-main function-math library functions. (13L)
28-L25	Introduction - specifying a class
29-L26	defining member functions-C++ program with class
30-L27	nesting of member functions - private member functions
31-L28	objects as function arguments - arrays within a class-array of objects-static class membersfriend
32-L29	functions-constructors
33-L30	parameterized constructors
34- P3	**Department Seminar**

35-L31	multiple constructors - constructors with default arguments - copy constructor. (15L)
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Revision
38- IT-II	**Internal Test-II**
39-L34	Introduction -defining operator overloading
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	overloading unary operators
42- L37	binary operators
43- L38	Inheritance - single inheritance
44- P4	**College level meeting/ function**
45-L39	multiple inheritance - multilevel inheritance
46-L40	hybrid inheritance - hierarchial inheritance
47-L41	virtual base class-abstract class Pointers- definition-declaration-arithmetic operations. (12L)
48-L42	Introduction - C++ stream
49-L43	C++ stream classes - unformatted I/O Operations
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	formatted console I/O operations - working with files - classes for file steam operations
52- L46	opening and closing a file - file pointers and their manipulations. (9L)
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.10.2019

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	

CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2018-2019)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Computer Programming in C ++
Course Code	**GMPH41**
Class	II Year (2018-2019)
Semester	Even
Staff Name	Dr. A.Arul Gnanam Dr.R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To Learn about C++ Programme
- 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
- To discuss about operators.
- To learn about programme goading.

Syllabus

OBJECT ORIENTED PROGRAMMING WTH C++

UNIT-I: Evolution of C++ - applications of C++ - structure of C++ program. Tokens – keywords – identifiers and constants

– basic data types – user-defined data types – constant pointers and pointers to constants – symbolic constants –type compatibility – declaration of variables – dynamic initialization of variables – reference variables – operators in C++ - scope resolution

operator – memory management operators – manipulators – type cast operator – expressions and their types – special assignment expressions –

implicit conversions – operator precedence.

UNIT-II: Functions in C++ : The main function – function prototyping – call by reference – return by reference – inline functions – default arguments – const arguments – function overloading. Managing Console I/O Operations: C++ streams – C++ stream classes – unformatted console I/O operations – formatted console I/O operations –managing output with manipulators.

UNIT-III: Classes and Objects: Specifying a class – defining member functions – making an outside function inline – nesting of member functions – private member functions – arrays within a class – memory allocation for objects –arrays of objects – objects as function arguments – friend functions – returning objects – const member functions. Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class – constructors with default arguments – copy constructor.

UNIT-IV: Operator Overloading: Introduction – defining operator overloading – overloading unary operators – overloading binary operators - overloading binary operators using friends – rules for overloading operators. Inheritance: Introduction – defining derived classes – single inheritance – making a private member inheritable – multilevel inheritance – multiple inheritance – hierarchical inheritance – hybrid inheritance

UNIT-V: Working with Files: Introduction – Classes for File Stream Operations - Opening and Closing a File – Detecting End-of-file – More about open( ): File Modes – File Pointers and their Manipulations – Sequential Input and Output Operations – Updating a File: Random Access

Course Calendar

Hour allotment	**Class Schedule**
	EVEN Semester 03.12.2018
1-L1	UNIT-I: Evolution of C++ - applications of C++
2-L2	Tokens – keywords – identifiers and constants
3- L3	basic data types – user-defined data types
4-L4	constant pointers and pointers to constants – symbolic constants

5-L5	constant pointers and pointers to constants – symbolic constants
6-L6	type compatibility – declaration of variables – dynamic initialization of variables – reference variables
7-L7	operators in C++ - scope resolution operator – memory management operators
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	manipulators – type cast operator – expressions and their types – special assignment expressions
10- L9	implicit conversions – operator precedence
11-L10	Functions in C++ : The main function – function prototyping – call by reference
12-L11	return by reference – inline functions – default arguments – const arguments – function overloading
13-L12	Managing Console I/O Operations: C++ streams – C++ stream classes – unformatted console I/O operations – formatted console I/O
14-L13	formatted console I/O operations –managing output with manipulators.
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 18.01.2019
16-L15	Classes and Objects: Specifying a class – defining member functions – making an outside function inline – nesting of member functions
17-IT-1	**Internal Test-I**
18-L16	private member functions – arrays within a class – memory allocation for object
19-L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	arrays of objects – objects as function arguments – friend functions – returning objects – const member functions.
21- L19	Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class
22- P2	College level meeting/Cell function
23-L20	Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class
24-L21	Operator Overloading: Introduction
25-L22	defining operator overloading – overloading unary operators
26-L23	overloading binary operators - overloading binary operators using friends –
27-L24	overloading binary operators - overloading binary operators using friends –
28-L25	rules for overloading operators
29-L26	Inheritance: Introduction
30-L27	defining derived classes
31-L28	single inheritance
32-L29	making a private member inheritable
33-L30	multilevel inheritance
34- P3	**Department Seminar**
35-L31	**Rivision**
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 25.02.2019
37- L33	**hierarchical inheritance**
38- IT-II	**Internal Test-II**
39-L34	hybrid inheritance
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	**Working with Files: Introduction**

42- L37	Classes for File Stream Operations
43- L38	Opening and Closing a File
44- P4	College level meeting/ function
45-L39	Detecting End-of-file
46-L40	More about open
47-L41	**Revision**
48-L42	**Revision Class**
49-L43	**File Modes**
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 22.03.2019
51 L45	**File Pointers and their Manipulations**
52- L46	**Revision**
53-IT-III	**Internal Test-III**
54-L47	Sequential Input and Output Operations – Updating a File: Random Access
55-L48	Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
	Model Test begins 08.04.2019
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2019

Course Outcomes

Learning Outcomes	**COs** of the course “<Computer Programming in C ++>”
CO1	Get insight knowledge about the language.
CO2	Get trained in writing small programs.
CO3	Capable of executes any programs and identifying errors in them
CO4	Design and implement C programs for any given problem
CO5	Work with existing programs and modify it as per the requirements.
CO6	Identify the errors in a C program.
CO7	Identify the output of a C program without actually executing it
Experimental Learning	
EL1	Capable coding any problem.
EL2	Capable of identifying errors in a coding
EL3	Capable handling any project assigned by a company.
Integrated Activity	
IA1	Individual and Team Work: Function effectively on teams to accomplish a common goal
IA2	Communication: Communicate effectively with a range of audiences and prepare technical documents and make effective oral presentations

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# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2019-2020)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Computer Programming in C ++
Course Code	**GMPH41**
Class	II Year (2019-2020)
Semester	Even
Staff Name	Dr. A.Arul Gnanam Dr.R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To Learn about C++ Programme
- 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
- To discuss about operators.
- To learn about programme goading.

Syllabus

OBJECT ORIENTED PROGRAMMING WTH C++

UNIT-I: Evolution of C++ - applications of C++ - structure of C++ program. Tokens – keywords – identifiers and constants

– basic data types – user-defined data types – constant pointers and pointers to constants – symbolic constants –type compatibility – declaration of variables – dynamic initialization of variables – reference variables – operators in C++ - scope resolution

operator – memory management operators – manipulators – type cast operator – expressions and their types – special assignment expressions –

implicit conversions – operator precedence.

UNIT-II: Functions in C++ : The main function – function prototyping – call by reference – return by reference – inline functions – default arguments – const arguments – function overloading. Managing Console I/O Operations: C++ streams – C++ stream classes – unformatted console I/O operations – formatted console I/O operations –managing output with manipulators.

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UNIT-IV: Operator Overloading: Introduction – defining operator overloading – overloading unary operators – overloading binary operators - overloading binary operators using friends – rules for overloading operators. Inheritance: Introduction – defining derived classes – single inheritance – making a private member inheritable – multilevel inheritance – multiple inheritance – hierarchical inheritance – hybrid inheritance

UNIT-V: Working with Files: Introduction – Classes for File Stream Operations - Opening and Closing a File – Detecting End-of-file – More about open( ): File Modes – File Pointers and their Manipulations – Sequential Input and Output Operations – Updating a File: Random Access

Course Calendar

Hour allotment	**Class Schedule**
	EVEN Semester 02.12.2019
1-L1	UNIT-I: Evolution of C++ - applications of C++
2-L2	Tokens – keywords – identifiers and constants
3- L3	basic data types – user-defined data types
4-L4	constant pointers and pointers to constants – symbolic constants

5-L5	constant pointers and pointers to constants – symbolic constants
6-L6	type compatibility – declaration of variables – dynamic initialization of variables – reference variables
7-L7	operators in C++ - scope resolution operator – memory management operators
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	manipulators – type cast operator – expressions and their types – special assignment expressions
10- L9	implicit conversions – operator precedence
11-L10	Functions in C++ : The main function – function prototyping – call by reference
12-L11	return by reference – inline functions – default arguments – const arguments – function overloading
13-L12	Managing Console I/O Operations: C++ streams – C++ stream classes – unformatted console I/O operations – formatted console I/O
14-L13	formatted console I/O operations –managing output with manipulators.
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Classes and Objects: Specifying a class – defining member functions – making an outside function inline – nesting of member functions
17-IT-1	**Internal Test-I**
18-L16	private member functions – arrays within a class – memory allocation for object
19-L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	arrays of objects – objects as function arguments – friend functions – returning objects – const member functions.
21- L19	Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class
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23-L20	Constructors and Destructors: Introduction – constructors – parameterized constructors – multiple constructors in a class
24-L21	Operator Overloading: Introduction
25-L22	defining operator overloading – overloading unary operators
26-L23	overloading binary operators - overloading binary operators using friends –
27-L24	overloading binary operators - overloading binary operators using friends –
28-L25	rules for overloading operators
29-L26	Inheritance: Introduction
30-L27	defining derived classes
31-L28	single inheritance
32-L29	making a private member inheritable
33-L30	multilevel inheritance
34- P3	**Department Seminar**
35-L31	**Rivision**
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**hierarchical inheritance**
38- IT-II	**Internal Test-II**
39-L34	hybrid inheritance
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	**Working with Files: Introduction**

42- L37	Classes for File Stream Operations
43- L38	Opening and Closing a File
44- P4	College level meeting/ function
45-L39	Detecting End-of-file
46-L40	More about open
47-L41	**Revision**
48-L42	**Revision Class**
49-L43	**File Modes**
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**File Pointers and their Manipulations**
52- L46	**Revision**
53-IT-III	**Internal Test-III**
54-L47	Sequential Input and Output Operations – Updating a File: Random Access
55-L48	Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on

Course Outcomes

Learning Outcomes	**COs** of the course "<Computer Programming in C ++>"
CO1	Get insight knowledge about the language.
CO2	Get trained in writing small programs.
CO3	Capable of executes any programs and identifying errors in them
CO4	Design and implement C programs for any given problem
CO5	Work with existing programs and modify it as per the requirements.
CO6	Identify the errors in a C program.
CO7	Identify the output of a C program without actually executing it
Experimental Learning	
EL1	Capable coding any problem.
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IA1	Individual and Team Work: Function effectively on teams to accomplish a common goal
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# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Communication Electronics
Course Code	JMPH5C
Class	III year (2018-2019)
Semester	Odd
Staff Name	Dr.A.Arul Gnanam Mrs.D.Priscilla Koilpillai
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- ➢
- ➢
- ➢
- ➢

Syllabus

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

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2018
1-L1	UNIT I: AMPLITUDE MODULATION AND TRANSMISSION
2-L2	amplitude Modulation – AM envelop – AM frequency spectrum and bandwidth
3- L3	Phasor representation of AM with carrier
4-L4	coefficient of modulation or percentage modulation or modulation index
5-L5	– degrees of modulation – AM power distribution -
6-L6	AM Current relation and efficiency - modulation by complex information signal
7-L7	doubleside band suppressed carrier AM
8- P1	single side band suppressed carrier AM
9- L8	Vestigal side band amplitude modulation
10- L9	AM modulator circuits – emitter modulations or low power AM
11-L10	collector modulator or medium and high power AM modulator
12-L11	AM transmitters – Broadcast AM transmitters
13-L12	Low level of AM transmitter – High level AM transmitter
14-L13	Welcoming of First year and Inauguration of MathematicsAssociation
15-L14	____ - Allotting portion for Internal Test-I
	Internal Test I begins
16-L15	UNIT II: AMPLITUDE MODULATION -RECEPTION
17-IT-1	Internal Test-I
18-L16	Comparison of AM system – Quadrature amplitude modulation
19-L17	____ -Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	principles of AM detection – AM receivers – receiver parameters
21- L19	Tuned radio frequency (TRF) receiver or straight receiver
22- P2	College level meeting/Cell function
23-L20	principles of superhetrodyne
24-L21	double frequency conversion AM receiver
25-L22	UNIT III:ANGLE MODULATION – TRANSMISSION
26-L23	Frequency modulation – Phase modulation
27-L24	Phase deviation and modulation index
28-L25	Multitone modulation
29-L26	Transmission band width of FM
30-L27	conversion of PM to FM or frequency modulator
31-L28	conversion of FM to PM / phase modulators
32-L29	commercial broadcast FM
33-L30	average power of an AM/FM wave
34- P3	Department Seminar
35-L31	generation of FM – direct method of FM generation
36-L32	____ - Allotting portion for Internal Test-II
	Internal Test II begins
37- L33	reactance tube modulator
38- IT-II	Internal Test-II
39-L34	indirect method of FM wave generation – FM transmitters

40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**Comparison of AM and FM.**
42- L37	**UNIT IV:FM RECEPTION FM**
43- L38	**detectors – Balanced slope detector**
44- P4	**College level meeting/ function**
45-L39	**Foster seely discriminator – ratio detector**
46-L40	**FM super heterodyne receiver – FM noise suppression**
47-L41	**threshold extension by FMFB technique**
48-L42	**UNIT – V: DIGITAL MODULATION TECHNIQUES**
49-L43	**BFSK – Binary phase shift keying**
50-L44	**Quadrature PSK – Differential PSK**
	Internal Test III begins
51 L45	**correlative coding – Duobinary encoding**
52- L46	**Performance comparison of digital modulation schemes - - M ary FSK**
53-IT-III	**Internal Test-III**
54-L47	**correlative coding – Duobinary encoding**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.11.2018

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	

IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Communication Electronics
Course Code	SEPH5C
Class	III year (2019-2020)
Semester	Odd
Staff Name	Dr.A.Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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-
-
-

Syllabus

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)

Page 20 of 54

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

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 17.06.2019
1-L1	UNIT I: AMPLITUDE MODULATION AND TRANSMISSION
2-L2	amplitude Modulation – AM envelop – AM frequency spectrum and bandwidth
3- L3	Phasor representation of AM with carrier
4-L4	coefficient of modulation or percentage modulation or modulation index
5-L5	– degrees of modulation – AM power distribution -
6-L6	AM Current relation and efficiency - modulation by complex information signal
7-L7	doubleside band suppressed carrier AM
8- P1	single side band suppressed carrier AM
9- L8	Vestigal side band amplitude modulation
10- L9	AM modulator circuits – emitter modulations or low power AM
11-L10	collector modulator or medium and high power AM modulator
12-L11	AM transmitters – Broadcast AM transmitters
13-L12	Low level of AM transmitter – High level AM transmitter
14-L13	Welcoming of First year and Inauguration of MathematicsAssociation
15-L14	____ - Allotting portion for Internal Test-I
	Internal Test I begins
16-L15	UNIT II: AMPLITUDE MODULATION -RECEPTION
17-IT-1	Internal Test-I
18-L16	Comparison of AM system – Quadrature amplitude modulation
19-L17	____ -Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	principles of AM detection – AM receivers – receiver parameters
21- L19	Tuned radio frequency (TRF) receiver or straight receiver
22- P2	College level meeting/Cell function
23-L20	principles of superhetrodyne
24-L21	double frequency conversion AM receiver
25-L22	UNIT III:ANGLE MODULATION – TRANSMISSION
26-L23	Frequency modulation – Phase modulation
27-L24	Phase deviation and modulation index
28-L25	Multitone modulation
29-L26	Transmission band width of FM
30-L27	conversion of PM to FM or frequency modulator
31-L28	conversion of FM to PM / phase modulators
32-L29	commercial broadcast FM
33-L30	average power of an AM/FM wave
34- P3	Department Seminar
35-L31	generation of FM – direct method of FM generation
36-L32	____ - Allotting portion for Internal Test-II
	Internal Test II begins
37- L33	reactance tube modulator
38- IT-II	Internal Test-II
39-L34	indirect method of FM wave generation – FM transmitters

40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**Comparison of AM and FM.**
42- L37	**UNIT IV:FM RECEPTION FM**
43- L38	**detectors – Balanced slope detector**
44- P4	**College level meeting/ function**
45-L39	**Foster seely discriminator – ratio detector**
46-L40	**FM super heterodyne receiver – FM noise suppression**
47-L41	**threshold extension by FMFB technique**
48-L42	**UNIT – V: DIGITAL MODULATION TECHNIQUES**
49-L43	**BFSK – Binary phase shift keying**
50-L44	**Quadrature PSK – Differential PSK**
	Internal Test III begins
51 L45	**correlative coding – Duobinary encoding**
52- L46	**Performance comparison of digital modulation schemes - - M ary FSK**
53-IT-III	**Internal Test-III**
54-L47	**correlative coding – Duobinary encoding**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on30.10.2019

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	

IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Digital Electronics
Course Code	GMPH63
Class	III year (2012-2015)
Semester	Even
Staff Name	Dr. M. Daniel Sweetlin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

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Syllabus

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 interconversions
-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)

5 Hrs

Page **24** of **54**

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

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 03.12.2014

1-L1	Decimal, binary, octal
2-L2	hexadecimal number systems
3- L3	Interconversions
4-L4	binary arithmetic-binary addition
5-L5	subtraction-1’s and 2’s complements
6-L6	BCD codes, ASCII code
7-L7	Excess-3code, Gray code. (7L+5T)
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	Boolean algebra
10- L9	De Morgan’s theorem
11-L10	Positive logic and negative logic system
12-L11	Basic logic gates, OR, AND, NOT
13-L12	NAND and NOR as universal building blocks. (8L+6T)
14-L13	Half and full adders
15-L14	Half and full subtractors
16-L15	RS Flip-flop-clocked RS Flip
17- L16	, JK Flip-flop, JK master slave Flip-flop
18- L17	D Flip-flop, T Flip-flop 555 timer
19- L18	Astable multivibrator, monostable multivibrator
20- L19	Frequency divider(11L+7T)
21- L20	____ - **Allotting portion for Internal Test-I**
	Internal Test I begins
22- L21	Karnaugh map
23- IT-1	**Internal Test-I**
24- L22	2,3 Variables
25- L23	4 Variables
26- L24	____ **-Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Simplification
28- L26	SOP form of Boolean Function
29- L27	POS Form of Boolean Function
30- P2	**College level meeting/Cell function**
31-L28	Don’t Care Conditions
32-L29	Multiplexer
33-L30	DeMultiplexer Explanation
34- L31	Encoder
35- L32	Decoder
36- L33	Parity Generator
37- L34	checker. (10L+6T)
38-L35	Types of Resisters
39- L36	Serial In
40- L37	Serial Out

41- L38	Parallel in
42-P3	**Department Seminar**
43- L39	Parallel out
44- L40	Parallel In
45- L41	Serial out- Parallel in- Parallel out
46- L42	Asynchronous Counters
47- L43	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
48- L44	Synchronous Counters
49-IT-II	**Internal Test-II**
50-L45	Ring counter
51- L46	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Ring counter
53- L48	Up- Down counter
54- L49	Mod-5 counter
55- L50	Mod-10 Counter
56- L51	decade counter
57- L52	A/D Counter
58- L53	D/A Counter
59-P4	**College level meeting/ function**
60- L54	Practical work
61- L55	Problems explanation
62- L56	Problems explanation
63- L57	**Revision**
64- L58	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
65- L59	Practical
66- L60	Problems
67-IT-III	**Internal Test-III**
68- L61	Revision
69- L62	Revision Test
70- L63	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
71-MT	**Model Test**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.4.2015

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"

CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Digital Electronics
Course Code	GMPH63
Class	III year (2012-2015)
Semester	Even
Staff Name	Dr. M. Daniel Sweetlin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

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Syllabus

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 interconversions
-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)

5 Hrs

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)

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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

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 03.12.2014

1-L1	Decimal, binary, octal
2-L2	hexadecimal number systems
3- L3	Interconversions
4-L4	binary arithmetic-binary addition
5-L5	subtraction-1’s and 2’s complements
6-L6	BCD codes, ASCII code
7-L7	Excess-3code, Gray code. (7L+5T)
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	Boolean algebra
10- L9	De Morgan’s theorem
11-L10	Positive logic and negative logic system
12-L11	Basic logic gates, OR, AND, NOT
13-L12	NAND and NOR as universal building blocks. (8L+6T)
14-L13	Half and full adders
15-L14	Half and full subtractors
16-L15	RS Flip-flop-clocked RS Flip
17- L16	, JK Flip-flop, JK master slave Flip-flop
18- L17	D Flip-flop, T Flip-flop 555 timer
19- L18	Astable multivibrator, monostable multivibrator
20- L19	Frequency divider(11L+7T)
21- L20	____ - **Allotting portion for Internal Test-I**
	Internal Test I begins
22- L21	Karnaugh map
23- IT-1	**Internal Test-I**
24- L22	2,3 Variables
25- L23	4 Variables
26- L24	____ **-Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Simplification
28- L26	SOP form of Boolean Function
29- L27	POS Form of Boolean Function
30- P2	**College level meeting/Cell function**
31-L28	Don’t Care Conditions
32-L29	Multiplexer
33-L30	DeMultiplexer Explanation
34- L31	Encoder
35- L32	Decoder
36- L33	Parity Generator
37- L34	checker. (10L+6T)
38-L35	Types of Resisters
39- L36	Serial In
40- L37	Serial Out

41- L38	Parallel in
42-P3	**Department Seminar**
43- L39	Parallel out
44- L40	Parallel In
45- L41	Serial out- Parallel in- Parallel out
46- L42	Asynchronous Counters
47- L43	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
48- L44	Synchronous Counters
49-IT-II	**Internal Test-II**
50-L45	Ring counter
51- L46	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Ring counter
53- L48	Up- Down counter
54- L49	Mod-5 counter
55- L50	Mod-10 Counter
56- L51	decade counter
57- L52	A/D Counter
58- L53	D/A Counter
59-P4	**College level meeting/ function**
60- L54	Practical work
61- L55	Problems explanation
62- L56	Problems explanation
63- L57	**Revision**
64- L58	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
65- L59	Practical
66- L60	Problems
67-IT-III	**Internal Test-III**
68- L61	Revision
69- L62	Revision Test
70- L63	**____ - Test Paper distribution and result analysis**
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	Model Test begins
71-MT	**Model Test**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.4.2015

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”

CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

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For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Digital Electronics
Course Code	GMPH63
Class	III year (2014-2017)
Semester	Even
Staff Name	Dr. M. Daniel Sweetlin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

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Syllabus

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

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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)

5 Hrs

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)

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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

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 01.12.2016

1-L1	Decimal, binary, octal
2-L2	hexadecimal number systems
3- L3	Interconversions
4-L4	binary arithmetic-binary addition
5-L5	subtraction-1's and 2's complements
6-L6	BCD codes, ASCII code
7-L7	Excess-3code, Gray code. (7L+5T)
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	Boolean algebra
10- L9	De Morgan's theorem
11-L10	Positive logic and negative logic system
12-L11	Basic logic gates, OR, AND, NOT
13-L12	NAND and NOR as universal building blocks. (8L+6T)
14-L13	Half and full adders
15-L14	Half and full subtractors
16-L15	RS Flip-flop-clocked RS Flip
17- L16	, JK Flip-flop, JK master slave Flip-flop
18- L17	D Flip-flop, T Flip-flop 555 timer
19- L18	Astable multivibrator, monostable multivibrator
20- L19	Frequency divider(11L+7T)
21- L20	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
22- L21	Karnaugh map
23- IT-1	**Internal Test-I**
24- L22	2,3 Variables
25- L23	4 Variables
26- L24	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Simplification
28- L26	SOP form of Boolean Function
29- L27	POS Form of Boolean Function
30- P2	**College level meeting/Cell function**
31-L28	Don't Care Conditions
32-L29	Multiplexer
33-L30	DeMultiplexer Explanation
34- L31	Encoder
35- L32	Decoder
36- L33	Parity Generator
37- L34	checker. (10L+6T)
38-L35	Types of Resisters
39- L36	Serial In
40- L37	Serial Out

41- L38	Parallel in
42-P3	**Department Seminar**
43- L39	Parallel out
44- L40	Parallel In
45- L41	Serial out- Parallel in- Parallel out
46- L42	Asynchronous Counters
47- L43	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
48- L44	Synchronous Counters
49-IT-II	**Internal Test-II**
50-L45	Ring counter
51- L46	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Ring counter
53- L48	Up- Down counter
54- L49	Mod-5 counter
55- L50	Mod-10 Counter
56- L51	decade counter
57- L52	A/D Counter
58- L53	D/A Counter
59-P4	**College level meeting/ function**
60- L54	Practical work
61- L55	Problems explanation
62- L56	Problems explanation
63- L57	**Revision**
64- L58	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
65- L59	Practical
66- L60	Problems
67-IT-III	**Internal Test-III**
68- L61	Revision
69- L62	Revision Test
70- L63	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
71-MT	**Model Test**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 21.4.2017

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”

CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Digital Electronics
Course Code	JMPH63
Class	III year (2016-2019)
Semester	Even
Staff Name	Dr. M. Daniel Sweetlin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

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-

Syllabus

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 interconversions

-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)

5 Hrs

Page **24** of **54**

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

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 3.12.2018

1-L1	Decimal, binary, octal
2-L2	hexadecimal number systems
3- L3	Interconversions
4-L4	binary arithmetic-binary addition
5-L5	subtraction-1's and 2's complements
6-L6	BCD codes, ASCII code
7-L7	Excess-3code, Gray code. (7L+5T)
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	Boolean algebra
10- L9	De Morgan's theorem
11-L10	Positive logic and negative logic system
12-L11	Basic logic gates, OR, AND, NOT
13-L12	NAND and NOR as universal building blocks. (8L+6T)
14-L13	Half and full adders
15-L14	Half and full subtractors
16-L15	RS Flip-flop-clocked RS Flip
17- L16	, JK Flip-flop, JK master slave Flip-flop
18- L17	D Flip-flop, T Flip-flop 555 timer
19- L18	Astable multivibrator, monostable multivibrator
20- L19	Frequency divider(11L+7T)
21- L20	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
22- L21	Karnaugh map
23- IT-1	**Internal Test-I**
24- L22	2,3 Variables
25- L23	4 Variables
26- L24	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Simplification
28- L26	SOP form of Boolean Function
29- L27	POS Form of Boolean Function
30- P2	**College level meeting/Cell function**
31-L28	Don't Care Conditions
32-L29	Multiplexer
33-L30	DeMultiplexer Explanation
34- L31	Encoder
35- L32	Decoder
36- L33	Parity Generator
37- L34	checker. (10L+6T)
38-L35	Types of Resisters
39- L36	Serial In
40- L37	Serial Out

41- L38	Parallel in
42-P3	**Department Seminar**
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44- L40	Parallel In
45- L41	Serial out- Parallel in- Parallel out
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47- L43	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
48- L44	Synchronous Counters
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	Entering Internal Test-II Marks into University portal
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55- L50	Mod-10 Counter
56- L51	decade counter
57- L52	A/D Counter
58- L53	D/A Counter
59-P4	**College level meeting/ function**
60- L54	Practical work
61- L55	Problems explanation
62- L56	Problems explanation
63- L57	**Revision**
64- L58	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
65- L59	Practical
66- L60	Problems
67-IT-III	**Internal Test-III**
68- L61	Revision
69- L62	Revision Test
70- L63	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
71-MT	**Model Test**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.4.2019

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”

CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

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HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Digital Electronics
Course Code	JMPH63
Class	III year (2016-2019)
Semester	Even
Staff Name	Dr. M. Daniel Sweetlin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

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Syllabus

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 interconversions
-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)
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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)
5 Hrs

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)
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4.Fundamentals of Digital Electronics and Microprocessors - Anokh singh

Course Calendar

Hour allotment	Class Schedule

	Even Semester Begin on 3.12.2018
1-L1	Decimal, binary, octal
2-L2	hexadecimal number systems
3- L3	Interconversions
4-L4	binary arithmetic-binary addition
5-L5	subtraction-1's and 2's complements
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9- L8	Boolean algebra
10- L9	De Morgan's theorem
11-L10	Positive logic and negative logic system
12-L11	Basic logic gates, OR, AND, NOT
13-L12	NAND and NOR as universal building blocks. (8L+6T)
14-L13	Half and full adders
15-L14	Half and full subtractors
16-L15	RS Flip-flop-clocked RS Flip
17- L16	, JK Flip-flop, JK master slave Flip-flop
18- L17	D Flip-flop, T Flip-flop 555 timer
19- L18	Astable multivibrator, monostable multivibrator
20- L19	Frequency divider(11L+7T)
21- L20	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
22- L21	Karnaugh map
23- IT-1	**Internal Test-I**
24- L22	2,3 Variables
25- L23	4 Variables
26- L24	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Simplification
28- L26	SOP form of Boolean Function
29- L27	POS Form of Boolean Function
30- P2	**College level meeting/Cell function**
31-L28	Don't Care Conditions
32-L29	Multiplexer
33-L30	DeMultiplexer Explanation
34- L31	Encoder
35- L32	Decoder
36- L33	Parity Generator
37- L34	checker. (10L+6T)
38-L35	Types of Resisters
39- L36	Serial In

40- L37	Serial Out
41- L38	Parallel in
42-P3	**Department Seminar**
43- L39	Parallel out
44- L40	Parallel In
45- L41	Serial out- Parallel in- Parallel out
46- L42	Asynchronous Counters
47- L43	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
48- L44	Synchronous Counters
49-IT-II	**Internal Test-II**
50-L45	Ring counter
51- L46	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Ring counter
53- L48	Up- Down counter
54- L49	Mod-5 counter
55- L50	Mod-10 Counter
56- L51	decade counter
57- L52	A/D Counter
58- L53	D/A Counter
59-P4	**College level meeting/ function**
60- L54	Practical work
61- L55	Problems explanation
62- L56	Problems explanation
63- L57	**Revision**
64- L58	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
65- L59	Practical
66- L60	Problems
67-IT-III	**Internal Test-III**
68- L61	Revision
69- L62	Revision Test
70- L63	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
71-MT	**Model Test**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.4.2019

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
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HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Digital Electronics
Course Code	SMPH63
Class	III year (2017-2020)
Semester	Even
Staff Name	Dr. M. Daniel Sweetlin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

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Syllabus

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

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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)

5 Hrs

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)

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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)

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4.Fundamentals of Digital Electronics and Microprocessors - Anokh singh

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 2.12.2019

1-L1	Decimal, binary, octal
2-L2	hexadecimal number systems
3- L3	Interconversions
4-L4	binary arithmetic-binary addition
5-L5	subtraction-1's and 2's complements
6-L6	BCD codes, ASCII code
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17- L16	, JK Flip-flop, JK master slave Flip-flop
18- L17	D Flip-flop, T Flip-flop 555 timer
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22- L21	Karnaugh map
23- IT-1	**Internal Test-I**
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25- L23	4 Variables
26- L24	____ **-Test Paper distribution and result analysis**
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56- L51	decade counter
57- L52	A/D Counter
58- L53	D/A Counter
59-P4	**College level meeting/ function**
60- L54	Practical work
61- L55	Problems explanation
62- L56	Problems explanation
63- L57	**Revision**
64- L58	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
65- L59	Practical
66- L60	Problems
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68- L61	Revision
69- L62	Revision Test
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	Model Test begins
71-MT	**Model Test**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 27.4.2020

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”

CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Electricity
Course Code	**SMPH31**
Class	II year (2014-2015)
Semester	Odd
Staff Name	Dr. A. Arul Gnanam
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- 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.

Syllabus

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- equip potential 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

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.6.2014
1-L1	Introduction-electric charge
2-L2	coulomb's law-electric field
3- L3	lines of forceelectric flux
4-L4	Gauss's law-applications
5-L5	coulomb's law from Gauss's law
6-L6	electric field at a point due to point charge
7-L7	line charge- spherically symmetric charge
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	distribution-sheet of charge
10- L9	electric potential
11-L10	relation connecting electric field and potential
12-L11	equipotential lines and surfaces

13-L12	potential at a point due to point charge
14-L13	dipole and charged spherical shell
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 30.07.2014
16-L15	electric potential Energy
17-IT-1	**Internal Test-I**
18-L16	UNIT-II: THERMO ELECTRICITY Seebeck effect
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	laws of thermo e.m.f
21- L19	measurement of thermo e.m.f using potentiometer
22- P2	**College level meeting/Cell function**
23-L20	Peltier effect-demonstration
24-L21	Thomson effect
25-L22	demonstration -thermodynamics of thermo couple
26-L23	thermo electric power diagram
27-L24	Usesapplications
28-L25	CHEMICAL EFFECT OF ELECTRIC CURRENT Introduction
29-L26	Faradays laws of electrolysis
30-L27	electrical conductivity of an electrolyte
31-L28	specific conductivity
32-L29	Kohlrausch's bridge method
33-L30	specific conductivity of an electrolyte
34- P3	**Department Seminar**
35-L31	Arrhenius theory of electrolytic dissociation
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 18.08.2014
37- L33	mobility of ions
38- IT-II	**Internal Test-II**
39-L34	Secondary cells- Gibbs
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Helmholtz equation
42- L37	Current and current density
43- L38	ohm's law in vector form
44- P4	**College level meeting/ function**
45-L39	conversion of galvanometer into voltmeter and ammeter-kirchoff's law
46-L40	application to wheat stone's network
47-L41	Growth and decay of current in a circuit containing L and R with d.c.voltages
48-L42	growth and decay of charge in a capacitance ,resistance circuitdetermination
49-L43	growth and decay of charge in LCR circuit-conditions for the discharge to be oscillatory
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 15.09.2014
51 L45	Alternating Current- j operator method –use of j operator in the study of AC

	circuits
52- L46	Capacitance and resistance in series
53-IT-III	**Internal Test-III**
54-L47	LCR series resonance circuit
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins 24.10.2014
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.11.2014

Course Outcomes

Learning Outcomes	**COs** of the course "<Electricity >"
CO1	Analysis of Resistive Circuits and Solution of resistive circuits with independent sources
CO2	Two Terminal Element Relationships for inductors and capacitors and analysis of magnetic
CO3	Analysis of Single Phase AC Circuits, the representation of alternating quantities and determining the power in these circuit
CO4	To acquire the knowledge about the characteristics and working principles of semiconductor diodes, Bipolar Junction Transistor
CO5	To get an insight about the basic introduction of Digital electronics.
CO6	Acquire basic knowledge on the working of various semi-conductor devices
CO7	Develop analysis capability in BJT and FET Amplifier Circuits
CO8	Develop competence in frequency response analysis of discrete amplifiers
CO9	Develop design competence in signal and power amplifiers using BJT and FET
Experimental Learning	
EL1	Design and experiment with various application circuits using diodes
EL2	Design and experiment with various signal and power amplifier circuits using BJTs and FETs
EL3	Design and experiment with various voltage regulation circuits
EL4	Study different meters and instruments for measurement of electronic quantities
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2014 – 2015)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Electricity
Course Code	**SMPH31**
Class	II year (2018-2019)
Semester	Odd
Staff Name	Dr. A. Arul Gnanam
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- 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.

Syllabus

ELECTRICITY
Preamble:
UNIT-1: ELETRIC FIELD AND POTENTIAL
Introduction-electric charge- coulomb's law-electric field-lines of forceelectric 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
See beck 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-kirch off'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

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.6.2014
1-L1	Introduction-electric charge
2-L2	coulomb's law-electric field
3- L3	lines of force electric flux
4-L4	Gauss's law-applications
5-L5	coulomb's law from Gauss's law
6-L6	electric field at a point due to point charge
7-L7	line charge- spherically symmetric charge
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	distribution-sheet of charge
10- L9	electric potential
11-L10	relation connecting electric field and potential
12-L11	equipotential lines and surfaces
13-L12	potential at a point due to point charge
14-L13	dipole and charged spherical shell

15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 30.07.2014
16-L15	electric potential Energy
17-IT-1	**Internal Test-I**
18-L16	UNIT-II: THERMO ELECTRICITY Seebeck effect
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	laws of thermo e.m.f
21- L19	measurement of thermo e.m.f using potentiometer
22- P2	**College level meeting/Cell function**
23-L20	Peltier effect-demonstration
24-L21	Thomson effect
25-L22	demonstration -thermodynamics of thermo couple
26-L23	thermo electric power diagram
27-L24	Uses applications
28-L25	CHEMICAL EFFECT OF ELECTRIC CURRENT Introduction
29-L26	Faradays laws of electrolysis
30-L27	electrical conductivity of an electrolyte
31-L28	specific conductivity
32-L29	Kohlrausch's bridge method
33-L30	specific conductivity of an electrolyte
34- P3	**Department Seminar**
35-L31	Arrhenius theory of electrolytic dissociation
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 18.08 .2014
37- L33	mobility of ions
38- IT-II	**Internal Test-II**
39-L34	Secondary cells- Gibbs
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Helmholtz equation
42- L37	Current and current density
43- L38	ohm's law in vector form
44- P4	**College level meeting/ function**
45-L39	conversion of galvanometer into voltmeter and ammeter-kirchoff's law
46-L40	application to wheat stone's network
47-L41	Growth and decay of current in a circuit containing L and R with d.c.voltages
48-L42	growth and decay of charge in a capacitance ,resistance circuit determination
49-L43	growth and decay of charge in LCR circuit-conditions for the discharge to be oscillatory
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 15.09 .2014
51 L45	Alternating Current- j operator method –use of j operator in the study of AC circuits

52- L46	Capacitance and resistance in series
53-IT-III	**Internal Test-III**
54-L47	LCR series resonance circuit
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins 24.10.2014
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.11.2018

Course Outcomes

Learning Outcomes	**COs** of the course “<Electricity>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Electricity
Course Code	SMPH31
Class	II year (2019-2020)
Semester	Odd
Staff Name	Dr. A. Arul Gnanam
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

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 forceelectric 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 – usesapplications-
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 circuitdetermination
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 resonanceparallel
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

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 17.6.2019
1-L1	Introduction-electric charge
2-L2	coulomb's law-electric field
3- L3	lines of forceelectric flux
4-L4	Gauss's law-applications
5-L5	coulomb's law from Gauss's law
6-L6	electric field at a point due to point charge
7-L7	line charge- spherically symmetric charge
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	distribution-sheet of charge
10- L9	electric potential
11-L10	relation connecting electric field and potential
12-L11	equipotential lines and surfaces
13-L12	potential at a point due to point charge
14-L13	dipole and charged spherical shell
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	electric potential Energy
17-IT-1	**Internal Test-I**
18-L16	UNIT-II: THERMO ELECTRICITY Seebeck effect
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	laws of thermo e.m.f
21- L19	measurement of thermo e.m.f using potentiometer
22- P2	**College level meeting/Cell function**
23-L20	Peltier effect-demonstration
24-L21	Thomson effect

25-L22	demonstration -thermodynamics of thermo couple
26-L23	thermo electric power diagram
27-L24	Usesapplications
28-L25	CHEMICAL EFFECT OF ELECTRIC CURRENT Introduction
29-L26	Faradays laws of electrolysis
30-L27	electrical conductivity of an electrolyte
31-L28	specific conductivity
32-L29	Kohlrausch's bridge method
33-L30	specific conductivity of an electrolyte
34- P3	**Department Seminar**
35-L31	Arrhenius theory of electrolytic dissociation
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	mobility of ions
38- IT-II	**Internal Test-II**
39-L34	Secondary cells- Gibbs
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Helmholtz equation
42- L37	Current and current density
43- L38	ohm's law in vector form
44- P4	**College level meeting/ function**
45-L39	conversion of galvanometer into voltmeter and ammeter-kirchoff's law
46-L40	application to wheat stone's network
47-L41	Growth and decay of current in a circuit containing L and R with d.c.voltages
48-L42	growth and decay of charge in a capacitance ,resistance circuitdetermination
49-L43	growth and decay of charge in LCR circuit-conditions for the discharge to be oscillatory
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Alternating Current- j operator method –use of j operator in the study of AC circuits
52- L46	Capacitance and resistance in series
53-IT-III	**Internal Test-III**
54-L47	LCR series resonance circuit
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins

56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.10.2019

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Electricity and Magnetism
Course Code	GMPH31
Class	II year (2014-2015)
Semester	Odd
Staff Name	Mrs. R. Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

ELECTRICITY AND MAGNETISM
Unit I
Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux – Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux – electric potential – relation connecting electric potential and electric field – potential at a point due to a point charge – potential due to an electric dipole – capacity – capacitance of a spherical and cylindrical
capacitor – energy of a charged capacitor – Loss of energy due to sharing of charges.
Unit II
Chemical Effects of Electric Current: Faraday‘s Laws of Electrolysis – electrical conductivity of an electrolyte – specific conductivity – Kohlrausch bridge – Thermoelectricity –
Seebeck effect – Peltier effect – Thomson effect – total e.m.f – thermodynamics of thermocouple
– thermoelectric power diagram – its uses – applications.

Unit III
Transient Current: Growth and decay of current in a circuit containing resistance and inductance – Growth and decay of charge in a circuit containing resistance and capacitance – Detremination of high resistance by leakage – Growth and decay of charge in a LCR circuit – condition for the discharge to be oscillatory – Frequency of Oscillation.
672
Unit IV
Alternating Current: j operator – properties – use of j operator in the study of A.C Circuit with R only – inductance only – capacitance only – LCR series and parallel circuits – power in
an AC circuit – Wattless current – choke coil – construction and working of AC generator, 1 phase and 3 phase AC generator – distribution of 3 phase AC – star connection – delta connection.
Unit V
Magnetic Properties of Materials: Magnetic induction – Magnetism – Relation between B, H and M – Magnetic susceptibility – Magnetic permeability – Relation between them – Electron theory of dia, para and ferromagnetism – Determination of susceptibility – Curie balance method – Moving coil Ballistic galvanometer – construction – theory – correction for damping in B.G – Measurement of Charge sensitiveness – absolute capacity of a condenser.
Books for Study and reference:
1.Electricity and Magnetism - D.N. Vasudeva
2.Electricity and Magnetism - Brijlal and Subramanian
3.Electricity and Magnetism - R. Murugeshan
4.Electricity and Magnetism - K.K. Tewari
5.Halliday Rhesnick walker Ed 6 Wiley

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.6.2014
1-L1	Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux
2-L2	Coulomb‘s law – electric field – electric dipole – electric flux – electric potential – relation connecting electric potential and electric field
3- L3	potential at a point due to a point charge – potential due to an electric dipole
4-L4	potential due to an electric dipole – capacity
5-L5	capacitance of a spherical and cylindrical
6-L6	capacitor – energy of a charged capacitor – Loss of energy due to sharing of charges
7-L7	Unit II Chemical Effects of Electric Current: Faraday‘s Laws of Electrolysis
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	Electrical conductivity of an electrolyte
10- L9	specific conductivity – Kohlrausch bridge – Thermoelectricity –

11-L10	Seebeck effect – Peltier effect – Thomson effect
12-L11	thermoelectric power diagram – its uses – applications
13-L12	Unit III Transient Current: Growth and decay of current in a circuit
14-L13	Growth and decay of charge in a circuit containing resistance and capacitance
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Detremination of high resistance by leakage –
17-IT-1	Growth and decay of charge in a LCR circuit –**Internal Test-I**
18-L16	Condition for the discharge to be oscillatory – Frequency of Oscillation.
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Alternating Current: j operator – properties
21- L19	properties – use of j operator in the study of A.C Circuit
22- P2	**College level meeting/Cell function**
23-L20	inductance only – capacitance only – LCR series and parallel circuits – power in an AC circuit
24-L21	Wattless current – choke coil
25-L22	construction and working of AC generator, 1
26-L23	phase and 3 phase AC generator
27-L24	distribution of 3 phase AC
28-L25	star connection – delta connection..
29-L26	Magnetic Properties of Materials
30-L27	Magnetic induction – Magnetism –
31-L28	Relation between B, H and M – Magnetic susceptibility
32-L29	Magnetic permeability
33-L30	Relation between them Electron theory of dia, para and ferromagnetism
34- P3	**Department Seminar**
35-L31	Determination of susceptibility
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Curie balance method
38- IT-II	**Internal Test-II**
39-L34	Moving coil Ballistic galvanometer
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Moving coil Ballistic galvanometer – construction
42- L37	theory – correction for
43- L38	correction for damping in B.G
44- P4	**College level meeting/ function**
45-L39	Measurement of Charge sensitiveness
46-L40	absolute capacity of a condenser
47-L41	Solving Problems
48-L42	Curie balance method explanation
49-L43	Determination of susceptibility
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Practical explanation

52- L46	Measurement of Charge sensitiveness
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2014

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Electricity and Magnetism
Course Code	GMPH31
Class	II year (2015-2016)
Semester	Odd
Staff Name	Mrs. R. Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

ELECTRICITY AND MAGNETISM
Unit I
Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux – Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux – electric potential – relation connecting electric potential and electric field – potential at a point due to a point charge – potential due to an electric dipole – capacity – capacitance of a spherical and cylindrical
capacitor – energy of a charged capacitor – Loss of energy due to sharing of charges.
Unit II
Chemical Effects of Electric Current: Faraday‘s Laws of Electrolysis – electrical conductivity of an electrolyte – specific conductivity – Kohlrausch bridge – Thermoelectricity –
Seebeck effect – Peltier effect – Thomson effect – total e.m.f – thermodynamics of thermocouple
– thermoelectric power diagram – its uses – applications.

Unit III
Transient Current: Growth and decay of current in a circuit containing resistance and inductance – Growth and decay of charge in a circuit containing resistance and capacitance – Detremination of high resistance by leakage – Growth and decay of charge in a LCR circuit – condition for the discharge to be oscillatory – Frequency of Oscillation.
672
Unit IV
Alternating Current: j operator – properties – use of j operator in the study of A.C Circuit with R only – inductance only – capacitance only – LCR series and parallel circuits – power in
an AC circuit – Wattless current – choke coil – construction and working of AC generator, 1 phase and 3 phase AC generator – distribution of 3 phase AC – star connection – delta connection.
Unit V
Magnetic Properties of Materials: Magnetic induction – Magnetism – Relation between B, H and M – Magnetic susceptibility – Magnetic permeability – Relation between them – Electron theory of dia, para and ferromagnetism – Determination of susceptibility – Curie balance method – Moving coil Ballistic galvanometer – construction – theory – correction for damping in B.G – Measurement of Charge sensitiveness – absolute capacity of a condenser.
Books for Study and reference:
1.Electricity and Magnetism - D.N. Vasudeva
2.Electricity and Magnetism - Brijlal and Subramanian
3.Electricity and Magnetism - R. Murugeshan
4.Electricity and Magnetism - K.K. Tewari
5.Halliday Rhesnick walker Ed 6 Wiley

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.6.2015
1-L1	Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux
2-L2	Coulomb‘s law – electric field – electric dipole – electric flux – electric potential – relation connecting electric potential and electric field
3- L3	potential at a point due to a point charge – potential due to an electric dipole
4-L4	potential due to an electric dipole – capacity
5-L5	capacitance of a spherical and cylindrical
6-L6	capacitor – energy of a charged capacitor – Loss of energy due to sharing of charges
7-L7	Unit II Chemical Effects of Electric Current: Faraday‘s Laws of Electrolysis
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	Electrical conductivity of an electrolyte
10- L9	specific conductivity – Kohlrausch bridge – Thermoelectricity –

11-L10	Seebeck effect – Peltier effect – Thomson effect
12-L11	– thermoelectric power diagram – its uses – applications
13-L12	Unit III Transient Current: Growth and decay of current in a circuit
14-L13	– Growth and decay of charge in a circuit containing resistance and capacitance
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Detremination of high resistance by leakage –
17-IT-1	Growth and decay of charge in a LCR circuit – **Internal Test-I**
18-L16	condition for the discharge to be oscillatory – Frequency of Oscillation.
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Alternating Current: j operator – properties
21- L19	– properties – use of j operator in the study of A.C Circuit
22- P2	**College level meeting/Cell function**
23-L20	– inductance only – capacitance only – LCR series and parallel circuits – power in an AC circuit
24-L21	Wattless current – choke coil
25-L22	construction and working of AC generator, 1
26-L23	phase and 3 phase AC generator
27-L24	– distribution of 3 phase AC
28-L25	– star connection – delta connection..
29-L26	Magnetic Properties of Materials
30-L27	Magnetic induction – Magnetism –
31-L28	Relation between B, H and M – Magnetic susceptibility
32-L29	Magnetic permeability
33-L30	Relation between them Electron theory of dia, para and ferromagnetism
34- P3	**Department Seminar**
35-L31	Determination of susceptibility
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Curie balance method
38- IT-II	**Internal Test-II**
39-L34	Moving coil Ballistic galvanometer
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Moving coil Ballistic galvanometer – construction
42- L37	theory – correction for
43- L38	correction for damping in B.G
44- P4	**College level meeting/ function**
45-L39	Measurement of Charge sensitiveness
46-L40	absolute capacity of a condenser
47-L41	Solving Problems
48-L42	Curie balance method explanation

49-L43	Determination of susceptibility
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Practical explanation
52- L46	Measurement of Charge sensitiveness
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 29.10.2015

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Electricity and Magnetism
Course Code	GMPH31
Class	II year (2016-2017)
Semester	Odd
Staff Name	Mrs. R. Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

ELECTRICITY AND MAGNETISM
Unit I
Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux – Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux – electric potential – relation connecting electric potential and electric field – potential at a point due to a point charge – potential due to an electric dipole – capacity – capacitance of a spherical and cylindrical
capacitor – energy of a charged capacitor – Loss of energy due to sharing of charges.
Unit II
Chemical Effects of Electric Current: Faraday‘s Laws of Electrolysis – electrical conductivity of an electrolyte – specific conductivity – Kohlrausch bridge – Thermoelectricity –
Seebeck effect – Peltier effect – Thomson effect – total e.m.f – thermodynamics of thermocouple
– thermoelectric power diagram – its uses – applications.

Unit III
Transient Current: Growth and decay of current in a circuit containing resistance and inductance – Growth and decay of charge in a circuit containing resistance and capacitance – Detremination of high resistance by leakage – Growth and decay of charge in a LCR circuit – condition for the discharge to be oscillatory – Frequency of Oscillation.
672
Unit IV
Alternating Current: j operator – properties – use of j operator in the study of A.C Circuit with R only – inductance only – capacitance only – LCR series and parallel circuits – power in
an AC circuit – Wattless current – choke coil – construction and working of AC generator, 1 phase and 3 phase AC generator – distribution of 3 phase AC – star connection – delta connection.
Unit V
Magnetic Properties of Materials: Magnetic induction – Magnetism – Relation between B, H and M – Magnetic susceptibility – Magnetic permeability – Relation between them – Electron theory of dia, para and ferromagnetism – Determination of susceptibility – Curie balance method – Moving coil Ballistic galvanometer – construction – theory – correction for damping in B.G – Measurement of Charge sensitiveness – absolute capacity of a condenser.
Books for Study and reference:
1.Electricity and Magnetism - D.N. Vasudeva
2.Electricity and Magnetism - Brijlal and Subramanian
3.Electricity and Magnetism - R. Murugeshan
4.Electricity and Magnetism - K.K. Tewari
5.Halliday Rhesnick walker Ed 6 Wiley

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 16.6.2016
1-L1	Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux
2-L2	Coulomb‘s law – electric field – electric dipole – electric flux – electric potential – relation connecting electric potential and electric field
3- L3	potential at a point due to a point charge – potential due to an electric dipole
4-L4	potential due to an electric dipole – capacity
5-L5	capacitance of a spherical and cylindrical
6-L6	capacitor – energy of a charged capacitor – Loss of energy due to sharing of charges
7-L7	Unit II Chemical Effects of Electric Current: Faraday‘s Laws of Electrolysis
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	Electrical conductivity of an electrolyte
10- L9	specific conductivity – Kohlrausch bridge – Thermoelectricity –

11-L10	Seebeck effect – Peltier effect – Thomson effect
12-L11	– thermoelectric power diagram – its uses – applications
13-L12	Unit III Transient Current: Growth and decay of current in a circuit
14-L13	– Growth and decay of charge in a circuit containing resistance and capacitance
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Detremination of high resistance by leakage –
17-IT-1	Growth and decay of charge in a LCR circuit – **Internal Test-I**
18-L16	condition for the discharge to be oscillatory – Frequency of Oscillation.
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Alternating Current: j operator – properties
21- L19	– properties – use of j operator in the study of A.C Circuit
22- P2	**College level meeting/Cell function**
23-L20	– inductance only – capacitance only – LCR series and parallel circuits – power in an AC circuit
24-L21	Wattless current – choke coil
25-L22	construction and working of AC generator, 1
26-L23	phase and 3 phase AC generator
27-L24	– distribution of 3 phase AC
28-L25	– star connection – delta connection..
29-L26	Magnetic Properties of Materials
30-L27	Magnetic induction – Magnetism –
31-L28	Relation between B, H and M – Magnetic susceptibility
32-L29	Magnetic permeability
33-L30	Relation between them Electron theory of dia, para and ferromagnetism
34- P3	**Department Seminar**
35-L31	Determination of susceptibility
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Curie balance method
38- IT-II	**Internal Test-II**
39-L34	Moving coil Ballistic galvanometer
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Moving coil Ballistic galvanometer – construction
42- L37	theory – correction for
43- L38	correction for damping in B.G
44- P4	**College level meeting/ function**
45-L39	Measurement of Charge sensitiveness
46-L40	absolute capacity of a condenser
47-L41	Solving Problems
48-L42	Curie balance method explanation

49-L43	Determination of susceptibility
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Practical explanation
52- L46	Measurement of Charge sensitiveness
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.11.2016

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Electromagnetism
Course Code	SMPH41
Class	II year (2018-2019)
Semester	Even
Staff Name	Dr.A.Arul Gnanam
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

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 couplingenergy
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 currentamperes

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 thempermeability 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.)

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on03.12.2018
1-L1	UNIT-1: ELECTROMAGNETIC INDUCTION Faraday's laws of electromagnetic induction
2-L2	self induction- self inductance of a toroidal solenoid
3- L3	self inductance of a long solenoid
4-L4	determination of L by Anderson's and Rayleigh's methods
5-L5	Owen's bridge
6-L6	mutual induction- experimental determination of mutual inductance between a pair of coils using BG
7-L7	co efficient of coupling energy stored in a coil
8- P1	**Welcoming of First year and Inauguration of Mathematics Association**
9- L8	eddy currents-uses
10- L9	Magnetic flux and magnetic induction
11-L10	relation between them- Biot Savart law
12-L11	magnetic induction at a point on the axis of a circular coil carrying current

13-L12	Amperes circuital law
14-L13	magnetic field inside a long solenoid -toroid
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Lorent'z force on a moving charge- direction of force
17-IT-1	**Internal Test-I**
18-L16	Moving coil Ballistic galvanometer-theory
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	De sauty bridge
21- L19	torque on a current loop in a uniform magnetic field
22- P2	**College level meeting/Cell function**
23-L20	MAGNETIC FIELDS AND MAXWELL'S EQUATION
24-L21	relation between thempermeability and susceptibility
25-L22	Hertz experiment for production and detection of EM waves.
26-L23	Wave equations for Electric field and Magnetic field
27-L24	EM waves in a matter
28-L25	Reflection and Transmission at normal incidence and oblique incidence
29-L26	The three magnetic vectors M, B, and H
30-L27	relation between them
31-L28	Hysteresis-Energy loss
32-L29	Maxwell's equations-Boundary conditions-Poynting vector
33-L30	Electromagnetic waves in free space
34- P3	**Department Seminar**
35-L31	monochromatic plane waves
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	B-H curve
38- IT-II	**Internal Test-II**
39-L34	Polarization by reflection
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Displacement current
42- L37	experiment to find charge sensitivity and absolute capacity of a capacitor
43- L38	experiment to find charge sensitivity and absolute capacity of a capacitor
44- P4	**College level meeting/ function**
45-L39	Class test
46-L40	measurement of horizontal component of Earth's Magnetic field
47-L41	calibration of BG
48-L42	induction coil and uses
49-L43	UNIT-V: APPLICATIONS OF ELECTROMAGNETISM

50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Earth inductor-uses of Earth inductor
52- L46	measurement of vertical component of Earth's Magnetic field
53-IT-III	**Internal Test-III**
54-L47	measurement of intense magnetic field using search coil and BG
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	component of the Earth's magnetic field
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on23.04.2019

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Electromagnetism
Course Code	SMPH41
Class	II year (2019-2020)
Semester	Even
Staff Name	Dr.A.Arul Gnanam
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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-
-

Syllabus

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 couplingenergy
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 currentamperes

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 thempermeability 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.)

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on02.12.2019
1-L1	UNIT-1: ELECTROMAGNETIC INDUCTION Faraday’s laws of electromagnetic induction
2-L2	self induction- self inductance of a toroidal solenoid
3- L3	self inductance of a long solenoid
4-L4	determination of L by Anderson’s and Rayleigh’s methods
5-L5	Owen’s bridge
6-L6	mutual induction- experimental determination of mutual inductance between a pair of coils using BG
7-L7	co efficient of coupling energy stored in a coil
8- P1	**Welcoming of First year and Inauguration of Mathematics Association**
9- L8	eddy currents-uses
10- L9	Magnetic flux and magnetic induction
11-L10	relation between them- Biot Savart law
12-L11	magnetic induction at a point on the axis of a circular coil carrying current

13-L12	Amperes circuital law
14-L13	magnetic field inside a long solenoid -toroid
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Lorent'z force on a moving charge- direction of force
17-IT-1	**Internal Test-I**
18-L16	Moving coil Ballistic galvanometer-theory
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	De sauty bridge
21- L19	torque on a current loop in a uniform magnetic field
22- P2	**College level meeting/Cell function**
23-L20	MAGNETIC FIELDS AND MAXWELL'S EQUATION
24-L21	relation between thempermeability and susceptibility
25-L22	Hertz experiment for production and detection of EM waves.
26-L23	Wave equations for Electric field and Magnetic field
27-L24	EM waves in a matter
28-L25	Reflection and Transmission at normal incidence and oblique incidence
29-L26	The three magnetic vectors M, B, and H
30-L27	relation between them
31-L28	Hysteresis-Energy loss
32-L29	Maxwell's equations-Boundary conditions-Poynting vector
33-L30	Electromagnetic waves in free space
34- P3	**Department Seminar**
35-L31	monochromatic plane waves
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	B-H curve
38- IT-II	**Internal Test-II**
39-L34	Polarization by reflection
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Displacement current
42- L37	experiment to find charge sensitivity and absolute capacity of a capacitor
43- L38	experiment to find charge sensitivity and absolute capacity of a capacitor
44- P4	**College level meeting/ function**
45-L39	Class test
46-L40	measurement of horizontal component of Earth's Magnetic field
47-L41	calibration of BG
48-L42	induction coil and uses
49-L43	UNIT-V: APPLICATIONS OF ELECTROMAGNETISM

50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Earth inductor-uses of Earth inductor
52- L46	measurement of vertical component of Earth's Magnetic field
53-IT-III	**Internal Test-III**
54-L47	measurement of intense magnetic field using search coil and BG
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	component of the Earth's magnetic field
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on27.04.2020

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Energy Physics
Course Code	JMPH6B
Class	III year (2018 – 2019)
Semester	Even
Staff Name	Mr.A.Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

ENERGY PHYSICS
(Major Elective Paper)

Unit I

Conventional Energy Sources: World's reserve of commercial energy sources and their availability - various forms of energy - renewable and conventional energy systems - comparison
- coal, oil and natural gas - availability - statistical details - applications - merits and demerits.
Nuclear energy – merits and demerits

Unit II

Non-Conventional Energy Sources: Renewable energy sources - solar energy - nature of solar radiation - components - solar heaters - crop dryers - space cooling - solar ponds, solar cookers - water desalination - photovoltaic generation basics - merits and demerits of solar energy.

Unit III
Biomass energy: Biomass energy - classification - photosynthesis - biomass conversion process - gobar gas plants - wood gasification - ethanol from wood - advantages and disadvantages of biomass as energy source

Unit IV
Geothermal energy - wind energy - ocean thermal energy conversion (OTEC) - energy from waves and tides (Basic ideas, nature, applications, merits and demerits of these).

Unit V
Impacts of Conventional Energy: Energy crisis and possible solutions - energy options for the developing countries - energy storage and hydrogen as a fuel(basics) - impact due to conventional energy sources – Thermal, Hydel , Nuclear - global warming- ecological damage -
Nuclear pollution (leaks, accidents, nuclear waste disposal).

Text Books:
1. Solar Energy by G.D. Rai, Ed. V, 1995.
2. Solar energy by S.P. Sukhatme, Tata McGraw-Hill Publishing Company, Ed. II, 1997.
Reference Books:
1 Non Conventional Energy Sources, G.D. Rai, 4th Edition, 1997.
2 Energy Technology by S. Rao and Dr. B.B. Parulekar 2nd Edition, 1997.
3 Power Plant technology by A.K. Wahil 1993
4 Renewable Energy: Power for a sustainable Future by Godfery Boyle, Alden Oess Ltd., Oxford, 1996.
5 Energy models for 2000 and beyond by Jyoti Parikh, Tata McGraw Hill Publishing Company, New Delhi, 1997.

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 03.12.2018
1-L1	World's reserve of commercial energy sources and their availability
2-L2	various forms of energy
3- L3	renewable and conventional energy systems
4-L4	Class Test
5-L5	Comparison - coal, oil and natural gas
6-L6	availability - statistical details
7-L7	applications
8- P1	**Welcoming of First year and Inauguration of Mathematics Association**
9- L8	merits and demerits
10- L9	Class Test
11-L10	Nuclear energy
12-L11	merits and demerits

13-L12	Renewable energy sources
14-L13	nature of solar radiation
15-L14	____ - **Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	components - solar heaters
17-IT-1	**Internal Test-I**
18-L16	crop dryers - space cooling
19-L17	____ **-Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Class Test
21- L19	Solar cookers
22- P2	**College level meeting/Cell function**
23-L20	water desalination
24-L21	photovoltaic generation basics
25-L22	merits and demerits of solar energy
26-L23	Class Test
27-L24	Biomass energy
28-L25	classification – photosynthesis
29-L26	biomass conversion process
30-L27	Class Test
31-L28	gobar gas plants - wood gasification
32-L29	ethanol from wood
33-L30	advantages and disadvantages of biomass as energy source
34- P3	**Department Seminar**
35-L31	Class Test
36-L32	____ - **Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Geothermal energy
38- IT-II	**Internal Test-II**
39-L34	wind energy
40-L35	____ **-Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	ocean thermal energy conversion (OTEC)
42- L37	Class Test
43- L38	Energy from waves and tides
44- P4	**College level meeting/ function**
45-L39	Basic ideas, nature, applications, merits and demerits of these
46-L40	Class Test
47-L41	Energy crisis and possible solutions
48-L42	energy options for the developing countries
49-L43	energy storage and hydrogen as a fuel(basics)
50-L44	____ - **Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	impact due to conventional energy sources
52- L46	Thermal, Hydel , Nuclear - global warming- ecological damage
53-IT-III	**Internal Test-III**
54-L47	Nuclear pollution (leaks, accidents, nuclear waste disposal).
55-L48	____ **- Test Paper distribution and result analysis**

	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2019

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Energy Physics
Course Code	SMPH6B
Class	III year (2019– 2020)
Semester	Even
Staff Name	Mr.A.Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- ➢
- ➢
- ➢
- ➢

Syllabus

ENERGY PHYSICS
(Major Elective Paper)

Unit I

Conventional Energy Sources: World's reserve of commercial energy sources and their availability - various forms of energy - renewable and conventional energy systems - comparison
- coal, oil and natural gas - availability - statistical details - applications - merits and demerits.
Nuclear energy – merits and demerits
Unit II
Non-Conventional Energy Sources: Renewable energy sources - solar energy - nature of solar radiation - components - solar heaters - crop dryers - space cooling - solar ponds, solar cookers - water desalination - photovoltaic generation basics - merits and demerits of solar energy.

Unit III
Biomass energy: Biomass energy - classification - photosynthesis - biomass conversion process - gobar gas plants - wood gasification - ethanol from wood - advantages and disadvantages of biomass as energy source

Unit IV
Geothermal energy - wind energy - ocean thermal energy conversion (OTEC) - energy from waves and tides (Basic ideas, nature, applications, merits and demerits of these).

Unit V
Impacts of Conventional Energy: Energy crisis and possible solutions - energy options for the developing countries - energy storage and hydrogen as a fuel(basics) - impact due to conventional energy sources – Thermal, Hydel , Nuclear - global warming- ecological damage -
Nuclear pollution (leaks, accidents, nuclear waste disposal).

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1. Solar Energy by G.D. Rai, Ed. V, 1995.
2. Solar energy by S.P. Sukhatme, Tata McGraw-Hill Publishing Company, Ed. II, 1997.
Reference Books:
1 Non Conventional Energy Sources, G.D. Rai, 4th Edition, 1997.
2 Energy Technology by S. Rao and Dr. B.B. Parulekar 2nd Edition, 1997.
3 Power Plant technology by A.K. Wahil 1993
4 Renewable Energy: Power for a sustainable Future by Godfery Boyle, Alden Oess Ltd., Oxford, 1996.
5 Energy models for 2000 and beyond by Jyoti Parikh, Tata McGraw Hill Publishing Company, New Delhi, 1997.

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 02.12.2019
1-L1	World's reserve of commercial energy sources and their availability
2-L2	various forms of energy
3- L3	renewable and conventional energy systems
4-L4	Class Test
5-L5	Comparison - coal, oil and natural gas
6-L6	availability - statistical details
7-L7	applications
8- P1	**Welcoming of First year and Inauguration of Mathematics Association**
9- L8	merits and demerits
10- L9	Class Test
11-L10	Nuclear energy
12-L11	merits and demerits
13-L12	Renewable energy sources
14-L13	nature of solar radiation
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins

16-L15	components - solar heaters
17-IT-1	**Internal Test-I**
18-L16	crop dryers - space cooling
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Class Test
21- L19	Solar cookers
22- P2	**College level meeting/Cell function**
23-L20	water desalination
24-L21	photovoltaic generation basics
25-L22	merits and demerits of solar energy
26-L23	Class Test
27-L24	Biomass energy
28-L25	classification – photosynthesis
29-L26	biomass conversion process
30-L27	Class Test
31-L28	gobar gas plants - wood gasification
32-L29	ethanol from wood
33-L30	advantages and disadvantages of biomass as energy source
34- P3	**Department Seminar**
35-L31	Class Test
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Geothermal energy
38- IT-II	**Internal Test-II**
39-L34	wind energy
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	ocean thermal energy conversion (OTEC)
42- L37	Class Test
43- L38	Energy from waves and tides
44- P4	**College level meeting/ function**
45-L39	Basic ideas, nature, applications, merits and demerits of these
46-L40	Class Test
47-L41	Energy crisis and possible solutions
48-L42	energy options for the developing countries
49-L43	energy storage and hydrogen as a fuel(basics)
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	impact due to conventional energy sources
52- L46	Thermal, Hydel , Nuclear - global warming- ecological damage
53-IT-III	**Internal Test-III**
54-L47	Nuclear pollution (leaks, accidents, nuclear waste disposal).
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**

58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 27.04.2020

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Energy Physics
Course Code	GNPH3B
Class	II year (2014-2015)
Semester	Odd
Staff Name	Mrs.D.Priscilla Koilpillai Mrs.R.Nithya Agnes
Credits	2
L. Hours /P. Hours	2 / WK
Total 30Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 20 Hrs (5 units; 5×4=20; 4Hrs /unit)	

Course Objectives

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-
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Syllabus

ENERGY PHYSICS
(Major Elective Paper)
Unit I
Conventional Energy Sources: World's reserve of commercial energy sources and their availability - various forms of energy - renewable and conventional energy systems - comparison
- coal, oil and natural gas - availability - statistical details - applications - merits and demerits.
Nuclear energy – merits and demerits
Unit II
Non-Conventional Energy Sources: Renewable energy sources - solar energy - nature of solar radiation - components - solar heaters - crop dryers - space cooling - solar ponds, solar cookers - water desalination - photovoltaic generation basics - merits and demerits of solar energy.
Unit III
Biomass energy: Biomass energy - classification - photosynthesis - biomass conversion

process - gobar gas plants - wood gasification - ethanol from wood - advantages and disadvantages of biomass as energy source

Unit IV

Geothermal energy - wind energy - ocean thermal energy conversion (OTEC) - energy from waves and tides (Basic ideas, nature, applications, merits and demerits of these).

Unit V

Impacts of Conventional Energy: Energy crisis and possible solutions - energy options for the developing countries - energy storage and hydrogen as a fuel(basics) - impact due to conventional energy sources – Thermal, Hydel , Nuclear - global warming- ecological damage -

Nuclear pollution (leaks,accidents, nuclear waste disposal).

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2014
1-L1	Unit I:Conventional Energy Sources: World's reserve of commercial energy sources and their availability
2-L2	various forms of energy
3- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
4-L3	renewable and conventional energy systems - comparison- coal, oil and natural gas
5-L4	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
6-IT-I	**Internal Test-I**
7-L5	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
8-L6	availability - statistical details - applications - merits and demerits
9-L7	Nuclear energy – merits and demerits Unit II Non-Conventional Energy Sources: Renewable energy sources - solar energy - nature of solar radiation - components
10-P2	**College level meeting/Cell function**
11-L8	solar heaters - crop dryers - space cooling - solar ponds, solar cookers - water desalination - photovoltaic generation basics - merits and demerits of solar energy.
12-L9	Unit III Biomass energy: Biomass energy - classification - photosynthesis - biomass conversion process - gobar gas plants - wood gasification - ethanol from wood
13-P3	**Department Seminar**
14-L10	advantages and disadvantages of biomass as energy source
15-L11	Unit IV Geothermal energy - wind energy - ocean thermal energy conversion (OTEC) – energy from waves and tides (Basic ideas, nature, applications, merits and demerits ofthese).
16-L12	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins

17-IT-1	**Internal Test-II**
18-L13	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
19-L14	Unit V Impacts of Conventional Energy: Energy crisis and possible solutions - energy options for the developing countries - energy storage and hydrogen as a fuel(basics) - impact due to conventional energy source
20- P2	**College level meeting/ function**
21-L15	Thermal, Hydel , Nuclear - global warming- ecological damage
22-L16	Nuclear pollution (leaks,accidents, nuclear waste disposal).
23- L17	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
24- IT-III	**Internal Test-III**
25-L18	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
26-MT	**Model Test**
27-MT	**Model Test**
28-MT	**Model Test**
29-L19	**Model test paper distribution and previous year university question paper discussion**
30-L20	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2014

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Energy Physics
Course Code	GNPH3B
Class	II year (2015-2016)
Semester	Odd
Staff Name	Mrs.D.Priscilla Koilpillai Mrs.R.Nithya Agnes
Credits	2
L. Hours /P. Hours	2 / WK
Total 30Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 20 Hrs (5 units; 5×4=20; 4Hrs /unit)	

Course Objectives

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Syllabus

ENERGY PHYSICS
(Major Elective Paper)
Unit I
Conventional Energy Sources: World's reserve of commercial energy sources and their availability - various forms of energy - renewable and conventional energy systems - comparison
- coal, oil and natural gas - availability - statistical details - applications - merits and demerits.
Nuclear energy – merits and demerits
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Unit III
Biomass energy: Biomass energy - classification - photosynthesis - biomass conversion

process - gobar gas plants - wood gasification - ethanol from wood - advantages and disadvantages of biomass as energy source

Unit IV

Geothermal energy - wind energy - ocean thermal energy conversion (OTEC) - energy from waves and tides (Basic ideas, nature, applications, merits and demerits of these).

Unit V

Impacts of Conventional Energy: Energy crisis and possible solutions - energy options for the developing countries - energy storage and hydrogen as a fuel(basics) - impact due to conventional energy sources – Thermal, Hydel , Nuclear - global warming- ecological damage -

Nuclear pollution (leaks,accidents, nuclear waste disposal).

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2015
1-L1	Unit I:Conventional Energy Sources: World's reserve of commercial energy sources and their availability
2-L2	various forms of energy
3- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
4-L3	renewable and conventional energy systems - comparison- coal, oil and natural gas
5-L4	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
6-IT-I	**Internal Test-I**
7-L5	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
8-L6	availability - statistical details - applications - merits and demerits
9-L7	Nuclear energy – merits and demerits Unit II Non-Conventional Energy Sources: Renewable energy sources - solar energy - nature of solar radiation - components
10-P2	**College level meeting/Cell function**
11-L8	solar heaters - crop dryers - space cooling - solar ponds, solar cookers - water desalination - photovoltaic generation basics - merits and demerits of solar energy.
12-L9	Unit III Biomass energy: Biomass energy - classification - photosynthesis - biomass conversion process - gobar gas plants - wood gasification - ethanol from wood
13-P3	**Department Seminar**
14-L10	advantages and disadvantages of biomass as energy source
15-L11	Unit IV Geothermal energy - wind energy - ocean thermal energy conversion (OTEC) – energy from waves and tides (Basic ideas, nature, applications, merits and demerits ofthese).
16-L12	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins

17-IT-1	**Internal Test-II**
18-L13	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
19-L14	Unit V Impacts of Conventional Energy: Energy crisis and possible solutions - energy options for the developing countries - energy storage and hydrogen as a fuel(basics) - impact due to conventional energy source
20- P2	**College level meeting/ function**
21-L15	Thermal, Hydel , Nuclear - global warming- ecological damage
22-L16	Nuclear pollution (leaks,accidents, nuclear waste disposal).
23- L17	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
24- IT-III	**Internal Test-III**
25-L18	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
26-MT	**Model Test**
27-MT	**Model Test**
28-MT	**Model Test**
29-L19	**Model test paper distribution and previous year university question paper discussion**
30-L20	**Feedback of the Course, analysis and report preparation**
	Last Working day on 29.10.2015

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Energy Physics
Course Code	GNPH3B
Class	II year a(2016-2017)
Semester	Odd
Staff Name	Mrs.D.Priscilla Koilpillai Mrs.R.Nithya Agnes
Credits	2
L. Hours /P. Hours	2 / WK
Total 30Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 20 Hrs (5 units; 5×4=20; 4Hrs /unit)	

Course Objectives

-
-
-

Syllabus

ENERGY PHYSICS
(Major Elective Paper)
Unit I
Conventional Energy Sources: World's reserve of commercial energy sources and their availability - various forms of energy - renewable and conventional energy systems - comparison
- coal, oil and natural gas - availability - statistical details - applications - merits and demerits.
Nuclear energy – merits and demerits
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Unit V

Impacts of Conventional Energy: Energy crisis and possible solutions - energy options for the developing countries - energy storage and hydrogen as a fuel(basics) - impact due to conventional energy sources – Thermal, Hydel , Nuclear - global warming- ecological damage -

Nuclear pollution (leaks,accidents, nuclear waste disposal).

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 16.06.2016
1-L1	Unit I:Conventional Energy Sources: World's reserve of commercial energy sources and their availability
2-L2	various forms of energy
3- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
4-L3	renewable and conventional energy systems - comparison- coal, oil and natural gas
5-L4	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
6-IT-I	**Internal Test-I**
7-L5	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
8-L6	availability - statistical details - applications - merits and demerits
9-L7	Nuclear energy – merits and demerits Unit II Non-Conventional Energy Sources: Renewable energy sources - solar energy - nature of solar radiation - components
10-P2	**College level meeting/Cell function**
11-L8	solar heaters - crop dryers - space cooling - solar ponds, solar cookers - water desalination - photovoltaic generation basics - merits and demerits of solar energy.
12-L9	Unit III Biomass energy: Biomass energy - classification - photosynthesis - biomass conversion process - gobar gas plants - wood gasification - ethanol from wood
13-P3	**Department Seminar**
14-L10	advantages and disadvantages of biomass as energy source
15-L11	Unit IV Geothermal energy - wind energy - ocean thermal energy conversion (OTEC) – energy from waves and tides (Basic ideas, nature, applications, merits and demerits ofthese).
16-L12	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins

17-IT-1	**Internal Test-II**
18-L13	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
19-L14	Unit V Impacts of Conventional Energy: Energy crisis and possible solutions - energy options for the developing countries - energy storage and hydrogen as a fuel(basics) - impact due to conventional energy source
20- P2	**College level meeting/ function**
21-L15	Thermal, Hydel , Nuclear - global warming- ecological damage
22-L16	Nuclear pollution (leaks,accidents, nuclear waste disposal).
23- L17	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
24- IT-III	**Internal Test-III**
25-L18	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
26-MT	**Model Test**
27-MT	**Model Test**
28-MT	**Model Test**
29-L19	**Model test paper distribution and previous year university question paper discussion**
30-L20	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.11.2016

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Energy Physics
Course Code	JNPH3B
Class	II year (2017-2018)
Semester	Odd
Staff Name	Mrs.D.Priscilla Koilpillai Mrs.R.Nithya Agnes
Credits	2
L. Hours /P. Hours	2 / WK
Total 30Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 20 Hrs (5 units; 5×4=20; 4Hrs /unit)	

Course Objectives

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Syllabus

ENERGY PHYSICS
(Major Elective Paper)
Unit I
Conventional Energy Sources: World's reserve of commercial energy sources and their availability - various forms of energy - renewable and conventional energy systems - comparison
- coal, oil and natural gas - availability - statistical details - applications - merits and demerits.
Nuclear energy – merits and demerits
Unit II
Non-Conventional Energy Sources: Renewable energy sources - solar energy - nature of solar radiation - components - solar heaters - crop dryers - space cooling - solar ponds, solar cookers - water desalination - photovoltaic generation basics - merits and demerits of solar energy.
Unit III
Biomass energy: Biomass energy - classification - photosynthesis - biomass conversion

process - gobar gas plants - wood gasification - ethanol from wood - advantages and disadvantages of biomass as energy source
Unit IV
Geothermal energy - wind energy - ocean thermal energy conversion (OTEC) - energy from waves and tides (Basic ideas, nature, applications, merits and demerits of these).
Unit V
Impacts of Conventional Energy: Energy crisis and possible solutions - energy options for the developing countries - energy storage and hydrogen as a fuel(basics) - impact due to conventional energy sources – Thermal, Hydel , Nuclear - global warming- ecological damage -
Nuclear pollution (leaks,accidents, nuclear waste disposal).

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 16.06.2017
1-L1	Unit I:Conventional Energy Sources: World's reserve of commercial energy sources and their availability
2-L2	various forms of energy
3- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
4-L3	renewable and conventional energy systems - comparison- coal, oil and natural gas
5-L4	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
6-IT-I	**Internal Test-I**
7-L5	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
8-L6	availability - statistical details - applications - merits and demerits
9-L7	Nuclear energy – merits and demerits Unit II Non-Conventional Energy Sources: Renewable energy sources - solar energy - nature of solar radiation - components
10-P2	**College level meeting/Cell function**
11-L8	solar heaters - crop dryers - space cooling - solar ponds, solar cookers - water desalination - photovoltaic generation basics - merits and demerits of solar energy.
12-L9	Unit III Biomass energy: Biomass energy - classification - photosynthesis - biomass conversion process - gobar gas plants - wood gasification - ethanol from wood
13-P3	**Department Seminar**
14-L10	advantages and disadvantages of biomass as energy source
15-L11	Unit IV Geothermal energy - wind energy - ocean thermal energy conversion (OTEC) – energy from waves and tides (Basic ideas, nature, applications, merits and demerits ofthese).
16-L12	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins

17-IT-1	**Internal Test-II**
18-L13	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
19-L14	Unit V Impacts of Conventional Energy: Energy crisis and possible solutions - energy options for the developing countries - energy storage and hydrogen as a fuel(basics) - impact due to conventional energy source
20- P2	**College level meeting/ function**
21-L15	Thermal, Hydel , Nuclear - global warming- ecological damage
22-L16	Nuclear pollution (leaks,accidents, nuclear waste disposal).
23- L17	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
24- IT-III	**Internal Test-III**
25-L18	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
26-MT	**Model Test**
27-MT	**Model Test**
28-MT	**Model Test**
29-L19	**Model test paper distribution and previous year university question paper discussion**
30-L20	**Feedback of the Course, analysis and report preparation**
	Last Working day on 06.11.2017

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Energy Physics
Course Code	SNPH3B
Class	II year (2018-2019)
Semester	Odd
Staff Name	Mrs.D.Priscilla Koilpillai Mrs.R.Nithya Agnes
Credits	2
L. Hours /P. Hours	2 / WK
Total 30Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 20 Hrs (5 units; 5×4=20; 4Hrs /unit)	

Course Objectives

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-
-

Syllabus

ENERGY PHYSICS
(Major Elective Paper)
Unit I
Conventional Energy Sources: World's reserve of commercial energy sources and their availability - various forms of energy - renewable and conventional energy systems - comparison
- coal, oil and natural gas - availability - statistical details - applications - merits and demerits.
Nuclear energy – merits and demerits
Unit II
Non-Conventional Energy Sources: Renewable energy sources - solar energy - nature of solar radiation - components - solar heaters - crop dryers - space cooling - solar ponds, solar cookers - water desalination - photovoltaic generation basics - merits and demerits of solar energy.
Unit III
Biomass energy: Biomass energy - classification - photosynthesis - biomass conversion

process - gobar gas plants - wood gasification - ethanol from wood - advantages and disadvantages of biomass as energy source
Unit IV
Geothermal energy - wind energy - ocean thermal energy conversion (OTEC) - energy from waves and tides (Basic ideas, nature, applications, merits and demerits of these).
Unit V
Impacts of Conventional Energy: Energy crisis and possible solutions - energy options for the developing countries - energy storage and hydrogen as a fuel(basics) - impact due to conventional energy sources – Thermal, Hydel , Nuclear - global warming- ecological damage -
Nuclear pollution (leaks,accidents, nuclear waste disposal).

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2018
1-L1	Unit I:Conventional Energy Sources: World's reserve of commercial energy sources and their availability
2-L2	various forms of energy
3- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
4-L3	renewable and conventional energy systems - comparison- coal, oil and natural gas
5-L4	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
6-IT-I	**Internal Test-I**
7-L5	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
8-L6	availability - statistical details - applications - merits and demerits
9-L7	Nuclear energy – merits and demerits Unit II Non-Conventional Energy Sources: Renewable energy sources - solar energy - nature of solar radiation - components
10-P2	**College level meeting/Cell function**
11-L8	solar heaters - crop dryers - space cooling - solar ponds, solar cookers - water desalination - photovoltaic generation basics - merits and demerits of solar energy.
12-L9	Unit III Biomass energy: Biomass energy - classification - photosynthesis - biomass conversion process - gobar gas plants - wood gasification - ethanol from wood
13-P3	**Department Seminar**
14-L10	advantages and disadvantages of biomass as energy source
15-L11	Unit IV Geothermal energy - wind energy - ocean thermal energy conversion (OTEC) – energy from waves and tides (Basic ideas, nature, applications, merits and demerits ofthese).
16-L12	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins

17-IT-1	**Internal Test-II**
18-L13	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
19-L14	Unit V Impacts of Conventional Energy: Energy crisis and possible solutions - energy options for the developing countries - energy storage and hydrogen as a fuel(basics) - impact due to conventional energy source
20- P2	**College level meeting/ function**
21-L15	Thermal, Hydel , Nuclear - global warming- ecological damage
22-L16	Nuclear pollution (leaks,accidents, nuclear waste disposal).
23- L17	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
24- IT-III	**Internal Test-III**
25-L18	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
26-MT	**Model Test**
27-MT	**Model Test**
28-MT	**Model Test**
29-L19	**Model test paper distribution and previous year university question paper discussion**
30-L20	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.11.2018

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Energy Physics
Course Code	SNPH3B
Class	II year (2019-2020)
Semester	Odd
Staff Name	Mrs.D.Priscilla Koilpillai
Credits	2
L. Hours /P. Hours	2 / WK
Total 30Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 20 Hrs (5 units; 5×4=20; 4Hrs /unit)	

Course Objectives

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Syllabus

ENERGY PHYSICS
(Major Elective Paper)
Unit I
Conventional Energy Sources: World's reserve of commercial energy sources and their availability - various forms of energy - renewable and conventional energy systems - comparison
- coal, oil and natural gas - availability - statistical details - applications - merits and demerits. Nuclear energy – merits and demerits
Unit II
Non-Conventional Energy Sources: Renewable energy sources - solar energy - nature of solar radiation - components - solar heaters - crop dryers - space cooling - solar ponds, solar cookers - water desalination - photovoltaic generation basics - merits and demerits of solar energy.
Unit III
Biomass energy: Biomass energy - classification - photosynthesis - biomass conversion process - gobar gas plants - wood gasification - ethanol from wood - advantages and

disadvantages of biomass as energy source
Unit IV
Geothermal energy - wind energy - ocean thermal energy conversion (OTEC) - energy from waves and tides (Basic ideas, nature, applications, merits and demerits of these).
Unit V
Impacts of Conventional Energy: Energy crisis and possible solutions - energy options for the developing countries - energy storage and hydrogen as a fuel(basics) - impact due to conventional energy sources – Thermal, Hydel , Nuclear - global warming- ecological damage -
Nuclear pollution (leaks,accidents, nuclear waste disposal).

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 17.06.2019
1-L1	Unit I:Conventional Energy Sources: World's reserve of commercial energy sources and their availability
2-L2	various forms of energy
3- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
4-L3	renewable and conventional energy systems - comparison- coal, oil and natural gas
5-L4	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
6-IT-I	**Internal Test-I**
7-L5	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
8-L6	availability - statistical details - applications - merits and demerits
9-L7	Nuclear energy – merits and demerits Unit II Non-Conventional Energy Sources: Renewable energy sources - solar energy - nature of solar radiation - components
10-P2	**College level meeting/Cell function**
11-L8	solar heaters - crop dryers - space cooling - solar ponds, solar cookers - water desalination - photovoltaic generation basics - merits and demerits of solar energy.
12-L9	Unit III Biomass energy: Biomass energy - classification - photosynthesis - biomass conversion process - gobar gas plants - wood gasification - ethanol from wood
13-P3	**Department Seminar**
14-L10	advantages and disadvantages of biomass as energy source
15-L11	Unit IV Geothermal energy - wind energy - ocean thermal energy conversion (OTEC) – energy from waves and tides (Basic ideas, nature, applications, merits and demerits ofthese).
16-L12	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
17-IT-1	**Internal Test-II**

18-L13	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
19-L14	Unit V Impacts of Conventional Energy: Energy crisis and possible solutions - energy options for the developing countries - energy storage and hydrogen as a fuel(basics) - impact due to conventional energy source
20- P2	**College level meeting/ function**
21-L15	Thermal, Hydel , Nuclear - global warming- ecological damage
22-L16	Nuclear pollution (leaks,accidents, nuclear waste disposal).
23- L17	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
24- IT-III	**Internal Test-III**
25-L18	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
26-MT	**Model Test**
27-MT	**Model Test**
28-MT	**Model Test**
29-L19	**Model test paper distribution and previous year university question paper discussion**
30-L20	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.10.2019

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Energy Physics
Course Code	SNPH3B
Class	II year (2019-2020)
Semester	Odd
Staff Name	Mrs.D.Priscilla Koilpillai
Credits	2
L. Hours /P. Hours	2 / WK
Total 30Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 20 Hrs (5 units; 5×4=20; 4Hrs /unit)	

Course Objectives

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Syllabus

ENERGY PHYSICS
(Major Elective Paper)
Unit I
Conventional Energy Sources: World's reserve of commercial energy sources and their availability - various forms of energy - renewable and conventional energy systems - comparison
- coal, oil and natural gas - availability - statistical details - applications - merits and demerits.
Nuclear energy – merits and demerits
Unit II
Non-Conventional Energy Sources: Renewable energy sources - solar energy - nature of solar radiation - components - solar heaters - crop dryers - space cooling - solar ponds, solar cookers - water desalination - photovoltaic generation basics - merits and demerits of solar energy.
Unit III
Biomass energy: Biomass energy - classification - photosynthesis - biomass conversion process - gobar gas plants - wood gasification - ethanol from wood - advantages and

disadvantages of biomass as energy source
Unit IV
Geothermal energy - wind energy - ocean thermal energy conversion (OTEC) - energy from waves and tides (Basic ideas, nature, applications, merits and demerits of these).
Unit V
Impacts of Conventional Energy: Energy crisis and possible solutions - energy options for the developing countries - energy storage and hydrogen as a fuel(basics) - impact due to conventional energy sources – Thermal, Hydel , Nuclear - global warming- ecological damage -
Nuclear pollution (leaks,accidents, nuclear waste disposal).

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 17.06.2019
1-L1	Unit I:Conventional Energy Sources: World's reserve of commercial energy sources and their availability
2-L2	various forms of energy
3- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
4-L3	renewable and conventional energy systems - comparison- coal, oil and natural gas
5-L4	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
6-IT-I	**Internal Test-I**
7-L5	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
8-L6	availability - statistical details - applications - merits and demerits
9-L7	Nuclear energy – merits and demerits Unit II Non-Conventional Energy Sources: Renewable energy sources - solar energy - nature of solar radiation - components
10-P2	**College level meeting/Cell function**
11-L8	solar heaters - crop dryers - space cooling - solar ponds, solar cookers - water desalination - photovoltaic generation basics - merits and demerits of solar energy.
12-L9	Unit III Biomass energy: Biomass energy - classification - photosynthesis - biomass conversion process - gobar gas plants - wood gasification - ethanol from wood
13-P3	**Department Seminar**
14-L10	advantages and disadvantages of biomass as energy source
15-L11	Unit IV Geothermal energy - wind energy - ocean thermal energy conversion (OTEC) – energy from waves and tides (Basic ideas, nature, applications, merits and demerits ofthese).
16-L12	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
17-IT-1	**Internal Test-II**

18-L13	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
19-L14	Unit V Impacts of Conventional Energy: Energy crisis and possible solutions - energy options for the developing countries - energy storage and hydrogen as a fuel(basics) - impact due to conventional energy source
20- P2	**College level meeting/ function**
21-L15	Thermal, Hydel , Nuclear - global warming- ecological damage
22-L16	Nuclear pollution (leaks,accidents, nuclear waste disposal).
23- L17	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
24- IT-III	**Internal Test-III**
25-L18	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
26-MT	**Model Test**
27-MT	**Model Test**
28-MT	**Model Test**
29-L19	**Model test paper distribution and previous year university question paper discussion**
30-L20	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.10.2019

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Maintanance of electronic equipments
Course Code	JSPH4A
Class	II year (2017-2018)
Semester	Even
Staff Name	Mrs.P.Justina Angeline
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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-

Syllabus

MAINTANANCE OF 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 shutteraperture-flash photography-filters-battery-tele and wide angle lens

Digital formats-data transfer to computer-ISO speed-resolution(11L)

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on07.12.2017
1-L1	**UNIT-I: ELECTRONIC COMPONENTS** Study of electronic components
2-L2	star and delta connection of resistors
3- L3	wattage rating-potential divider arrangement
4-L4	capacitors - type -characteristics -–working voltage
5-L5	resistors - types - characteristics – colour coding
6-L6	soldering and desoldering techniques
7-L7	Groove board,bread board
8- P1	**Welcoming of First year and Inauguration of Mathematics Association**
9- L8	Practical uses of Multimeter (analog and digital)
10- L9	measurement of voltage, frequency and phase
11-L10	waveforms and Lissajoue’s figures
12-L11	CRO - Block Diagram
13-L12	Digital Storage Oscilloscopes
14-L13	LCD display for instruments
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins

16-L15	A/F and R/F oscillators
17-IT-1	**Internal Test-I**
18-L16	printed circuit board
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Classification of transducers
21- L19	active and passive transducers, resistive (Potentiometer-Theory, temperature compensation &applications
22- P2	**College level meeting/Cell function**
23-L20	Capacitive (variable air gap type),
24-L21	Inductive (LVDT) &piezoelectric transducers.
25-L22	Measurement of temperature (RTD, semiconductor IC sensors)
26-L23	Light transducers
27-L24	Basic concepts of radio transmitter and receiver
28-L25	TV antennas
29-L26	Dipole antenna - Folded dipole
30-L27	Yagi antenna
31-L28	Dish antenna
32-L29	Mobile communication system
33-L30	MODEM.
34- P3	**Department Seminar**
35-L31	Telephone systems
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	cellular Telephone systems
38- IT-II	**Internal Test-II**
39-L34	mobile phone-principle of operation
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	integrated services
42- L37	digital networks(ISDN)
43- L38	Yagi antenna design
44- P4	**College level meeting/ function**
45-L39	resonance antennas and their characteristics
46-L40	basic requirements/characteristics of Transducers
47-L41	DTH system
48-L42	(photo resistors & photovoltaic cells).
49-L43	Class test
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**UNIT-V: Photography** Introduction to cameras-parts of camera and accessories
52- L46	lens shutteraperture
53-IT-III	**Internal Test-III**

54-L47	flash photography-filters-battery
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	tele and wide angle lens Digital formats-data transfer to computer- ISO speed-resolution
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on23.04.2018

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Maintanance of electronic appliances
Course Code	SSPH4A
Class	II year (2018-2019)
Semester	Even
Staff Name	Mrs.P.Justina Angeline
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

MAINTANANCE OF 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 shutteraperture-flash photography-filters-battery-tele and wide angle lens

Digital formats-data transfer to computer-ISO speed-resolution(11L)

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on03.12.2018
1-L1	**UNIT-I: ELECTRONIC COMPONENTS** Study of electronic components
2-L2	star and delta connection of resistors
3- L3	wattage rating-potential divider arrangement
4-L4	capacitors - type -characteristics -–working voltage
5-L5	resistors - types - characteristics – colour coding
6-L6	soldering and desoldering techniques
7-L7	Groove board,bread board
8- P1	**Welcoming of First year and Inauguration of Mathematics Association**
9- L8	Practical uses of Multimeter (analog and digital)
10- L9	measurement of voltage, frequency and phase
11-L10	waveforms and Lissajoue’s figures
12-L11	CRO - Block Diagram
13-L12	Digital Storage Oscilloscopes
14-L13	LCD display for instruments
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins

16-L15	A/F and R/F oscillators
17-IT-1	**Internal Test-I**
18-L16	printed circuit board
19-L17	____ **-Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Classification of transducers
21- L19	active and passive transducers, resistive (Potentiometer-Theory, temperature compensation &applications
22- P2	**College level meeting/Cell function**
23-L20	Capacitive (variable air gap type),
24-L21	Inductive (LVDT) &piezoelectric transducers.
25-L22	Measurement of temperature (RTD, semiconductor IC sensors)
26-L23	Light transducers
27-L24	Basic concepts of radio transmitter and receiver
28-L25	TV antennas
29-L26	Dipole antenna - Folded dipole
30-L27	Yagi antenna
31-L28	Dish antenna
32-L29	Mobile communication system
33-L30	MODEM.
34- P3	**Department Seminar**
35-L31	Telephone systems
36-L32	____ - **Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	cellular Telephone systems
38- IT-II	**Internal Test-II**
39-L34	mobile phone-principle of operation
40-L35	____ **-Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	integrated services
42- L37	digital networks(ISDN)
43- L38	Yagi antenna design
44- P4	**College level meeting/ function**
45-L39	resonance antennas and their characteristics
46-L40	basic requirements/characteristics of Transducers
47-L41	DTH system
48-L42	(photo resistors & photovoltaic cells).
49-L43	Class test
50-L44	____ - **Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**UNIT-V: Photography** Introduction to cameras-parts of camera and accessories
52- L46	lens shutteraperture
53-IT-III	**Internal Test-III**

54-L47	flash photography-filters-battery
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	tele and wide angle lens Digital formats-data transfer to computer-ISO speed-resolution
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on23.04.2019

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

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Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Maintanance of electronic appliances
Course Code	SSPH4A
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Semester	Even
Staff Name	Dr.D.Arul Asir Abraham
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Course Objectives

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Syllabus

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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 shutteraperture-flash photography-filters-battery-tele and wide angle lens

Digital formats-data transfer to computer-ISO speed-resolution(11L)

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on02.12.2019
1-L1	**UNIT-I: ELECTRONIC COMPONENTS** Study of electronic components
2-L2	star and delta connection of resistors
3- L3	wattage rating-potential divider arrangement
4-L4	capacitors - type -characteristics -–working voltage
5-L5	resistors - types - characteristics – colour coding
6-L6	soldering and desoldering techniques
7-L7	Groove board,bread board
8- P1	**Welcoming of First year and Inauguration of Mathematics Association**
9- L8	Practical uses of Multimeter (analog and digital)
10- L9	measurement of voltage, frequency and phase
11-L10	waveforms and Lissajoue’s figures
12-L11	CRO - Block Diagram
13-L12	Digital Storage Oscilloscopes
14-L13	LCD display for instruments
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins

16-L15	A/F and R/F oscillators
17-IT-1	**Internal Test-I**
18-L16	printed circuit board
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Classification of transducers
21- L19	active and passive transducers, resistive (Potentiometer-Theory, temperature compensation &applications
22- P2	**College level meeting/Cell function**
23-L20	Capacitive (variable air gap type),
24-L21	Inductive (LVDT) &piezoelectric transducers.
25-L22	Measurement of temperature (RTD, semiconductor IC sensors)
26-L23	Light transducers
27-L24	Basic concepts of radio transmitter and receiver
28-L25	TV antennas
29-L26	Dipole antenna - Folded dipole
30-L27	Yagi antenna
31-L28	Dish antenna
32-L29	Mobile communication system
33-L30	MODEM.
34- P3	**Department Seminar**
35-L31	Telephone systems
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	cellular Telephone systems
38- IT-II	**Internal Test-II**
39-L34	mobile phone-principle of operation
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	integrated services
42- L37	digital networks(ISDN)
43- L38	Yagi antenna design
44- P4	**College level meeting/ function**
45-L39	resonance antennas and their characteristics
46-L40	basic requirements/characteristics of Transducers
47-L41	DTH system
48-L42	(photo resistors & photovoltaic cells).
49-L43	Class test
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**UNIT-V: Photography** Introduction to cameras-parts of camera and accessories
52- L46	lens shutteraperture
53-IT-III	**Internal Test-III**

54-L47	flash photography-filters-battery
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	tele and wide angle lens Digital formats-data transfer to computer-ISO speed-resolution
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on27.04.2020

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Maintenance Of Electrical Appliances
Course Code	SSPH3A
Class	II year (2018-2019)
Semester	Odd
Staff Name	Mrs.P.Justina Angeline
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

MAINTAINANCE OF ELECTRICAL EQUIPMENT (Skilled Based Subject)

Unit-I ,

Network Analysis: Direct Current and Alternating Current, power , Ohms law,kircoff law resistances ,capacitances, combination in series, parallel - problems

Unit-II

Two Port Networks: Resistance, impedence and reactances, Impedance Parameters, Admittance Parameters, Hybrid Parameters, Inverse Hybrid Parameters,

Unit-III

Elecrical bulb, choke, starter, tube light wiring, cfl functioning, LED lighting , staircase switch, domestic wiring, fuse, ELCB,(Earth leak circuit breaker), circuit breaker(MCB),

Unit-IV

Transformers, Electric iron, fan, mixie , grinder, refrigerator, circuit diagram and working Two Port Networks: Resistance, impedence and reactances, Impedance Parameters, Admittance Parameters, Hybrid Parameters, Inverse Hybrid Parameters,

Unit-III

Elecrical bulb, choke, starter, tube light wiring, cfl functioning, LED lighting , staircase switch, domestic wiring, fuse, ELCB,(Earth leak circuit breaker), circuit breaker(MCB),

Unit-IV

Transformers, Electric iron, fan, mixie , grinder, refrigerator, circuit diagram and working

Unit-V

Soldering and Desoldering Techniques : Grove board, bread board, printed circuit board, wave soldering

Reference Books.:

1. Circuits and Networks by A. Sudhakar and Shyam Mohan 2. Instrumentation Repair and Maintenance by R.G. Gupta 3. Basic Electronics and Linear Circuits by Bhargava & Kulshreshtha (TTTI) 4. Integrated Electronics by Millman and Halkias 5. Instrumentation Cooper 6. Internet

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2018
1-L1	Network Analysis: Direct Current and Alternating Current,
2-L2	power , Ohms law,
3- L3	Kircoff law
4-L4	resistances,
5-L5	Capacitances
6-L6	combination in series,
7-L7	Parallel
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**

9- L8	- problems
10- L9	Problems for solving
11-L10	Revision for unit-I
12-L11	Unit-II introduction
13-L12	Two Port Networks:
14-L13	: Resistance
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Revision
17-IT-1	**Internal Test-I**
18-L16	, impedence and
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	reactances,
21- L19	Impedance Parameters,
22- P2	**College level meeting/Cell function**
23-L20	Admittance Parameters,
24-L21	Hybrid Parameters,
25-L22	Inverse Hybrid Parameters,
26-L23	Solving for problems
27-L24	Revision
28-L25	Class test
29-L26	Unit-III Introduction
30-L27	choke, starter,
31-L28	tube light wiring, cfl functioning, LED lighting , staircase switch, domestic wiring,
32-L29	fuse,
33-L30	ELCB,(Earth leak circuit breaker),
34- P3	**Department Seminar**
35-L31	circuit breaker(MCB),
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Revision
38- IT-II	**Internal Test-II**
39-L34	Unil-IV Introduction
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Transformers, Electric iron, fan, mixie , iagram
42- L37	grinder, refrigerator, circuit diagram and working
43- L38	Soldering and Desoldering Techniques :
44- P4	**College level meeting/ function**
45-L39	: Grove board, bread board,
46-L40	printed circuit board,

47-L41	wave soldering
48-L42	Problems
49-L43	Solving for problems
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Revision
52- L46	Class test
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working 23.11.2018

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

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Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Maintenance Of Electrical Appliances
Course Code	SSPH3A
Class	II year (2019-2020)
Semester	Odd
Staff Name	Dr.D.Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

MAINTAINANCE OF ELECTRICAL EQUIPMENT (Skilled Based Subject)

Unit-I ,

Network Analysis: Direct Current and Alternating Current, power , Ohms law,kircoff law resistances ,capacitances, combination in series, parallel - problems

Unit-II

Two Port Networks: Resistance, impedence and reactances, Impedance Parameters, Admittance Parameters, Hybrid Parameters, Inverse Hybrid Parameters,

Unit-III

Elecrical bulb, choke, starter, tube light wiring, cfl functioning, LED lighting , staircase switch, domestic wiring, fuse, ELCB,(Earth leak circuit breaker), circuit breaker(MCB),

Unit-IV

Transformers, Electric iron, fan, mixie , grinder, refrigerator, circuit diagram and working Two Port Networks: Resistance, impedence and reactances, Impedance Parameters, Admittance Parameters, Hybrid Parameters, Inverse Hybrid Parameters,

Unit-III

Elecrical bulb, choke, starter, tube light wiring, cfl functioning, LED lighting , staircase switch, domestic wiring, fuse, ELCB,(Earth leak circuit breaker), circuit breaker(MCB),

Unit-IV

Transformers, Electric iron, fan, mixie , grinder, refrigerator, circuit diagram and working

Unit-V

Soldering and Desoldering Techniques : Grove board, bread board, printed circuit board, wave soldering

Reference Books.:

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Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 17.06.2019
1-L1	Network Analysis: Direct Current and Alternating Current,
2-L2	power , Ohms law,
3- L3	Kircoff law
4-L4	resistances,
5-L5	Capacitances
6-L6	combination in series,
7-L7	Parallel
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**

9- L8	- problems
10- L9	Problems for solving
11-L10	Revision for unit-I
12-L11	Unit-II introduction
13-L12	Two Port Networks:
14-L13	: Resistance
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Revision
17-IT-1	**Internal Test-I**
18-L16	, impedence and
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	reactances,
21- L19	Impedance Parameters,
22- P2	**College level meeting/Cell function**
23-L20	Admittance Parameters,
24-L21	Hybrid Parameters,
25-L22	Inverse Hybrid Parameters,
26-L23	Solving for problems
27-L24	Revision
28-L25	Class test
29-L26	Unit-III Introduction
30-L27	choke, starter,
31-L28	tube light wiring, cfl functioning, LED lighting , staircase switch, domestic wiring,
32-L29	fuse,
33-L30	ELCB,(Earth leak circuit breaker),
34- P3	**Department Seminar**
35-L31	circuit breaker(MCB),
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Revision
38- IT-II	**Internal Test-II**
39-L34	Unil-IV Introduction
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Transformers, Electric iron, fan, mixie , iagram
42- L37	grinder, refrigerator, circuit diagram and working
43- L38	Soldering and Desoldering Techniques :
44- P4	**College level meeting/ function**
45-L39	: Grove board, bread board,
46-L40	printed circuit board,

47-L41	wave soldering
48-L42	Problems
49-L43	Solving for problems
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Revision
52- L46	Class test
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working 30.10.2019

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
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IA1	
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Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Maintenance Of Electrical Equipment
Course Code	GSPH3A
Class	II year (2014-2015)
Semester	Odd
Staff Name	Dr.S.JohnKennadyVethanathan, Mr.A.Arul Gnanam
Credits	4
L. Hours /P. Hours	4 / WK
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Course Objectives

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Unit-II

Two Port Networks: Resistance, impedence and reactances, Impedance Parameters, Admittance Parameters, Hybrid Parameters, Inverse Hybrid Parameters,

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Transformers, Electric iron, fan, mixie , grinder, refrigerator, circuit diagram and working

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Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2014
1-L1	Network Analysis: Direct Current and Alternating Current,
2-L2	power , Ohms law,
3- L3	Kircoff law
4-L4	resistances,
5-L5	Capacitances
6-L6	combination in series,

7-L7	Parallel
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
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11-L10	Revision for unit-I
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14-L13	: Resistance
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17-IT-1	**Internal Test-I**
18-L16	, impedence and
19-L17	**____ -Test Paper distribution and result analysis**
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21- L19	Impedance Parameters,
22- P2	**College level meeting/Cell function**
23-L20	Admittance Parameters,
24-L21	Hybrid Parameters,
25-L22	Inverse Hybrid Parameters,
26-L23	Solving for problems
27-L24	Revision
28-L25	Class test
29-L26	Unit-III Introduction
30-L27	choke, starter,
31-L28	tube light wiring, cfl functioning, LED lighting , staircase switch, domestic wiring,
32-L29	fuse,
33-L30	ELCB,(Earth leak circuit breaker),
34- P3	**Department Seminar**
35-L31	circuit breaker(MCB),
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Revision
38- IT-II	**Internal Test-II**
39-L34	Unil-IV Introduction
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Transformers, Electric iron, fan, mixie , iagram
42- L37	grinder, refrigerator, circuit diagram and working
43- L38	Soldering and Desoldering Techniques :
44- P4	**College level meeting/ function**
45-L39	: Grove board, bread board,

46-L40	printed circuit board,
47-L41	wave soldering
48-L42	Problems
49-L43	Solving for problems
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Revision
52- L46	Class test
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working 31.10.2014

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Maintenance Of Electrical Equipment
Course Code	GSPH3A
Class	II year (2015-2016)
Semester	Odd
Staff Name	Dr.S.JohnKennadyVethanathan, Mr.A.Arul Gnanam
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

MAINTAINANCE OF ELECTRICAL EQUIPMENT (Skilled Based Subject)

Unit-I ,

Network Analysis: Direct Current and Alternating Current, power , Ohms law,kircoff law resistances ,capacitances, combination in series, parallel - problems

Unit-II

Two Port Networks: Resistance, impedence and reactances, Impedance Parameters, Admittance Parameters, Hybrid Parameters, Inverse Hybrid Parameters,

Unit-III

Elecrical bulb, choke, starter, tube light wiring, cfl functioning, LED lighting , staircase switch, domestic wiring, fuse, ELCB,(Earth leak circuit breaker), circuit breaker(MCB),

Unit-IV

Transformers, Electric iron, fan, mixie , grinder, refrigerator, circuit diagram and working Two Port Networks: Resistance, impedence and reactances, Impedance Parameters, Admittance Parameters, Hybrid Parameters, Inverse Hybrid Parameters,

Unit-III

Elecrical bulb, choke, starter, tube light wiring, cfl functioning, LED lighting , staircase switch, domestic wiring, fuse, ELCB,(Earth leak circuit breaker), circuit breaker(MCB),

Unit-IV

Transformers, Electric iron, fan, mixie , grinder, refrigerator, circuit diagram and working

Unit-V

Soldering and Desoldering Techniques : Grove board, bread board, printed circuit board, wave soldering

Reference Books.:

1. Circuits and Networks by A. Sudhakar and Shyam Mohan 2. Instrumentation Repair and Maintenance by R.G. Gupta 3. Basic Electronics and Linear Circuits by Bhargava & Kulshreshtha (TTTI) 4. Integrated Electronics by Millman and Halkias 5. Instrumentation Cooper 6. Internet

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2015
1-L1	Network Analysis: Direct Current and Alternating Current,
2-L2	power , Ohms law,
3- L3	Kircoff law
4-L4	resistances,
5-L5	Capacitances
6-L6	combination in series,

7-L7	Parallel
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	- problems
10- L9	Problems for solving
11-L10	Revision for unit-I
12-L11	Unit-II introduction
13-L12	Two Port Networks:
14-L13	: Resistance
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Revision
17-IT-1	**Internal Test-I**
18-L16	, impedence and
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	reactances,
21- L19	Impedance Parameters,
22- P2	**College level meeting/Cell function**
23-L20	Admittance Parameters,
24-L21	Hybrid Parameters,
25-L22	Inverse Hybrid Parameters,
26-L23	Solving for problems
27-L24	Revision
28-L25	Class test
29-L26	Unit-III Introduction
30-L27	choke, starter,
31-L28	tube light wiring, cfl functioning, LED lighting , staircase switch, domestic wiring,
32-L29	fuse,
33-L30	ELCB,(Earth leak circuit breaker),
34- P3	**Department Seminar**
35-L31	circuit breaker(MCB),
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Revision
38- IT-II	**Internal Test-II**
39-L34	Unil-IV Introduction
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Transformers, Electric iron, fan, mixie , iagram
42- L37	grinder, refrigerator, circuit diagram and working
43- L38	Soldering and Desoldering Techniques :
44- P4	**College level meeting/ function**
45-L39	: Grove board, bread board,

46-L40	printed circuit board,
47-L41	wave soldering
48-L42	Problems
49-L43	Solving for problems
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Revision
52- L46	Class test
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working 29.10.2015

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Maintenance Of Electrical Equipment
Course Code	GSPH3A
Class	II year (2016-2017)
Semester	Odd
Staff Name	Dr.S.JohnKennadyVethanathan, Mr.A.Arul Gnanam
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

MAINTAINANCE OF ELECTRICAL EQUIPMENT (Skilled Based Subject)

Unit-I ,

Network Analysis: Direct Current and Alternating Current, power , Ohms law,kircoff law resistances ,capacitances, combination in series, parallel - problems

Unit-II

Two Port Networks: Resistance, impedence and reactances, Impedance Parameters, Admittance Parameters, Hybrid Parameters, Inverse Hybrid Parameters,

Unit-III

Elecrical bulb, choke, starter, tube light wiring, cfl functioning, LED lighting , staircase switch, domestic wiring, fuse, ELCB,(Earth leak circuit breaker), circuit breaker(MCB),

Unit-IV

Transformers, Electric iron, fan, mixie , grinder, refrigerator, circuit diagram and working Two Port Networks: Resistance, impedence and reactances, Impedance Parameters, Admittance Parameters, Hybrid Parameters, Inverse Hybrid Parameters,

Unit-III

Elecrical bulb, choke, starter, tube light wiring, cfl functioning, LED lighting , staircase switch, domestic wiring, fuse, ELCB,(Earth leak circuit breaker), circuit breaker(MCB),

Unit-IV

Transformers, Electric iron, fan, mixie , grinder, refrigerator, circuit diagram and working

Unit-V

Soldering and Desoldering Techniques : Grove board, bread board, printed circuit board, wave soldering

Reference Books.:

1. Circuits and Networks by A. Sudhakar and Shyam Mohan 2. Instrumentation Repair and Maintenance by R.G. Gupta 3. Basic Electronics and Linear Circuits by Bhargava & Kulshreshtha (TTTI) 4. Integrated Electronics by Millman and Halkias 5. Instrumentation Cooper 6. Internet

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 16.06.2016
1-L1	Network Analysis: Direct Current and Alternating Current,
2-L2	power , Ohms law,
3- L3	Kircoff law
4-L4	resistances,
5-L5	Capacitances
6-L6	combination in series,

7-L7	Parallel
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	- problems
10- L9	Problems for solving
11-L10	Revision for unit-I
12-L11	Unit-II introduction
13-L12	Two Port Networks:
14-L13	: Resistance
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Revision
17-IT-1	**Internal Test-I**
18-L16	, impedence and
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	reactances,
21- L19	Impedance Parameters,
22- P2	**College level meeting/Cell function**
23-L20	Admittance Parameters,
24-L21	Hybrid Parameters,
25-L22	Inverse Hybrid Parameters,
26-L23	Solving for problems
27-L24	Revision
28-L25	Class test
29-L26	Unit-III Introduction
30-L27	choke, starter,
31-L28	tube light wiring, cfl functioning, LED lighting , staircase switch, domestic wiring,
32-L29	fuse,
33-L30	ELCB,(Earth leak circuit breaker),
34- P3	**Department Seminar**
35-L31	circuit breaker(MCB),
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Revision
38- IT-II	**Internal Test-II**
39-L34	Unil-IV Introduction
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Transformers, Electric iron, fan, mixie , iagram
42- L37	grinder, refrigerator, circuit diagram and working
43- L38	Soldering and Desoldering Techniques :
44- P4	**College level meeting/ function**
45-L39	: Grove board, bread board,

46-L40	printed circuit board,
47-L41	wave soldering
48-L42	Problems
49-L43	Solving for problems
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Revision
52- L46	Class test
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working 30.11.2016

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Maintenance Of Electrical Equipment
Course Code	JSPH3A
Class	II year (2017-2018)
Semester	Odd
Staff Name	Mr.K.G.Dhinakar Mr.D.Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

MAINTAINANCE OF ELECTRICAL EQUIPMENT (Skilled Based Subject)

Unit-I ,

Network Analysis: Direct Current and Alternating Current, power , Ohms law,kircoff law resistances ,capacitances, combination in series, parallel - problems

Unit-II

Two Port Networks: Resistance, impedence and reactances, Impedance Parameters, Admittance Parameters, Hybrid Parameters, Inverse Hybrid Parameters,

Unit-III

Elecrical bulb, choke, starter, tube light wiring, cfl functioning, LED lighting , staircase switch, domestic wiring, fuse, ELCB,(Earth leak circuit breaker), circuit breaker(MCB),

Unit-IV

Transformers, Electric iron, fan, mixie , grinder, refrigerator, circuit diagram and working Two Port Networks: Resistance, impedence and reactances, Impedance Parameters, Admittance Parameters, Hybrid Parameters, Inverse Hybrid Parameters,

Unit-III

Elecrical bulb, choke, starter, tube light wiring, cfl functioning, LED lighting , staircase switch, domestic wiring, fuse, ELCB,(Earth leak circuit breaker), circuit breaker(MCB),

Unit-IV

Transformers, Electric iron, fan, mixie , grinder, refrigerator, circuit diagram and working

Unit-V

Soldering and Desoldering Techniques : Grove board, bread board, printed circuit board, wave soldering

Reference Books.:

1. Circuits and Networks by A. Sudhakar and Shyam Mohan 2. Instrumentation Repair and Maintenance by R.G. Gupta 3. Basic Electronics and Linear Circuits by Bhargava & Kulshreshtha (TTTI) 4. Integrated Electronics by Millman and Halkias 5. Instrumentation Cooper 6. Internet

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 16.06.2017
1-L1	Network Analysis: Direct Current and Alternating Current,
2-L2	power , Ohms law,
3- L3	Kircoff law
4-L4	resistances,
5-L5	Capacitances
6-L6	combination in series,

7-L7	Parallel
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	- problems
10- L9	Problems for solving
11-L10	Revision for unit-I
12-L11	Unit-II introduction
13-L12	Two Port Networks:
14-L13	: Resistance
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Revision
17-IT-1	**Internal Test-I**
18-L16	, impedence and
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	reactances,
21- L19	Impedance Parameters,
22- P2	**College level meeting/Cell function**
23-L20	Admittance Parameters,
24-L21	Hybrid Parameters,
25-L22	Inverse Hybrid Parameters,
26-L23	Solving for problems
27-L24	Revision
28-L25	Class test
29-L26	Unit-III Introduction
30-L27	choke, starter,
31-L28	tube light wiring, cfl functioning, LED lighting , staircase switch, domestic wiring,
32-L29	fuse,
33-L30	ELCB,(Earth leak circuit breaker),
34- P3	**Department Seminar**
35-L31	circuit breaker(MCB),
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Revision
38- IT-II	**Internal Test-II**
39-L34	Unil-IV Introduction
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Transformers, Electric iron, fan, mixie , iagram
42- L37	grinder, refrigerator, circuit diagram and working
43- L38	Soldering and Desoldering Techniques :
44- P4	**College level meeting/ function**
45-L39	: Grove board, bread board,

46-L40	printed circuit board,
47-L41	wave soldering
48-L42	Problems
49-L43	Solving for problems
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Revision
52- L46	Class test
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working 06.11.2017

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Mechanics And Relativity
Course Code	GMPH21
Class	I year (2014-2017)
Semester	EVEN
Staff Name	Mr.A.Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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-
-

Syllabus

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, Stokes and Greens theorem

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. Torque - Rotational Kinetic energy - parallel axis and perpendicular axis theorem - Newton's second law for rotation - 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.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 3.12.2014
1-L1	**MECHANICS AND RELATIVITY UNIT-I:Introduction**
2-L2	**VECTORS** Vector analysis gradient of a scalar point function
3- L3	components of a vector
4-L4	gradient of a scalar point function
5-L5	angular momentum as a vector-product of two vectors
6-L6	work as a scalar product of two vectors - line, surface and volume integrals
7-L7	Gauss divergence, Stokes and Greens theorem
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	Laws of conservation of energy, linear momentum and angular momentum
10- L9	linear momentum and angular momentum
11-L10	work energy theorem
12-L11	work done by gravitational force - work done by spring force
13-L12	proof of Kepler's second and third laws
14-L13	Two body problem and reduced mass - central field motion - motion of planets in elliptical orbits
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	conservative and non conservative forces - potential energy curve - centre of mass
17-IT-1	**Internal Test-I**
18-L16	work done by gravitational force - work done by spring force - potential energy
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	work energy theorem
21- L19	Translational and rotational motion
22- P2	**College level meeting/Cell function**
23-L20	moment of inertia and radius of gyration
24-L21	Angular momentum and angular impulse

25-L22	moment of inertia of a thin circular ring, solid sphere
26-L23	Torque- Rotational Kinetic energy
27-L24	Kinetic energy of rolling
28-L25	Gyrostat
29-L26	moment of inertia of a solid cylinder
30-L27	parallel axis and perpendicular axis theorem
31-L28	Newton's second law for rotation - work, rotational
32-L29	Kinetic energy and expression for power during rotation
33-L30	Acceleration of a uniform body, rolling down an inclined plane.
34- P3	**Department Seminar**
35-L31	Precessional motion
36-L32	____ - **Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Pressure and thrust - Thrust on a plane surface immersed in a liquid
38- IT-II	**Internal Test-II**
39-L34	centre of pressure
40-L35	____ **-Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	centre of pressure on a rectangular lamina, a triangular lamina
42- L37	Laws of floation - determination of meta centric height of a ship
43- L38	steady and streamline flow - equation of continuity - energy of a fluid
44- P4	**College level meeting/ function**
45-L39	Bernoulli's theorem – proof - pitot's tube and venturimeter
46-L40	Introduction - Reference frames-inertial frames
47-L41	the ether hypothesis - Michelson morley experiment
48-L42	Postulates of special theory of relativity - Lorentz transformation equations
49-L43	Lorentz Fitzgerald contraction - time dilation - Relativistic addition of velocities
50-L44	____ - **Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	velocity addition theorem - simultaneity - Relativistic mass – Relativistic momentum - mass energy equivalence
52- L46	Relation between total energy, rest mass energy and momentum
53-IT-III	**Internal Test-III**
54-L47	Accelerated frames and Gravity - general theory of relativity (basics) - gravity waves.
55-L48	____ - **Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2015

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Mechanics And Relativity
Course Code	GMPH21
Class	I year (2015-2018)
Semester	EVEN
Staff Name	Mr.A.Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

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, Stokes and Greens theorem

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. Torque - Rotational Kinetic energy - parallel axis and perpendicular axis theorem - Newton's second law for rotation - 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.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 2.12.2015
1-L1	**MECHANICS AND RELATIVITY UNIT-I:Introduction**
2-L2	**VECTORS** Vector analysis gradient of a scalar point function
3- L3	components of a vector
4-L4	gradient of a scalar point function
5-L5	angular momentum as a vector-product of two vectors
6-L6	work as a scalar product of two vectors - line, surface and volume integrals
7-L7	Gauss divergence, Stokes and Greens theorem
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	Laws of conservation of energy, linear momentum and angular momentum
10- L9	linear momentum and angular momentum
11-L10	work energy theorem
12-L11	work done by gravitational force - work done by spring force
13-L12	proof of Kepler's second and third laws
14-L13	Two body problem and reduced mass - central field motion - motion of planets in elliptical orbits
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	conservative and non conservative forces - potential energy curve - centre of mass
17-IT-1	**Internal Test-I**
18-L16	work done by gravitational force - work done by spring force - potential energy
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	work energy theorem
21- L19	Translational and rotational motion
22- P2	**College level meeting/Cell function**
23-L20	moment of inertia and radius of gyration
24-L21	Angular momentum and angular impulse

25-L22	moment of inertia of a thin circular ring, solid sphere
26-L23	Torque- Rotational Kinetic energy
27-L24	Kinetic energy of rolling
28-L25	Gyrostat
29-L26	moment of inertia of a solid cylinder
30-L27	parallel axis and perpendicular axis theorem
31-L28	Newton's second law for rotation - work, rotational
32-L29	Kinetic energy and expression for power during rotation
33-L30	Acceleration of a uniform body, rolling down an inclined plane.
34- P3	**Department Seminar**
35-L31	Precessional motion
36-L32	____ - **Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Pressure and thrust - Thrust on a plane surface immersed in a liquid
38- IT-II	**Internal Test-II**
39-L34	centre of pressure
40-L35	____ **-Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	centre of pressure on a rectangular lamina, a triangular lamina
42- L37	Laws of floation - determination of meta centric height of a ship
43- L38	steady and streamline flow - equation of continuity - energy of a fluid
44- P4	**College level meeting/ function**
45-L39	Bernoulli's theorem – proof - pitot's tube and venturimeter
46-L40	Introduction - Reference frames-inertial frames
47-L41	the ether hypothesis - Michelson morley experiment
48-L42	Postulates of special theory of relativity - Lorentz transformation equations
49-L43	Lorentz Fitzgerald contraction - time dilation - Relativistic addition of velocities
50-L44	____ - **Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	velocity addition theorem - simultaneity - Relativistic mass – Relativistic momentum - mass energy equivalence
52- L46	Relation between total energy, rest mass energy and momentum
53-IT-III	**Internal Test-III**
54-L47	Accelerated frames and Gravity - general theory of relativity (basics) - gravity waves.
55-L48	____ - **Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 22.04.2016

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Mechanics And Relativity
Course Code	JMPH21
Class	I year (2016-2019)
Semester	EVEN
Staff Name	Mrs.D.Priscilla Koilpillai
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

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, Stokes and Greens theorem

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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.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 1.12.2016
1-L1	**MECHANICS AND RELATIVITY UNIT-I:Introduction**
2-L2	**VECTORS** Vector analysis gradient of a scalar point function
3- L3	components of a vector
4-L4	gradient of a scalar point function
5-L5	angular momentum as a vector-product of two vectors
6-L6	work as a scalar product of two vectors - line, surface and volume integrals
7-L7	Gauss divergence, Stokes and Greens theorem
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	Laws of conservation of energy, linear momentum and angular momentum
10- L9	linear momentum and angular momentum
11-L10	work energy theorem
12-L11	work done by gravitational force - work done by spring force
13-L12	proof of Kepler's second and third laws
14-L13	Two body problem and reduced mass - central field motion - motion of planets in elliptical orbits
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	conservative and non conservative forces - potential energy curve - centre of mass
17-IT-1	**Internal Test-I**
18-L16	work done by gravitational force - work done by spring force - potential energy
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	work energy theorem
21- L19	Translational and rotational motion
22- P2	**College level meeting/Cell function**
23-L20	moment of inertia and radius of gyration
24-L21	Angular momentum and angular impulse

25-L22	moment of inertia of a thin circular ring, solid sphere
26-L23	Torque- Rotational Kinetic energy
27-L24	Kinetic energy of rolling
28-L25	Gyrostat
29-L26	moment of inertia of a solid cylinder
30-L27	parallel axis and perpendicular axis theorem
31-L28	Newton's second law for rotation - work, rotational
32-L29	Kinetic energy and expression for power during rotation
33-L30	Acceleration of a uniform body, rolling down an inclined plane.
34- P3	**Department Seminar**
35-L31	Precessional motion
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Pressure and thrust - Thrust on a plane surface immersed in a liquid
38- IT-II	**Internal Test-II**
39-L34	centre of pressure
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	centre of pressure on a rectangular lamina, a triangular lamina
42- L37	Laws of floation - determination of meta centric height of a ship
43- L38	steady and streamline flow - equation of continuity - energy of a fluid
44- P4	**College level meeting/ function**
45-L39	Bernoulli's theorem – proof - pitot's tube and venturimeter
46-L40	Introduction - Reference frames-inertial frames
47-L41	the ether hypothesis - Michelson morley experiment
48-L42	Postulates of special theory of relativity - Lorentz transformation equations
49-L43	Lorentz Fitzgerald contraction - time dilation - Relativistic addition of velocities
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	velocity addition theorem - simultaneity - Relativistic mass – Relativistic momentum - mass energy equivalence
52- L46	Relation between total energy, rest mass energy and momentum
53-IT-III	**Internal Test-III**
54-L47	Accelerated frames and Gravity - general theory of relativity (basics) - gravity waves.
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 21.04.2017

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

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Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Mechanics And Relativity
Course Code	SMPH11
Class	I year (2017-2020)
Semester	ODD
Staff Name	Mrs.R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

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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.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2017
1-L1	**MECHANICS AND RELATIVITY UNIT-I:Introduction**
2-L2	**VECTORS** Vector analysis gradient of a scalar point function
3- L3	components of a vector
4-L4	gradient of a scalar point function
5-L5	angular momentum as a vector-product of two vectors
6-L6	work as a scalar product of two vectors - line, surface and volume integrals
7-L7	Gauss divergence, Stokes and Greens theorem
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	Laws of conservation of energy, linear momentum and angular momentum
10- L9	linear momentum and angular momentum
11-L10	work energy theorem
12-L11	work done by gravitational force - work done by spring force
13-L12	proof of Kepler’s second and third laws
14-L13	Two body problem and reduced mass - central field motion - motion of planets in elliptical orbits
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	conservative and non conservative forces - potential energy curve - centre of mass
17-IT-1	**Internal Test-I**
18-L16	work done by gravitational force - work done by spring force - potential energy
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	work energy theorem
21- L19	Translational and rotational motion
22- P2	**College level meeting/Cell function**
23-L20	moment of inertia and radius of gyration
24-L21	Angular momentum and angular impulse

25-L22	moment of inertia of a thin circular ring, solid sphere
26-L23	Torque- Rotational Kinetic energy
27-L24	Kinetic energy of rolling
28-L25	Gyrostat
29-L26	moment of inertia of a solid cylinder
30-L27	parallel axis and perpendicular axis theorem
31-L28	Newton's second law for rotation - work, rotational
32-L29	Kinetic energy and expression for power during rotation
33-L30	Acceleration of a uniform body, rolling down an inclined plane.
34- P3	**Department Seminar**
35-L31	Precessional motion
36-L32	____ - **Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Pressure and thrust - Thrust on a plane surface immersed in a liquid
38- IT-II	**Internal Test-II**
39-L34	centre of pressure
40-L35	____ -**Test Paper distribution and result analysis**
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42- L37	Laws of floation - determination of meta centric height of a ship
43- L38	steady and streamline flow - equation of continuity - energy of a fluid
44- P4	**College level meeting/ function**
45-L39	Bernoulli's theorem – proof - pitot's tube and venturimeter
46-L40	Introduction - Reference frames-inertial frames
47-L41	the ether hypothesis - Michelson morley experiment
48-L42	Postulates of special theory of relativity - Lorentz transformation equations
49-L43	Lorentz Fitzgerald contraction - time dilation - Relativistic addition of velocities
50-L44	____ - **Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	velocity addition theorem - simultaneity - Relativistic mass – Relativistic momentum - mass energy equivalence
52- L46	Relation between total energy, rest mass energy and momentum
53-IT-III	**Internal Test-III**
54-L47	Accelerated frames and Gravity - general theory of relativity (basics) - gravity waves.
55-L48	____ - **Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 06.11.2017

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
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# Extension activity	: Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Mechanics And Relativity
Course Code	SMPH11
Class	I year (2018-2021)
Semester	ODD
Staff Name	Mrs.R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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-

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Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2018
1-L1	**MECHANICS AND RELATIVITY UNIT-I:Introduction**
2-L2	**VECTORS** Vector analysis gradient of a scalar point function
3- L3	components of a vector
4-L4	gradient of a scalar point function
5-L5	angular momentum as a vector-product of two vectors
6-L6	work as a scalar product of two vectors - line, surface and volume integrals
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	Internal Test I begins
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17-IT-1	**Internal Test-I**
18-L16	work done by gravitational force - work done by spring force - potential energy
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	work energy theorem
21- L19	Translational and rotational motion
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49-L43	Lorentz Fitzgerald contraction - time dilation - Relativistic addition of velocities
50-L44	____ - **Allotting portion for Internal Test-III**
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51 L45	velocity addition theorem - simultaneity - Relativistic mass – Relativistic momentum - mass energy equivalence
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53-IT-III	**Internal Test-III**
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55-L48	____ - **Test Paper distribution and result analysis**
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	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.11.2018

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

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Department of Physics

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Course Code	SMPH11
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Semester	ODD
Staff Name	Mrs.D.Priscilla Koilpillai Mrs.G.Gomathisankari
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L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

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, Stokes and Greens theorem

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. Torque - Rotational Kinetic energy - parallel axis and perpendicular axis theorem - Newton's second law for rotation - 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.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 17.06.2019
1-L1	**MECHANICS AND RELATIVITY UNIT-I:Introduction**
2-L2	**VECTORS** Vector analysis gradient of a scalar point function
3- L3	components of a vector
4-L4	gradient of a scalar point function
5-L5	angular momentum as a vector-product of two vectors
6-L6	work as a scalar product of two vectors - line, surface and volume integrals
7-L7	Gauss divergence, Stokes and Greens theorem
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	Laws of conservation of energy, linear momentum and angular momentum
10- L9	linear momentum and angular momentum
11-L10	work energy theorem
12-L11	work done by gravitational force - work done by spring force
13-L12	proof of Kepler's second and third laws
14-L13	Two body problem and reduced mass - central field motion - motion of planets in elliptical orbits
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	conservative and non conservative forces - potential energy curve - centre of mass
17-IT-1	**Internal Test-I**
18-L16	work done by gravitational force - work done by spring force - potential energy
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	work energy theorem
21- L19	Translational and rotational motion
22- P2	**College level meeting/Cell function**
23-L20	moment of inertia and radius of gyration
24-L21	Angular momentum and angular impulse

25-L22	moment of inertia of a thin circular ring, solid sphere
26-L23	Torque- Rotational Kinetic energy
27-L24	Kinetic energy of rolling
28-L25	Gyrostat
29-L26	moment of inertia of a solid cylinder
30-L27	parallel axis and perpendicular axis theorem
31-L28	Newton's second law for rotation - work, rotational
32-L29	Kinetic energy and expression for power during rotation
33-L30	Acceleration of a uniform body, rolling down an inclined plane.
34- P3	**Department Seminar**
35-L31	Precessional motion
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Pressure and thrust - Thrust on a plane surface immersed in a liquid
38- IT-II	**Internal Test-II**
39-L34	centre of pressure
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	centre of pressure on a rectangular lamina, a triangular lamina
42- L37	Laws of floation - determination of meta centric height of a ship
43- L38	steady and streamline flow - equation of continuity - energy of a fluid
44- P4	**College level meeting/ function**
45-L39	Bernoulli's theorem – proof - pitot's tube and venturimeter
46-L40	Introduction - Reference frames-inertial frames
47-L41	the ether hypothesis - Michelson morley experiment
48-L42	Postulates of special theory of relativity - Lorentz transformation equations
49-L43	Lorentz Fitzgerald contraction - time dilation - Relativistic addition of velocities
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	velocity addition theorem - simultaneity - Relativistic mass – Relativistic momentum - mass energy equivalence
52- L46	Relation between total energy, rest mass energy and momentum
53-IT-III	**Internal Test-III**
54-L47	Accelerated frames and Gravity - general theory of relativity (basics) - gravity waves.
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.10.2019

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Nuclear physics
Course Code	GMPH61
Class	III year (2014-2015)
Semester	Even
Staff Name	Dr. S. John Kennady vethanathan Mrs.D.Priscilla Koilpillai
Credits	6
L. Hours /P. Hours	6 / WK
Total 90 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 80 Hrs (5 units; 5×16=80; 16Hrs /unit)	

Course Objectives

- ➢
- ➢
- ➢
- ➢

Syllabus

NUCLEAR PHYSICS

UNIT – I Atomic Nucleus : General properties of nucleus - Binding energy - Mass defect - Proton - proton hypothesis - proton neutron hypothesis - Nuclear forces - Characteristics of nuclear forces - Liquid drop model - Weizsacker semi-empirical mass formula - Shell model - Magic Numbers

UNIT – II Natural radioactivity - alpha, beta and gamma rays - properties - Radioactive series - Laws of radio active disintegration - Radio - Carbon dating - Alpha decay - Beta decay - Neutrino and its properties - Gamma decay - Internal Conversion - Nuclear energy levels - Nuclear isomerism

UNIT – III Particle accelerators: Cyclotron - Betatron – Synchrotron - Types of Nuclear reaction - Q value of Nuclear Reactions - The balance of mass and energy in Nuclear reactions - Nuclear transmutations.

UNIT – IV Energy from the Nucleus: Nuclear fission - Types of fission - P-E Curve for fission - Bohr Wheeler's Theory of Nuclear fission - Nuclear fusion and Thermonuclear reactions - Controlled thermonuclear reactions - Nuclear chain reaction - critical size of a reactor - radiation hazards. UNIT – V Detection and measurements of Nuclear radiations Elementary particles : G-M Counter - Scintillation Counter - Cloud Chamber Bubble Chamber - Cerenkov Counters - Classification of elementary particles - Particle interaction - Conservation Laws - Leptons - Hardons - The Quark model

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 03.12.2014
1-L1	**UNIT -I Atomic Nucleus**
2-L2	**General properties of nucleus**
3- L3	**Binding energy**
4-L4	**Mass defect**
5-L5	**Proton**
6-L6	**proton hypothesis**
7-L7	**proton neutron hypothesis**
8-L8	**Nuclear forces**
9-L9	**Characteristics of nuclear forces**
10-P1	**Problem solving**
11-L10	**Weizsacker semi-empirical mass formula**
12-L11	**Shell model**
13-L12	**Magic Numbers**
14-L13	**UNIT – II Natural radioactivity**
15-L14	**Natural radioactivity**
16-L15	**alpha, beta and gamma rays**
17-L16	**properties**
18-L17	**Radioactive series**
19-L18	**Laws of radio active disintegration**
20-L19	**Radio**
21-L20	
22-L21	**Alpha decay**
23-L22	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins

24-L23	**Beta decay**
25-L24	**Neutrino and its properties**
26-IT-1	**Internal Test-I**
27-L25	**Gamma decay**
28-L26	**Internal Conversion**
29-L27	**Nuclear energy levels**
30-L28	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
31- L29	**Nuclear isomerism**
32- L30	**UNIT – III Particle accelerators**
33- L31	**Cyclotron**
34-P2	**College level meeting/Cell function**
35- L32	**Betatron**
36- L33	**Synchrotron**
37- L34	**Types of Nuclear reaction**
38- L35	**Q value of Nuclear Reactions**
39- L36	**The balance of mass and energy in Nuclear reactions**
40- L37	**Nuclear transmutations**
41- L38	**UNIT – IV Energy from the Nucleus**
42- L39	**Nuclear fission**
43- L40	**Types of fission**
44- L41	**P-E Curve for fission**
45- L42	**Bohr Wheeler's Theory of Nuclear fission**
46- L43	**Nuclear fusion and Thermonuclear reactions**
47- L44	**Controlled thermonuclear reactions**
48- L45	**- Nuclear chain reaction**
49- L46	**critical size of a reactor**
50- L47	**radiation hazards**
51- P3	**Department Seminar**
52- L48	**UNIT – V Detection and measurements of Nuclear**
53- L49	**G-M Counter**
54- L50	**Scintillation Counter**
55- L51	**Cloud Chamber**
56-L52	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
57-L53	**Bubble Chamber**
58-L54	**Cerenkov Counters**
59-IT-II	**Internal Test-II**
60- L55	**Classification of elementary particles**
61- L56	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
62- L57	**Particle interaction**
63- L58	**Conservation Laws**
64- L59	**Leptons**
65- L60	**Hardons**
66- L61	**The Quark model**
67- L62	**Liquid drop model**
68- L63	**Problem solving**

69- L64	**Carbon dating**
70- L65	**Problem solving**
71- L66	**Problem solving**
72- L67	**Bohr Wheeler‘s Theory of Nuclear fission**
73- L68	**Types of Nuclear reaction**
74-P4	**College level meeting/ function**
75- L69	**G-M Counter**
76- L70	**Problem solving**
77- L71	**Neutrino and its properties**
78- L72	**Problem solving**
79- L73	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
80- L74	**Problem solving**
81- L75	**Nuclear fusion and Thermonuclear reactions**
82-IT-III	**Internal Test-III**
83- L76	**Problem solving**
84- L77	**____ - Test Paper distribution and result analysis**
85- L78	**Problem solving**
	Entering Internal Test-III Marks into University portal
	Model Test begins
86- L79	**Model Test**
87-MT	**Model Test**
88-MT	**Model Test**
89-MT	**Model test paper distribution and previous year university question paper discussion**
90-L-80	**Feedback of the Course, analysis and report preparation**
	Even semester end with 23.04.2015

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	

IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

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Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Nuclear physics
Course Code	GMPH61
Class	III year (2015-2016)
Semester	Even
Staff Name	Dr. S. John Kennady vethanathan Mrs.D.Priscilla Koilpillai
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L. Hours /P. Hours	6 / WK
Total 90 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 80 Hrs (5 units; 5×16=80; 16Hrs /unit)	

Course Objectives

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-
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Syllabus

NUCLEAR PHYSICS

UNIT – I Atomic Nucleus : General properties of nucleus - Binding energy - Mass defect - Proton - proton hypothesis - proton neutron hypothesis - Nuclear forces - Characteristics of nuclear forces - Liquid drop model - Weizsacker semi-empirical mass formula - Shell model - Magic Numbers

UNIT – II Natural radioactivity - alpha, beta and gamma rays - properties - Radioactive series - Laws of radio active disintegration - Radio - Carbon dating - Alpha decay - Beta decay - Neutrino and its properties - Gamma decay - Internal Conversion - Nuclear energy levels - Nuclear isomerism

UNIT – III Particle accelerators: Cyclotron - Betatron – Synchrotron - Types of Nuclear reaction - Q value of Nuclear Reactions - The balance of mass and energy in Nuclear reactions - Nuclear transmutations.

UNIT – IV Energy from the Nucleus: Nuclear fission - Types of fission - P-E Curve for fission - Bohr Wheeler‘s Theory of Nuclear fission - Nuclear fusion and Thermonuclear reactions - Controlled thermonuclear reactions - Nuclear chain reaction - critical size of a reactor - radiation hazards. UNIT – V Detection and measurements of Nuclear radiations Elementary particles : G-M Counter - Scintillation Counter - Cloud Chamber Bubble Chamber - Cerenkov Counters - Classification of elementary particles - Particle interaction - Conservation Laws - Leptons - Hardons - The Quark model

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 02.12.2015
1-L1	**UNIT -I Atomic Nucleus**
2-L2	**General properties of nucleus**
3- L3	**Binding energy**
4-L4	**Mass defect**
5-L5	**Proton**
6-L6	**proton hypothesis**
7-L7	**proton neutron hypothesis**
8-L8	**Nuclear forces**
9-L9	**Characteristics of nuclear forces**
10-P1	**Problem solving**
11-L10	**Weizsacker semi-empirical mass formula**
12-L11	**Shell model**
13-L12	**Magic Numbers**
14-L13	**UNIT – II Natural radioactivity**
15-L14	**Natural radioactivity**
16-L15	**alpha, beta and gamma rays**
17-L16	**properties**
18-L17	**Radioactive series**
19-L18	**Laws of radio active disintegration**
20-L19	**Radio**
21-L20	
22-L21	**Alpha decay**
23-L22	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins

24-L23	**Beta decay**
25-L24	**Neutrino and its properties**
26-IT-1	**Internal Test-I**
27-L25	**Gamma decay**
28-L26	**Internal Conversion**
29-L27	**Nuclear energy levels**
30-L28	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
31- L29	**Nuclear isomerism**
32- L30	**UNIT – III Particle accelerators**
33- L31	**Cyclotron**
34-P2	**College level meeting/Cell function**
35- L32	**Betatron**
36- L33	**Synchrotron**
37- L34	**Types of Nuclear reaction**
38- L35	**Q value of Nuclear Reactions**
39- L36	**The balance of mass and energy in Nuclear reactions**
40- L37	**Nuclear transmutations**
41- L38	**UNIT – IV Energy from the Nucleus**
42- L39	**Nuclear fission**
43- L40	**Types of fission**
44- L41	**P-E Curve for fission**
45- L42	**Bohr Wheeler‘s Theory of Nuclear fission**
46- L43	**Nuclear fusion and Thermonuclear reactions**
47- L44	**Controlled thermonuclear reactions**
48- L45	**- Nuclear chain reaction**
49- L46	**critical size of a reactor**
50- L47	**radiation hazards**
51- P3	**Department Seminar**
52- L48	**UNIT – V Detection and measurements of Nuclear**
53- L49	**G-M Counter**
54- L50	**Scintillation Counter**
55- L51	**Cloud Chamber**
56-L52	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
57-L53	**Bubble Chamber**
58-L54	**Cerenkov Counters**
59-IT-II	**Internal Test-II**
60- L55	**Classification of elementary particles**
61- L56	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
62- L57	**Particle interaction**
63- L58	**Conservation Laws**
64- L59	**Leptons**
65- L60	**Hardons**
66- L61	**The Quark model**
67- L62	**Liquid drop model**
68- L63	**Problem solving**

69- L64	**Carbon dating**
70- L65	**Problem solving**
71- L66	**Problem solving**
72- L67	**Bohr Wheeler's Theory of Nuclear fission**
73- L68	**Types of Nuclear reaction**
74-P4	**College level meeting/ function**
75- L69	**G-M Counter**
76- L70	**Problem solving**
77- L71	**Neutrino and its properties**
78- L72	**Problem solving**
79- L73	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
80- L74	**Problem solving**
81- L75	**Nuclear fusion and Thermonuclear reactions**
82-IT-III	**Internal Test-III**
83- L76	**Problem solving**
84- L77	**____ - Test Paper distribution and result analysis**
85- L78	**Problem solving**
	Entering Internal Test-III Marks into University portal
	Model Test begins
86- L79	**Model Test**
87-MT	**Model Test**
88-MT	**Model Test**
89-MT	**Model test paper distribution and previous year university question paper discussion**
90-L-80	**Feedback of the Course, analysis and report preparation**
	Even semester end with 22.04.2016

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	

IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

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Extension activity : Motivate student to take classes for school students.

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Department of Physics

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(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Nuclear physics
Course Code	GMPH61
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Staff Name	Dr. S. John Kennady vethanathan Mrs.D.Priscilla Koilpillai
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Total 90 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 80 Hrs (5 units; 5×16=80; 16Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

NUCLEAR PHYSICS

UNIT – I Atomic Nucleus : General properties of nucleus - Binding energy - Mass defect - Proton - proton hypothesis - proton neutron hypothesis - Nuclear forces - Characteristics of nuclear forces - Liquid drop model - Weizsacker semi-empirical mass formula - Shell model - Magic Numbers

UNIT – II Natural radioactivity - alpha, beta and gamma rays - properties - Radioactive series - Laws of radio active disintegration - Radio - Carbon dating - Alpha decay - Beta decay - Neutrino and its properties - Gamma decay - Internal Conversion - Nuclear energy levels - Nuclear isomerism

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UNIT – IV Energy from the Nucleus: Nuclear fission - Types of fission - P-E Curve for fission - Bohr Wheeler‘s Theory of Nuclear fission - Nuclear fusion and Thermonuclear reactions - Controlled thermonuclear reactions - Nuclear chain reaction - critical size of a reactor - radiation hazards. UNIT – V Detection and measurements of Nuclear radiations Elementary particles : G-M Counter - Scintillation Counter - Cloud Chamber Bubble Chamber - Cerenkov Counters - Classification of elementary particles - Particle interaction - Conservation Laws - Leptons - Hardons - The Quark model

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 01.12.2016
1-L1	**UNIT -I Atomic Nucleus**
2-L2	**General properties of nucleus**
3- L3	**Binding energy**
4-L4	**Mass defect**
5-L5	**Proton**
6-L6	**proton hypothesis**
7-L7	**proton neutron hypothesis**
8-L8	**Nuclear forces**
9-L9	**Characteristics of nuclear forces**
10-P1	**Problem solving**
11-L10	**Weizsacker semi-empirical mass formula**
12-L11	**Shell model**
13-L12	**Magic Numbers**
14-L13	**UNIT – II Natural radioactivity**
15-L14	**Natural radioactivity**
16-L15	**alpha, beta and gamma rays**
17-L16	**properties**
18-L17	**Radioactive series**
19-L18	**Laws of radio active disintegration**
20-L19	**Radio**
21-L20	
22-L21	**Alpha decay**
23-L22	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins

24-L23	**Beta decay**
25-L24	**Neutrino and its properties**
26-IT-1	**Internal Test-I**
27-L25	**Gamma decay**
28-L26	**Internal Conversion**
29-L27	**Nuclear energy levels**
30-L28	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
31- L29	**Nuclear isomerism**
32- L30	**UNIT – III Particle accelerators**
33- L31	**Cyclotron**
34-P2	**College level meeting/Cell function**
35- L32	**Betatron**
36- L33	**Synchrotron**
37- L34	**Types of Nuclear reaction**
38- L35	**Q value of Nuclear Reactions**
39- L36	**The balance of mass and energy in Nuclear reactions**
40- L37	**Nuclear transmutations**
41- L38	**UNIT – IV Energy from the Nucleus**
42- L39	**Nuclear fission**
43- L40	**Types of fission**
44- L41	**P-E Curve for fission**
45- L42	**Bohr Wheeler‘s Theory of Nuclear fission**
46- L43	**Nuclear fusion and Thermonuclear reactions**
47- L44	**Controlled thermonuclear reactions**
48- L45	**- Nuclear chain reaction**
49- L46	**critical size of a reactor**
50- L47	**radiation hazards**
51- P3	**Department Seminar**
52- L48	**UNIT – V Detection and measurements of Nuclear**
53- L49	**G-M Counter**
54- L50	**Scintillation Counter**
55- L51	**Cloud Chamber**
56-L52	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
57-L53	**Bubble Chamber**
58-L54	**Cerenkov Counters**
59-IT-II	**Internal Test-II**
60- L55	**Classification of elementary particles**
61- L56	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
62- L57	**Particle interaction**
63- L58	**Conservation Laws**
64- L59	**Leptons**
65- L60	**Hardons**
66- L61	**The Quark model**
67- L62	**Liquid drop model**
68- L63	**Problem solving**

69- L64	**Carbon dating**
70- L65	**Problem solving**
71- L66	**Problem solving**
72- L67	**Bohr Wheeler‘s Theory of Nuclear fission**
73- L68	**Types of Nuclear reaction**
74-P4	**College level meeting/ function**
75- L69	**G-M Counter**
76- L70	**Problem solving**
77- L71	**Neutrino and its properties**
78- L72	**Problem solving**
79- L73	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
80- L74	**Problem solving**
81- L75	**Nuclear fusion and Thermonuclear reactions**
82-IT-III	**Internal Test-III**
83- L76	**Problem solving**
84- L77	**____ - Test Paper distribution and result analysis**
85- L78	**Problem solving**
	Entering Internal Test-III Marks into University portal
	Model Test begins
86- L79	**Model Test**
87-MT	**Model Test**
88-MT	**Model Test**
89-MT	**Model test paper distribution and previous year university question paper discussion**
90-L-80	**Feedback of the Course, analysis and report preparation**
	Even semester end with 21.04.2017

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	

IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

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Course Name	Nuclear physics
Course Code	GMPH61
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Credits	6
L. Hours /P. Hours	6 / WK
Total 90 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 80 Hrs (5 units; 5×16=80; 16Hrs /unit)	

Course Objectives

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Syllabus

NUCLEAR PHYSICS

UNIT – I Atomic Nucleus : General properties of nucleus - Binding energy - Mass defect - Proton - proton hypothesis - proton neutron hypothesis - Nuclear forces - Characteristics of nuclear forces - Liquid drop model - Weizsacker semi-empirical mass formula - Shell model - Magic Numbers

UNIT – II Natural radioactivity - alpha, beta and gamma rays - properties - Radioactive series - Laws of radio active disintegration - Radio - Carbon dating - Alpha decay - Beta decay - Neutrino and its properties - Gamma decay - Internal Conversion - Nuclear energy levels - Nuclear isomerism

UNIT – III Particle accelerators: Cyclotron - Betatron – Synchrotron - Types of Nuclear reaction - Q value of Nuclear Reactions - The balance of mass and energy in Nuclear reactions - Nuclear transmutations.

UNIT – IV Energy from the Nucleus: Nuclear fission - Types of fission - P-E Curve for fission - Bohr Wheeler's Theory of Nuclear fission - Nuclear fusion and Thermonuclear reactions - Controlled thermonuclear reactions - Nuclear chain reaction - critical size of a reactor - radiation hazards. UNIT – V Detection and measurements of Nuclear radiations Elementary particles : G-M Counter - Scintillation Counter - Cloud Chamber Bubble Chamber - Cerenkov Counters - Classification of elementary particles - Particle interaction - Conservation Laws - Leptons - Hardons - The Quark model

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 07.12.2017
1-L1	**UNIT -I Atomic Nucleus**
2-L2	**General properties of nucleus**
3- L3	**Binding energy**
4-L4	**Mass defect**
5-L5	**Proton**
6-L6	**proton hypothesis**
7-L7	**proton neutron hypothesis**
8-L8	**Nuclear forces**
9-L9	**Characteristics of nuclear forces**
10-P1	**Problem solving**
11-L10	**Weizsacker semi-empirical mass formula**
12-L11	**Shell model**
13-L12	**Magic Numbers**
14-L13	**UNIT – II Natural radioactivity**
15-L14	**Natural radioactivity**
16-L15	**alpha, beta and gamma rays**
17-L16	**properties**
18-L17	**Radioactive series**
19-L18	**Laws of radio active disintegration**
20-L19	**Radio**
21-L20	
22-L21	**Alpha decay**
23-L22	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins

24-L23	**Beta decay**
25-L24	**Neutrino and its properties**
26-IT-1	**Internal Test-I**
27-L25	**Gamma decay**
28-L26	**Internal Conversion**
29-L27	**Nuclear energy levels**
30-L28	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
31- L29	**Nuclear isomerism**
32- L30	**UNIT – III Particle accelerators**
33- L31	**Cyclotron**
34-P2	**College level meeting/Cell function**
35- L32	**Betatron**
36- L33	**Synchrotron**
37- L34	**Types of Nuclear reaction**
38- L35	**Q value of Nuclear Reactions**
39- L36	**The balance of mass and energy in Nuclear reactions**
40- L37	**Nuclear transmutations**
41- L38	**UNIT – IV Energy from the Nucleus**
42- L39	**Nuclear fission**
43- L40	**Types of fission**
44- L41	**P-E Curve for fission**
45- L42	**Bohr Wheeler‘s Theory of Nuclear fission**
46- L43	**Nuclear fusion and Thermonuclear reactions**
47- L44	**Controlled thermonuclear reactions**
48- L45	**- Nuclear chain reaction**
49- L46	**critical size of a reactor**
50- L47	**radiation hazards**
51- P3	**Department Seminar**
52- L48	**UNIT – V Detection and measurements of Nuclear**
53- L49	**G-M Counter**
54- L50	**Scintillation Counter**
55- L51	**Cloud Chamber**
56-L52	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
57-L53	**Bubble Chamber**
58-L54	**Cerenkov Counters**
59-IT-II	**Internal Test-II**
60- L55	**Classification of elementary particles**
61- L56	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
62- L57	**Particle interaction**
63- L58	**Conservation Laws**
64- L59	**Leptons**
65- L60	**Hardons**
66- L61	**The Quark model**
67- L62	**Liquid drop model**
68- L63	**Problem solving**

69- L64	**Carbon dating**
70- L65	**Problem solving**
71- L66	**Problem solving**
72- L67	**Bohr Wheeler‘s Theory of Nuclear fission**
73- L68	**Types of Nuclear reaction**
74-P4	**College level meeting/ function**
75- L69	**G-M Counter**
76- L70	**Problem solving**
77- L71	**Neutrino and its properties**
78- L72	**Problem solving**
79- L73	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
80- L74	**Problem solving**
81- L75	**Nuclear fusion and Thermonuclear reactions**
82-IT-III	**Internal Test-III**
83- L76	**Problem solving**
84- L77	**____ - Test Paper distribution and result analysis**
85- L78	**Problem solving**
	Entering Internal Test-III Marks into University portal
	Model Test begins
86- L79	**Model Test**
87-MT	**Model Test**
88-MT	**Model Test**
89-MT	**Model test paper distribution and previous year university question paper discussion**
90-L-80	**Feedback of the Course, analysis and report preparation**
	Even semester end with 23.04.2018

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	

IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Nuclear Physics
Course Code	SMPH63
Class	III Year (2019-2020)
Semester	Even
Staff Name	Dr.A.Arul Gnanam
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-

SYLLABUS

NUCLEAR PHYSICS

UNIT – I Atomic Nucleus : General properties of nucleus - Binding energy - Mass defect - Proton - proton hypothesis - proton neutron hypothesis - Nuclear forces - Characteristics of nuclear forces - Liquid drop model - Weizsacker semi-empirical mass formula - Shell model - Magic Numbers

UNIT – II Natural radioactivity - alpha, beta and gamma rays - properties - Radioactive series - Laws of radio active disintegration - Radio - Carbon dating - Alpha decay - Beta decay - Neutrino and its properties - Gamma decay - Internal Conversion - Nuclear energy levels - Nuclear isomerism

UNIT – III Particle accelerators: Cyclotron - Betatron – Synchrotron - Types of Nuclear reaction - Q value of Nuclear Reactions - The balance of mass and energy in Nuclear reactions - Nuclear transmutations.

UNIT – IV Energy from the Nucleus: Nuclear fission - Types of fission - P-E Curve for fission - Bohr Wheeler‘s Theory of Nuclear fission - Nuclear fusion and Thermonuclear reactions - Controlled thermonuclear reactions - Nuclear chain reaction - critical size of a reactor - radiation hazards

UNIT – V Detection and measurements of Nuclear radiations Elementary particles : G-M Counter - Scintillation Counter - Cloud Chamber Bubble Chamber - Cerenkov Counters - Classification of elementary particles - Particle interaction - Conservation Laws - Leptons - Hardons - The Quark model

Books for Reference: 1. Nuclear Physics by Irving Kaplan

2. Nuclear Physics by D.C Tayal

3. Halliday Rhesnick walker Ed 6 Wiley

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 02-12-2019
1-L1	**UNIT – I Atomic Nucleus**
2-L2	**General properties of nucleus - Binding energy –mass defect**
3- L3	**Proton - proton hypothesis**
4-L4	**proton neutron hypothesis - Nuclear forces**
5-L5	**Characteristics of nuclear forces**
6-L6	**Liquid drop model**
7-L7	**Weizsacker semi-empirical mass formula -**
8- P1	**Shell model - Magic Numbers**
9- L8	**UNIT – II Natural radioactivity**
10- L9	**alpha, beta and gamma rays properties**
11-L10	**Radioactive series**
12-L11	**Laws of radio active disintegration**
13-L12	**Radio - Carbon dating**
14-L13	**Alpha decay - Beta decay - Neutrino and its properties - Gamma decay**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**Internal Conversion - Nuclear energy levels - Nuclear isomerism**

17-IT-1	**Internal Test-I**
18-L16	**UNIT – III Particle accelerators**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**Cyclotron - Betatron**
21- L19	**Synchrotron - Types of Nuclear reaction -**
22- P2	**College level meeting/Cell function**
23-L20	**Q value of Nuclear Reactions -**
24-L21	**The balance of mass and energy in Nuclear reactions -**
25-L22	**Nuclear transmutations**
26-L23	**UNIT – IV Energy from the Nucleus**
27-L24	**Nuclear fission - Types of fission**
28-L25	**P-E Curve for fission -**
29-L26	**Bohr Wheeler‘s Theory of Nuclear fission**
30-L27	**Nuclear fusion and Thermonuclear reactions**
31-L28	**Controlled thermonuclear reactions**
32-L29	**Nuclear chain reaction**
33-L30	**critical size of a reactor**
34- P3	**Department Seminar**
35-L31	Revision
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Class test
38- IT-II	**Internal Test-II**
39-L34	**UNIT – V Detection and measurements of Nuclear radiations Elementary particles**
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**G-M Counter**
42- L37	**Scintillation Counter**
43- L38	**Cloud Chamber Bubble Chamber -**
44- P4	**College level meeting/ function**
45-L39	**Cerenkov Counters**
46-L40	**Classification of elementary particles**
47-L41	**Particle interaction**
48-L42	**Conservation Laws -**
49-L43	**Leptons - Hardons**
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**The Quark model**
52- L46	**Revision**
53-IT-III	**Internal Test-III**
54-L47	Problems
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**

58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working on 27-04-2020

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Optics
Course Code	GMPH12
Class	I year (2014-2017)
Semester	Odd
Staff Name	Mrs.D. Priscilla Koilpillai
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

Syllabus

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 - Fresnel's biprism theory and experiment to measure wavelength - Interference in thin films due to reflected light - Air wedge - experiment to find thickness of a wire - Testing the plainness of surfaces - 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 grating 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 polarized,elliptically polarized and circularly polarized light - Quarter wave 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; their characteristics - sources of power loss in optical fibres - Advantages of fibre optic communication. 5

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 - semiconductor diode lasers - dye laser-nitrogen and carbon - di- oxide lasers - di- oxide lasers. Holography and simple application

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 6

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2014
1-L1	Introduction - chromatic and spherical aberration in lenses and their removal
2-L2	Dispersion of light - Refraction through a thin prism
3- L3	Dispersive power of a prism
4-L4	Constant deviation spectroscope. Eyepieces
5-L5	Huygen , Ramsden and Gauss eyepieces -
6-L6	Aplanatic points - oil immersion objective
7-L7	Prism binocular.
8- P1	Analytical treatment of interference
9- L8	Theory of interference fringes
10- L9	Fresnel's biprism theory and experiment to measure wavelength
11-L10	Interference in thin films due to reflected light
12-L11	Air wedge - experiment to find thickness of a wire
13-L12	Testing the plainness of surfaces
14-L13	Michaelson's interferometer and applications.
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Diffraction by single slit and determination of intensity distribution by phasor method
17-IT-1	**Internal Test-I**
18-L16	Diffraction by circular aperture
19-L17	**____ -Test Paper distribution and result analysis**

	Entering Internal Test-I Marks into University portal
20-L18	Plane transmission grating
21- L19	Diffraction grating at normal and oblique incidence
22- P2	**College level meeting/Cell function**
23-L20	Limit of resolution and resolving power
24-L21	Rayleigh Criterion for resolution
25-L22	Resolving power of a plane diffraction grating and prism
26-L23	Fresnel wave front and theory of half period zones
27-L24	Zone plate-comparison with convex lens
28-L25	Double refraction - Nicol Prism as polarizer and analyser
29-L26	Production and detection of plane polarized,elliptically polarized and circularly polarized light
30-L27	Quarter wave and Half wave plates - optical activity
31-L28	Dichroism. Optical fibre and principles of fibre optics
32-L29	Acceptance angle - numerical aperture expression
33-L30	Step index optical fibre. Single mode and multimode step index optical fibres; their characteristics
34- P3	**Department Seminar**
35-L31	Sources of power loss in optical fibres
36-L32	____ - **Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Advantages of fibre optic communication
38- IT-II	**Internal Test-II**
39-L34	Problem solving
40-L35	____ **-Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Principle of laser - spontaneous emission stimulated emission
42- L37	Threshold condition (Schaw low and townes equations
43- L38	Rate equation - optical excitation
44- P4	**College level meeting/ function**
45-L39	Three and four level lasers
46-L40	Types of lasers
47-L41	Semiconductor diode lasers
48-L42	Dye laser-nitrogen and carbon -di- oxide lasers
49-L43	Holography and simple application
50-L44	____ - **Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Problem Solving
52- L46	Revision
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	____ - **Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper**

	discussion
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2014

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Optics
Course Code	GMPH12
Class	I year (2015-2018)
Semester	Odd
Staff Name	Mrs.D.Priscilla Koilpillai
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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-

Syllabus

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 - Fresnel's biprism theory and experiment to measure wavelength - Interference in thin films due to reflected light - Air wedge - experiment to find thickness of a wire - Testing the plainness of surfaces - 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 grating 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 polarized,elliptically polarized and circularly polarized light - Quarter wave 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; their characteristics - sources of power loss in optical fibres - Advantages of fibre optic communication. 5

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 - semiconductor diode lasers - dye laser-nitrogen and carbon - di- oxide lasers - di- oxide lasers. Holography and simple application

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 6

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2015
1-L1	Introduction - chromatic and spherical aberration in lenses and their removal
2-L2	Dispersion of light - Refraction through a thin prism
3- L3	Dispersive power of a prism
4-L4	Constant deviation spectroscope. Eyepieces
5-L5	Huygen , Ramsden and Gauss eyepieces -
6-L6	Aplanatic points - oil immersion objective
7-L7	Prism binocular.
8- P1	Analytical treatment of interference
9- L8	Theory of interference fringes
10- L9	Fresnel's biprism theory and experiment to measure wavelength
11-L10	Interference in thin films due to reflected light
12-L11	Air wedge - experiment to find thickness of a wire
13-L12	Testing the plainness of surfaces
14-L13	Michaelson's interferometer and applications.
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Diffraction by single slit and determination of intensity distribution by phasor method
17-IT-1	**Internal Test-I**
18-L16	Diffraction by circular aperture
19-L17	**____ -Test Paper distribution and result analysis**

	Entering Internal Test-I Marks into University portal
20-L18	Plane transmission grating
21- L19	Diffraction grating at normal and oblique incidence
22- P2	**College level meeting/Cell function**
23-L20	Limit of resolution and resolving power
24-L21	Rayleigh Criterion for resolution
25-L22	Resolving power of a plane diffraction grating and prism
26-L23	Fresnel wave front and theory of half period zones
27-L24	Zone plate-comparison with convex lens
28-L25	Double refraction - Nicol Prism as polarizer and analyser
29-L26	Production and detection of plane polarized,elliptically polarized and circularly polarized light
30-L27	Quarter wave and Half wave plates - optical activity
31-L28	Dichroism. Optical fibre and principles of fibre optics
32-L29	Acceptance angle - numerical aperture expression
33-L30	Step index optical fibre. Single mode and multimode step index optical fibres; their characteristics
34- P3	**Department Seminar**
35-L31	Sources of power loss in optical fibres
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Advantages of fibre optic communication
38- IT-II	**Internal Test-II**
39-L34	Problem solving
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Principle of laser - spontaneous emission stimulated emission
42- L37	Threshold condition (Schaw low and townes equations
43- L38	Rate equation - optical excitation
44- P4	**College level meeting/ function**
45-L39	Three and four level lasers
46-L40	Types of lasers
47-L41	Semiconductor diode lasers
48-L42	Dye laser-nitrogen and carbon -di- oxide lasers
49-L43	Holography and simple application
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Problem Solving
52- L46	Revision
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper**

	discussion
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 29.10.2015

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Optics
Course Code	JMPH12
Class	I year (2016-2019)
Semester	Odd
Staff Name	Mrs.R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

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 - Fresnel's biprism theory and experiment to measure wavelength - Interference in thin films due to reflected light - Air wedge - experiment to find thickness of a wire - Testing the plainness of surfaces - 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 grating 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 polarized,elliptically polarized and circularly polarized light - Quarter wave 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; their characteristics - sources of power loss in optical fibres - Advantages of fibre optic communication. 5

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 - semiconductor diode lasers - dye laser-nitrogen and carbon - di- oxide lasers - di- oxide lasers. Holography and simple application

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 6

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2016
1-L1	Introduction - chromatic and spherical aberration in lenses and their removal
2-L2	Dispersion of light - Refraction through a thin prism
3- L3	Dispersive power of a prism
4-L4	Constant deviation spectroscope. Eyepieces
5-L5	Huygen , Ramsden and Gauss eyepieces -
6-L6	Aplanatic points - oil immersion objective
7-L7	Prism binocular.
8- P1	Analytical treatment of interference
9- L8	Theory of interference fringes
10- L9	Fresnel's biprism theory and experiment to measure wavelength
11-L10	Interference in thin films due to reflected light
12-L11	Air wedge - experiment to find thickness of a wire
13-L12	Testing the plainness of surfaces
14-L13	Michaelson's interferometer and applications.
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Diffraction by single slit and determination of intensity distribution by phasor method
17-IT-1	**Internal Test-I**
18-L16	Diffraction by circular aperture
19-L17	**____ -Test Paper distribution and result analysis**

	Entering Internal Test-I Marks into University portal
20-L18	Plane transmission grating
21- L19	Diffraction grating at normal and oblique incidence
22- P2	**College level meeting/Cell function**
23-L20	Limit of resolution and resolving power
24-L21	Rayleigh Criterion for resolution
25-L22	Resolving power of a plane diffraction grating and prism
26-L23	Fresnel wave front and theory of half period zones
27-L24	Zone plate-comparison with convex lens
28-L25	Double refraction - Nicol Prism as polarizer and analyser
29-L26	Production and detection of plane polarized,elliptically polarized and circularly polarized light
30-L27	Quarter wave and Half wave plates - optical activity
31-L28	Dichroism. Optical fibre and principles of fibre optics
32-L29	Acceptance angle - numerical aperture expression
33-L30	Step index optical fibre. Single mode and multimode step index optical fibres; their characteristics
34- P3	**Department Seminar**
35-L31	Sources of power loss in optical fibres
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Advantages of fibre optic communication
38- IT-II	**Internal Test-II**
39-L34	Problem solving
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Principle of laser - spontaneous emission stimulated emission
42- L37	Threshold condition (Schaw low and townes equations
43- L38	Rate equation - optical excitation
44- P4	**College level meeting/ function**
45-L39	Three and four level lasers
46-L40	Types of lasers
47-L41	Semiconductor diode lasers
48-L42	Dye laser-nitrogen and carbon -di- oxide lasers
49-L43	Holography and simple application
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Problem Solving
52- L46	Revision
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper**

	discussion
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.11.2016

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

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St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Optics
Course Code	SMPH22
Class	I year (2017-2020)
Semester	Even
Staff Name	Mrs.R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

Paper II OPTICS

UNIT– I GEOMETRICAL OPTICS: Refraction through a thin lens – power of a lens – Effective focal length of two thin lenses in and out of contact – chromatic and spherical aberration and their removal. Dispersion of light – Refraction of light through a thin prism – dispersive power of a prism – deviation without dispersion – dispersion without deviation – Direct vision spectroscope.

UNIT – II PHYSICAL OPTICS:- INTERFERENCE: Conditions for interference – Fresnel's prism determination of wavelength of light (Theory & Expt) – Newton's ring – Determination of wavelength of light (Theory & Expt) – Airwedge – Determination of diameter for thin wire (Theory & Expt) – Testing a surface for planeness – Michelson's interferometer – Determination of wavelength of light.

UNIT – III DIFFRACTION: Fraunhofer diffraction – single slit – double slit – theory of plane transmission grating – oblique incidence – wavelength determination – resolving power of a grating – diffraction by a circular aperture – Fraunhofer diffraction – theory of half period zones – theory of zone plate – diffraction at a circular aperture.

UNIT – IV POLARISATION: Double refraction – nicol prism quarter wave plate – half wave plate – production, detection and analysis of plane, circularly and elliptically polarized light – optical rotation – Fresnel's theory of optical rotation – Laurentz half shade polarimeter – determination of specific rotatory power.

UNIT – V MODERN OPTICS:- Principles of fiber optics – optical fiber – critical angle of propagation – modes of propagation – acceptance angle – numerical aperture – types of optical fibers – single mode fiber and multimode fiber. Lasers – Einstein A and B coefficients – Ruby and He – Ne Lasers – Three level pumping scheme for laser operation – Holography and simple applications.

BOOKS FOR STUDY

1. A text book of OPTICS by N. Subramaniyam, Birjlal revised by M.N. Avadhanulu, S. Chand & Company Ltd., Ram Nagar, New Delhi – 110055. 2. OPTICS and SPECTROSCOPY by R. Murugeshan, S. Chand & Company Ltd., Ram Nagar, New Delhi – 110055. 3. Physics, Robert Resnick, David Halliday, Jearl Walker Wiley and Sons Inc., Sixth Edition.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 07.12.2017
1-L1	**UNIT– I GEOMETRICAL OPTICS**
2-L2	**Refraction through a thin lens**
3- L3	**power of a lens Effective focal length of two thin lenses in and out of contact**
4-L4	**chromatic and spherical aberration and their removal**
5-L5	**Dispersion of light – Refraction of light through a thin prism**
6-L6	**dispersive power of a prism**

7-L7	**deviation without dispersion – dispersion without deviation**
8- P1	**Direct vision spectroscope**
9- L8	**UNIT – II PHYSICAL OPTICS**
10- L9	**INTERFERENCE: Conditions for interference**
11-L10	**Fresnel's prism determination of wavelength of light (Theory & Expt)**
12-L11	**Newton's ring Determination of wavelength of light (Theory & Expt)**
13-L12	**Airwedge – Determination of diameter for thin wire (Theory & Expt)**
14-L13	**Testing a surface for planeness Determination of wavelength of light**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**UNIT – III DIFFRACTION**
17-IT-1	**Internal Test-I**
18-L16	**Fraunhofer diffraction – single slit – double slit**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**theory of plane transmission grating oblique incidence**
21- L19	**wavelength determination – resolving power of a grating diffraction by a circular aperture**
22- P2	**College level meeting/Cell function**
23-L20	**Fraunhofer diffraction – theory of half period zones – theory of zone plate**
24-L21	**determination of specific rotatory power**
25-L22	**UNIT – IV POLARISATION**
26-L23	**Principles of fiber optics**
27-L24	**nicol prism quarter wave plate – half wave plate**
28-L25	**production, detection and analysis of plane, circularly and elliptically polarized light**
29-L26	**optical rotation – Fresnel's theory of optical rotation**
30-L27	**Laurentz half shade polarimeter**
31-L28	**determination of specific rotatory power**
32-L29	**UNIT – V MODERN OPTICS**
33-L30	**Principles of fiber optics**
34- P3	**Department Seminar**
35-L31	**optical fiber – critical angle of propagation**
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**modes of propagation**
38- IT-II	**Internal Test-II**
39-L34	**acceptance angle**
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**numerical aperture**
42- L37	**types of optical fibers**
43- L38	**single mode fiber**
44- P4	**College level meeting/ function**
45-L39	**multimode fiber**
46-L40	**Lasers – Einstein A and B coefficients**
47-L41	**Problem solving**
48-L42	**Ruby and He**

49-L43	**Ne Lasers**
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**Three level pumping scheme for laser operation**
52- L46	**Problem solving**
53-IT-III	**Internal Test-III**
54-L47	**Holography and simple applications**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2018

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Optics
Course Code	SMPH22
Class	I year (2018-2021)
Semester	Even
Staff Name	Mrs.R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

Paper II OPTICS

UNIT– I GEOMETRICAL OPTICS: Refraction through a thin lens – power of a lens – Effective focal length of two thin lenses in and out of contact – chromatic and spherical aberration and their removal. Dispersion of light – Refraction of light through a thin prism – dispersive power of a prism – deviation without dispersion – dispersion without deviation – Direct vision spectroscope.

UNIT – II PHYSICAL OPTICS:- INTERFERENCE: Conditions for interference – Fresnel’s prism determination of wavelength of light (Theory & Expt) – Newton’s ring – Determination of wavelength of light (Theory & Expt) – Airwedge – Determination of

diameter for thin wire (Theory & Expt) – Testing a surface for planeness – Michelson's interferometer – Determination of wavelength of light.

UNIT – III DIFFRACTION: Fraunhofer diffraction – single slit – double slit – theory of plane transmission grating – oblique incidence – wavelength determination – resolving power of a grating – diffraction by a circular aperture – Fraunhofer diffraction – theory of half period zones – theory of zone plate – diffraction at a circular aperture.

UNIT – IV POLARISATION: Double refraction – nicol prism quarter wave plate – half wave plate – production, detection and analysis of plane, circularly and elliptically polarized light – optical rotation – Fresnel's theory of optical rotation – Laurentz half shade polarimeter – determination of specific rotatory power.

UNIT – V MODERN OPTICS:- Principles of fiber optics – optical fiber – critical angle of propagation – modes of propagation – acceptance angle – numerical aperture – types of optical fibers – single mode fiber and multimode fiber. Lasers – Einstein A and B coefficients – Ruby and He – Ne Lasers – Three level pumping scheme for laser operation – Holography and simple applications.

BOOKS FOR STUDY

1. A text book of OPTICS by N. Subramaniyam, Birjlal revised by M.N. Avadhanulu, S. Chand & Company Ltd., Ram Nagar, New Delhi – 110055. 2. OPTICS and SPECTROSCOPY by R. Murugeshan, S. Chand & Company Ltd., Ram Nagar, New Delhi – 110055. 3. Physics, Robert Resnick, David Halliday, Jearl Walker Wiley and Sons Inc., Sixth Edition.

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 03.12.2018
1-L1	**UNIT– I GEOMETRICAL OPTICS**
2-L2	**Refraction through a thin lens**
3- L3	**power of a lens Effective focal length of two thin lenses in and out of contact**
4-L4	**chromatic and spherical aberration and their removal**
5-L5	**Dispersion of light – Refraction of light through a thin prism**
6-L6	**dispersive power of a prism**
7-L7	**deviation without dispersion – dispersion without deviation**
8- P1	**Direct vision spectroscope**
9- L8	**UNIT – II PHYSICAL OPTICS**

10- L9	**INTERFERENCE: Conditions for interference**
11-L10	**Fresnel's prism determination of wavelength of light (Theory & Expt)**
12-L11	**Newton's ring Determination of wavelength of light (Theory & Expt)**
13-L12	**Airwedge – Determination of diameter for thin wire (Theory & Expt)**
14-L13	**Testing a surface for planeness Determination of wavelength of light**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**UNIT – III DIFFRACTION**
17-IT-1	**Internal Test-I**
18-L16	**Fraunhofer diffraction – single slit – double slit**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**theory of plane transmission grating oblique incidence**
21- L19	**wavelength determination – resolving power of a grating diffraction by a circular aperture**
22- P2	**College level meeting/Cell function**
23-L20	**Fraunhofer diffraction – theory of half period zones – theory of zone plate**
24-L21	**determination of specific rotatory power**
25-L22	**UNIT – IV POLARISATION**
26-L23	**Principles of fiber optics**
27-L24	**nicol prism quarter wave plate – half wave plate**
28-L25	**production, detection and analysis of plane, circularly and elliptically polarized light**
29-L26	**optical rotation – Fresnel's theory of optical rotation**
30-L27	**Laurentz half shade polarimeter**
31-L28	**determination of specific rotatory power**
32-L29	**UNIT – V MODERN OPTICS**
33-L30	**Principles of fiber optics**
34- P3	**Department Seminar**
35-L31	**optical fiber – critical angle of propagation**
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**modes of propagation**
38- IT-II	**Internal Test-II**
39-L34	**acceptance angle**
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**numerical aperture**
42- L37	**types of optical fibers**
43- L38	**single mode fiber**
44- P4	**College level meeting/ function**
45-L39	**multimode fiber**
46-L40	**Lasers – Einstein A and B coefficients**
47-L41	**Problem solving**
48-L42	**Ruby and He**
49-L43	**Ne Lasers**
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins

51 L45	**Three level pumping scheme for laser operation**
52- L46	**Problem solving**
53-IT-III	**Internal Test-III**
54-L47	**Holography and simple applications**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2019

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Optics
Course Code	SMPH22
Class	I year (2019-2022)
Semester	Even
Staff Name	Mrs.R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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-
-

Syllabus

Paper II **OPTICS**

UNIT– I GEOMETRICAL OPTICS: Refraction through a thin lens – power of a lens – Effective focal length of two thin lenses in and out of contact – chromatic and spherical aberration and their removal. Dispersion of light – Refraction of light through a thin prism – dispersive power of a prism – deviation without dispersion – dispersion without deviation – Direct vision spectroscope.

UNIT – II PHYSICAL OPTICS:- INTERFERENCE: Conditions for interference – Fresnel's prism determination of wavelength of light (Theory & Expt) – Newton's ring – Determination of wavelength of light (Theory & Expt) – Airwedge – Determination of

diameter for thin wire (Theory & Expt) – Testing a surface for planeness – Michelson's interferometer – Determination of wavelength of light.

UNIT – III DIFFRACTION: Fraunhofer diffraction – single slit – double slit – theory of plane transmission grating – oblique incidence – wavelength determination – resolving power of a grating – diffraction by a circular aperture – Fraunhofer diffraction – theory of half period zones – theory of zone plate – diffraction at a circular aperture.

UNIT – IV POLARISATION: Double refraction – nicol prism quarter wave plate – half wave plate – production, detection and analysis of plane, circularly and elliptically polarized light – optical rotation – Fresnel's theory of optical rotation – Laurentz half shade polarimeter – determination of specific rotatory power.

UNIT – V MODERN OPTICS:- Principles of fiber optics – optical fiber – critical angle of propagation – modes of propagation – acceptance angle – numerical aperture – types of optical fibers – single mode fiber and multimode fiber. Lasers – Einstein A and B coefficients – Ruby and He – Ne Lasers – Three level pumping scheme for laser operation – Holography and simple applications.

BOOKS FOR STUDY

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Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 02.12.2019
1-L1	**UNIT– I GEOMETRICAL OPTICS**
2-L2	**Refraction through a thin lens**
3- L3	**power of a lens Effective focal length of two thin lenses in and out of contact**
4-L4	**chromatic and spherical aberration and their removal**
5-L5	**Dispersion of light – Refraction of light through a thin prism**
6-L6	**dispersive power of a prism**
7-L7	**deviation without dispersion – dispersion without deviation**
8- P1	**Direct vision spectroscope**
9- L8	**UNIT – II PHYSICAL OPTICS**

10- L9	**INTERFERENCE: Conditions for interference**
11-L10	**Fresnel's prism determination of wavelength of light (Theory & Expt)**
12-L11	**Newton's ring Determination of wavelength of light (Theory & Expt)**
13-L12	**Airwedge – Determination of diameter for thin wire (Theory & Expt)**
14-L13	**Testing a surface for planeness Determination of wavelength of light**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**UNIT – III DIFFRACTION**
17-IT-1	**Internal Test-I**
18-L16	**Fraunhofer diffraction – single slit – double slit**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**theory of plane transmission grating oblique incidence**
21- L19	**wavelength determination – resolving power of a grating diffraction by a circular aperture**
22- P2	**College level meeting/Cell function**
23-L20	**Fraunhofer diffraction – theory of half period zones – theory of zone plate**
24-L21	**determination of specific rotatory power**
25-L22	**UNIT – IV POLARISATION**
26-L23	**Principles of fiber optics**
27-L24	**nicol prism quarter wave plate – half wave plate**
28-L25	**production, detection and analysis of plane, circularly and elliptically polarized light**
29-L26	**optical rotation – Fresnel's theory of optical rotation**
30-L27	**Laurentz half shade polarimeter**
31-L28	**determination of specific rotatory power**
32-L29	**UNIT – V MODERN OPTICS**
33-L30	**Principles of fiber optics**
34- P3	**Department Seminar**
35-L31	**optical fiber – critical angle of propagation**
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**modes of propagation**
38- IT-II	**Internal Test-II**
39-L34	**acceptance angle**
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**numerical aperture**
42- L37	**types of optical fibers**
43- L38	**single mode fiber**
44- P4	**College level meeting/ function**
45-L39	**multimode fiber**
46-L40	**Lasers – Einstein A and B coefficients**
47-L41	**Problem solving**
48-L42	**Ruby and He**
49-L43	**Ne Lasers**
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins

51 L45	**Three level pumping scheme for laser operation**
52- L46	**Problem solving**
53-IT-III	**Internal Test-III**
54-L47	**Holography and simple applications**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 27.04.2020

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	**PHYSICS FOR COMPETITIVE EXAMINATIONS**
Course Code	GSPH4A
Class	II Year (2014-2015)
Semester	Even
Staff Name	Dr. S. John Kennady vedhanathan Mrs. R. Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
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-
-

Syllabus

PHYSICS FOR COMPETITIVE EXAMINATIONS
(Skilled Based Subject)

Unit I
PEPotential Energy, Path dependence of conservative forces, Determining values, Conservation a PE curve, work done on a system by external forces, Conservation of energyof mechanical energy, Reading

Unit II
Avogadro‘s number, Ideal gases, Pressure, temperature and RMS speed, Translational KE, Mean free path, Distribution of molecular speedsspecifi, f ideal gasmolar c heats of ideal gases, C, quantum theory basics, adiabatic expansion o

Unit III

Electric potential energy, , equipotential SurfaceElectric Calculating potentialspotential from, field, Potential due to a group of chargesPE for a group o, f charges, ipolePE due to a d, PE due to continous distribution, calculating Field from Potential, Potential of a system of point charges, potential of a charged conductor.

Unit IV

Diffraction and wave theory, single slit maxima, minima, intensity single slit diffraction, circular aperture, double slitdouble slit, , dispersion, resolving power,

Unit V

Waves on a string and matter waves, Energies of trapped electrons, wave function of trapped electrons, finite well, different electron wells, hydrogen atom

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 03.12.2014
1-L1	PEPotential Energy, Path dependence of conservative forces, Determining
2-L2	, Determining values, Conservation
3- L3	a PE curve, work done on a system by external forces
4-L4	Conservation of energyof mechanical energy, Reading
5-L5	**Init II Introduction Avagatro's Number**
6-L6	Avogadro's number
7-L7	, Ideal gases, Pressure
8- P1	Pressure, temperature and RMS speed
9- L8	Translational KE
10- L9	Mean free path, Distribution of molecular speedsspecifi
11-L10	, f ideal gasmolar c heats of ideal gases
12-L11	quantum theory basics
13-L12	*adiabatic Expression Introduction*
14-L13	adiabatic expansion
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Problem Solving
17-IT-1	**Internal Test-I**
18-L16	Unit III Introduction
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**Unit III** Electric potential energy
21- L19	equipotential SurfaceElectric potentials
22- P2	Calculating potentialspotential from, field,
23-L20	Potential due to a group of charges
24-L21	chargesPE for a group o f charges
25-L22	dipolePE due to a PE

26-L23	to continous distribution
27-L24	calculating Field from Potential
28-L25	Potential of a system of point charges
29-L26	potential of a charged conductor
30-L27	Problem Solving
31-L28	Introduction of III Unit
32-L29	Discussion for the solving Problems
33-L30	Preparation for Internal Exam
34- P3	**Department Seminar**
35-L31	Unit Iv Diffraction Introduction
36-L32	____ - **Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Diffraction and wave theory
38- IT-II	**Internal Test-II**
39-L34	wave theory
40-L35	____ -**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	single slit maxima
42- L37	intensity single slit
43- L38	diffraction, circular
44- P4	diffraction, circular
45-L39	aperture, double
46-L40	Problem Solving
47-L41	Introduction of the double slit
48-L42	double slit,
49-L43	double slitdouble slit
50-L44	____ - **Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Revision
52- L46	Revision Class test
53-IT-III	**Internal Test-III**
54-L47	resolving power, **Unit V** Waves on a string and matter waves, Energies of trapped electrons
55-L48	____ - **Test Paper distribution and result analysis**
	wave function of trapped electrons, finite well, different electron wells, hydrogen atom
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2015

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

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St. John's College, Palayamkottai

Department of Physics

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(Prepared by staff member handling the course)

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Course Code	GSPH4A
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Staff Name	Dr. S. John Kennady vedhanathan Mrs. R. Nithya Agnes
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Course Objectives

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Syllabus

PHYSICS FOR COMPETITIVE EXAMINATIONS
(Skilled Based Subject)

Unit I

PEPotential Energy, Path dependence of conservative forces, Determining values, Conservation a PE curve, work done on a system by external forces, Conservation of energyof mechanical energy, Reading

Unit II

Avogadro's number, Ideal gases, Pressure, temperature and RMS speed, Translational KE, Mean free path, Distribution of molecular speedsspecifi, f ideal gasmolar c heats of ideal gases, C, quantum theory basics, adiabatic expansion o

Unit III

Electric potential energy, , equipotential SurfaceElectric Calculating potentialspotential from, field, Potential due to a group of chargesPE for a group o, f charges, ipolePE due to a d, PE due to continous distribution, calculating Field from Potential, Potential of a system of point charges, potential of a charged conductor.

Unit IV

Diffraction and wave theory, single slit maxima, minima, intensity single slit diffraction, circular aperture, double slitdouble slit, , dispersion, resolving power,

Unit V

Waves on a string and matter waves, Energies of trapped electrons, wave function of trapped electrons, finite well, different electron wells, hydrogen atom

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 02.12.2015
1-L1	PEPotential Energy, Path dependence of conservative forces, Determining
2-L2	, Determining values, Conservation
3- L3	a PE curve, work done on a system by external forces
4-L4	Conservation of energyof mechanical energy, Reading
5-L5	**Init II Introduction Avagatro's Number**
6-L6	Avogadro‘s number
7-L7	, Ideal gases, Pressure
8- P1	Pressure, temperature and RMS speed
9- L8	Translational KE
10- L9	Mean free path, Distribution of molecular speedsspecifi
11-L10	, f ideal gasmolar c heats of ideal gases
12-L11	quantum theory basics
13-L12	*adiabatic Expression Introduction*
14-L13	adiabatic expansion
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Problem Solving
17-IT-1	**Internal Test-I**
18-L16	Unit III Introduction
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**Unit III** Electric potential energy
21- L19	equipotential SurfaceElectric potentials
22- P2	Calculating potentialspotential from, field,
23-L20	Potential due to a group of charges
24-L21	chargesPE for a group o f charges
25-L22	dipolePE due to a PE

26-L23	to continous distribution
27-L24	calculating Field from Potential
28-L25	Potential of a system of point charges
29-L26	potential of a charged conductor
30-L27	Problem Solving
31-L28	Introduction of III Unit
32-L29	Discussion for the solving Problems
33-L30	Preparation for Internal Exam
34- P3	**Department Seminar**
35-L31	Unit Iv Diffraction Introduction
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Diffraction and wave theory
38- IT-II	**Internal Test-II**
39-L34	wave theory
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	single slit maxima
42- L37	intensity single slit
43- L38	diffraction, circular
44- P4	diffraction, circular
45-L39	aperture, double
46-L40	Problem Solving
47-L41	Introduction of the double slit
48-L42	double slit,
49-L43	double slitdouble slit
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Revision
52- L46	Revision Class test
53-IT-III	**Internal Test-III**
54-L47	resolving power, **Unit V** Waves on a string and matter waves, Energies of trapped electrons
55-L48	**____ - Test Paper distribution and result analysis**
	wave function of trapped electrons, finite well, different electron wells, hydrogen atom
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 22.04.2016

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	**PHYSICS FOR COMPETITIVE EXAMINATIONS**
Course Code	GSPH4A
Class	II Year (2016-2017)
Semester	Even
Staff Name	Dr. S. John Kennady vedhanathan Mrs. R. Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

PHYSICS FOR COMPETITIVE EXAMINATIONS
(Skilled Based Subject)

Unit I

PEPotential Energy, Path dependence of conservative forces, Determining values, Conservation a PE curve, work done on a system by external forces, Conservation of energyof mechanical energy, Reading

Unit II

Avogadro‘s number, Ideal gases, Pressure, temperature and RMS speed, Translational KE, Mean free path, Distribution of molecular speedsspecifi, f ideal gasmolar c heats of ideal gases, C, quantum theory basics, adiabatic expansion o

Unit III

Electric potential energy, , equipotential SurfaceElectric Calculating potentialspotential from, field, Potential due to a group of chargesPE for a group o, f charges, ipolePE due to a d, PE due to continous distribution, calculating Field from Potential, Potential of a system of point charges, potential of a charged conductor.

Unit IV

Diffraction and wave theory, single slit maxima, minima, intensity single slit diffraction, circular aperture, double slitdouble slit, , dispersion, resolving power,

Unit V

Waves on a string and matter waves, Energies of trapped electrons, wave function of trapped electrons, finite well, different electron wells, hydrogen atom

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 01.12.2016
1-L1	PEPotential Energy, Path dependence of conservative forces, Determining
2-L2	, Determining values, Conservation
3- L3	a PE curve, work done on a system by external forces
4-L4	Conservation of energyof mechanical energy, Reading
5-L5	**Init II Introduction Avagatro's Number**
6-L6	Avogadro's number
7-L7	, Ideal gases, Pressure
8- P1	Pressure, temperature and RMS speed
9- L8	Translational KE
10- L9	Mean free path, Distribution of molecular speedsspecifi
11-L10	, f ideal gasmolar c heats of ideal gases
12-L11	quantum theory basics
13-L12	*adiabatic Expression Introduction*
14-L13	adiabatic expansion
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Problem Solving
17-IT-1	**Internal Test-I**
18-L16	Unit III Introduction
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**Unit III** Electric potential energy
21- L19	equipotential SurfaceElectric potentials
22- P2	Calculating potentialspotential from, field,
23-L20	Potential due to a group of charges
24-L21	chargesPE for a group o f charges
25-L22	dipolePE due to a PE

26-L23	to continous distribution
27-L24	calculating Field from Potential
28-L25	Potential of a system of point charges
29-L26	potential of a charged conductor
30-L27	Problem Solving
31-L28	Introduction of III Unit
32-L29	Discussion for the solving Problems
33-L30	Preparation for Internal Exam
34- P3	**Department Seminar**
35-L31	Unit Iv Diffraction Introduction
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Diffraction and wave theory
38- IT-II	**Internal Test-II**
39-L34	wave theory
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	single slit maxima
42- L37	intensity single slit
43- L38	diffraction, circular
44- P4	diffraction, circular
45-L39	aperture, double
46-L40	Problem Solving
47-L41	Introduction of the double slit
48-L42	double slit,
49-L43	double slitdouble slit
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Revision
52- L46	Revision Class test
53-IT-III	**Internal Test-III**
54-L47	resolving power, **Unit V** Waves on a string and matter waves, Energies of trapped electrons
55-L48	**____ - Test Paper distribution and result analysis**
	wave function of trapped electrons, finite well, different electron wells, hydrogen atom
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 21.04.2017

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

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St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Properties of Matter
Course Code	GMPH11
Class	I Year (2014-2015)
Semester	Odd
Staff Name	Mr.Dhinakaran
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

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 - oscillations - Uniform bending and Non- Determination of Young's modulus by cantilever uniform bending - theory and experiments . UNIT-III: FLUIDS Surface Tension - Synclastic and anticlastic surface - 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

3

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 by Murugeshan R, S Chand & Co. Pvt. Ltd., New Delhi

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

Books for Reference

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

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

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

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

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

6. The Feynman Lectures on Physics, Vols. I, II and III, by R P Feynman, RB

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 18.6.2014
1-L1	**Hooke's law - Stress-strain diagram**
2-L2	**Elastic moduli-Relation between elastic constants**
3- L3 –	**Poisson's Ratio**
4-L4	**Expression for Poisson's ratio in terms of elastic constants**
5-L5	**- experimental determination of poisson's ratio of rubber**
6-L6	**Twisting couple on a cylinder**
7-L7	**-Work done in twisting a wire**
8- P1	**Torsional pendulum-**
9- L8	**Determination of Rigidity modulus and moment of inertia**
10- L9	**q, n and σ by Searles method**
11-L10	**- section griders**
12-L11	**BEAMS Bending of beams**
13-L12	**Expression for bending moment**
14-L13	Rivision
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**Cantilever**
17-IT-1	**Internal Test-I**
18-L16	**Uniform bending and Non-uniform bending - theory and experiments**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**Expression for cantilever depression and oscillations**
21- L19	**oscillations - Uniform bending and Non- Determination of Young's modulus by cantilever uniform bending**
22- P2	**College level meeting/Cell function**
23-L20	**theory and experiments**
24-L21	**FLUIDS Surface Tension**
25-L22	**Synclastic and anticlastic surface**
26-L23	**Excess of pressure**
27-L24	**Application to spherical and cylindrical drops and bubbles**
28-L25	**variation of surface tension with temperature**
29-L26	**- Jaegar's method**
30-L27	**Capillary rise - Experimental determination of surface tension by capillary rise**
31-L28	**- Experimental determination of surface tension by capillary rise - angle of contact of mercury**
32-L29	**Quincke's method**
33-L30	**Viscosity - Rate flow of liquid in a capillary tube - Poiseuille's formula**
34- P3	**Department Seminar**

35-L31	Rivision
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**Determination of coefficient of viscosity by capillary flow - Variations of viscosity of a liquid with temperature- lubricants.**
38- IT-II	**Internal Test-II**
39-L34	**: SOUND Sound - Simple harmonic motion - free, damped, forced vibrations and resonance -Helmholtz resonator-**
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**Helmholtz resonator-laws of transverse vibration of strings - Sonometer- Determination of AC frequency using sonometer**
42- L37	**- Determination of frequency using Melde's apparatus. Decibels - Intensity levels - musical notes - musical scale**
43- L38	**ULTRASONICS Ultrasonics - production - piezoelectric method- magnetostriction method- detection - properties – applications**
44- P4	**College level meeting/ function**
45-L39	**Intensity level and loudness** **Acoustics of buildings**
46-L40	**Reverberation - reverberation time - derivation of Sabine's formula - determination of absorption coefficient -**
47-L41	**factors affecting acoustics of buildings-**
48-L42	
49-L43	
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**optimum reverberation time**
52- L46	Rivision
53-IT-III	**Internal Test-III**
54-L47	**– sources of noises and its control-sound level meter130**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2014

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	

CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
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Department of Physics

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(Prepared by staff member handling the course)

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Course Name	Properties of Matter
Course Code	GMPH11
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Semester	Odd
Staff Name	Mrs.R.Nithya Agnes
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Course Objectives

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Syllabus

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UNIT-II: BENDING OF BEAMS Bending of beams - Expression for bending moment - Cantilever - Expression for cantilever depression and oscillations - oscillations - Uniform bending and Non- Determination of Young’s modulus by cantilever uniform bending - theory and experiments . UNIT-III: FLUIDS Surface Tension - Synclastic and anticlastic surface - Excess of pressure - Application to spherical and cylindrical

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6. The Feynman Lectures on Physics, Vols. I, II and III, by R P Feynman, RB

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 18.6.2015
1-L1	**Hooke's law - Stress-strain diagram**
2-L2	**Elastic moduli-Relation between elastic constants**
3- L3 –	**Poisson's Ratio**
4-L4	**Expression for Poisson's ratio in terms of elastic constants**
5-L5	**- experimental determination of poisson's ratio of rubber**
6-L6	**Twisting couple on a cylinder**
7-L7	**-Work done in twisting a wire**
8- P1	**Torsional pendulum-**
9- L8	**Determination of Rigidity modulus and moment of inertia**
10- L9	**q, n and σ by Searles method**
11-L10	**- section griders**
12-L11	**BEAMS Bending of beams**
13-L12	**Expression for bending moment**
14-L13	Rivision
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**Cantilever**
17-IT-1	**Internal Test-I**
18-L16	**Uniform bending and Non-uniform bending - theory and experiments**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**Expression for cantilever depression and oscillations**
21- L19	**oscillations - Uniform bending and Non- Determination of Young's modulus by cantilever uniform bending**
22- P2	**College level meeting/Cell function**
23-L20	**theory and experiments**
24-L21	**FLUIDS Surface Tension**
25-L22	**Synclastic and anticlastic surface**
26-L23	**Excess of pressure**
27-L24	**Application to spherical and cylindrical drops and bubbles**
28-L25	**variation of surface tension with temperature**
29-L26	**- Jaegar's method**
30-L27	**Capillary rise - Experimental determination of surface tension by capillary rise**
31-L28	**- Experimental determination of surface tension by capillary rise - angle of contact of mercury**
32-L29	**Quincke's method**
33-L30	**Viscosity - Rate flow of liquid in a capillary tube - Poiseuille's formula**
34- P3	**Department Seminar**

35-L31	Rivision
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**Determination of coefficient of viscosity by capillary flow - Variations of viscosity of a liquid with temperature- lubricants.**
38- IT-II	**Internal Test-II**
39-L34	**: SOUND Sound - Simple harmonic motion - free, damped, forced vibrations and resonance -Helmholtz resonator-**
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**Helmholtz resonator-laws of transverse vibration of strings - Sonometer-Determination of AC frequency using sonometer**
42- L37	**- Determination of frequency using Melde's apparatus. Decibels - Intensity levels - musical notes - musical scale**
43- L38	**ULTRASONICS Ultrasonics - production - piezoelectric method-magnetostriction method- detection - properties – applications**
44- P4	**College level meeting/ function**
45-L39	**Intensity level and loudness** **Acoustics of buildings**
46-L40	**Reverberation - reverberation time - derivation of Sabine's formula - determination of absorption coefficient -**
47-L41	**factors affecting acoustics of buildings-**
48-L42	
49-L43	
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**optimum reverberation time**
52- L46	Rivision
53-IT-III	**Internal Test-III**
54-L47	**– sources of noises and its control-sound level meter130**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 29.10.2015

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	

CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Properties of Matter
Course Code	JMPH11
Class	I Year (2016-2017)
Semester	Odd
Staff Name	Mrs.R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

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 - oscillations - Uniform bending and Non- Determination of Young’s modulus by cantilever uniform

bending - theory and experiments . UNIT-III: FLUIDS Surface Tension - Synclastic and anticlastic surface - 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

3

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 by Murugeshan R, S Chand & Co. Pvt. Ltd., New Delhi

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

Books for Reference

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

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

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

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

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

6. The Feynman Lectures on Physics, Vols. I, II and III, by R P Feynman, RB

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 16.6.2016
1-L1	**Hooke's law - Stress-strain diagram**
2-L2	**Elastic moduli-Relation between elastic constants**
3- L3 –	**Poisson's Ratio**
4-L4	**Expression for Poisson's ratio in terms of elastic constants**
5-L5	**- experimental determination of poisson's ratio of rubber**
6-L6	**Twisting couple on a cylinder**
7-L7	**-Work done in twisting a wire**
8- P1	**Torsional pendulum-**
9- L8	**Determination of Rigidity modulus and moment of inertia**
10- L9	**q, n and σ by Searles method**
11-L10	**- section griders**
12-L11	**BEAMS Bending of beams**
13-L12	**Expression for bending moment**
14-L13	Rivision
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**Cantilever**
17-IT-1	**Internal Test-I**
18-L16	**Uniform bending and Non-uniform bending - theory and experiments**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**Expression for cantilever depression and oscillations**
21- L19	**oscillations - Uniform bending and Non- Determination of Young's modulus by cantilever uniform bending**
22- P2	**College level meeting/Cell function**
23-L20	**theory and experiments**
24-L21	**FLUIDS Surface Tension**
25-L22	**Synclastic and anticlastic surface**
26-L23	**Excess of pressure**
27-L24	**Application to spherical and cylindrical drops and bubbles**
28-L25	**variation of surface tension with temperature**
29-L26	**- Jaegar's method**
30-L27	**Capillary rise - Experimental determination of surface tension by capillary rise**
31-L28	**- Experimental determination of surface tension by capillary rise - angle of contact of mercury**

32-L29	**Quincke's method**
33-L30	**Viscosity - Rate flow of liquid in a capillary tube - Poiseuille's formula**
34- P3	**Department Seminar**
35-L31	Rivision
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**Determination of coefficient of viscosity by capillary flow - Variations of viscosity of a liquid with temperature- lubricants.**
38- IT-II	**Internal Test-II**
39-L34	**: SOUND Sound - Simple harmonic motion - free, damped, forced vibrations and resonance -Helmholtz resonator-**
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**Helmholtz resonator-laws of transverse vibration of strings - Sonometer-Determination of AC frequency using sonometer**
42- L37	**- Determination of frequency using Melde's apparatus. Decibels - Intensity levels - musical notes - musical scale**
43- L38	**ULTRASONICS Ultrasonics - production - piezoelectric method-magnetostriction method- detection - properties – applications**
44- P4	**College level meeting/ function**
45-L39	**Intensity level and loudness** **Acoustics of buildings**
46-L40	**Reverberation - reverberation time - derivation of Sabine's formula - determination of absorption coefficient -**
47-L41	**factors affecting acoustics of buildings-**
48-L42	
49-L43	
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**optimum reverberation time**
52- L46	Rivision
53-IT-III	**Internal Test-III**
54-L47	**– sources of noises and its control-sound level meter130**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.11.2016

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Properties Of Matter
Course Code	SMPH12
Class	I year (2017-2018)
Semester	Odd
Staff Name	Mr.Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

Paper I Properties of Matter and Oscillations

Unit I. ELASTICITY: - Modulus of elasticity- Poisson’s ratio- Relation between elastic constants and Poisson’s ratio- Twisting couple on a cylinder -Energy stored in a twisted wire- - Torsional pendulum (with and without weights)- Bending of beams- Bending moment- Cantilever loading- -Non-uniform and uniform bending of a beam

Bending of beams- Bending moment- Cantilever loading- -Non-uniform and uniform bending of a beam

UnitII.Viscosity and low pressure : - Newton’s law- Poiseuilles flow- Stoke’s fall-Rotation viscometer- Ostwald viscometer- Meyer’s formula for viscosity of gas-Rankine’s method- Effect of temperature and pressure on viscosity- Vacuum pump-Rotary oil pump-Mercury diffusion pump- Knudsen Gauge.

Unit III. SURFACE TENSION: - Molecular interpretation- surface energy- Pressure difference across a curved surface- Excess pressure in liquid drops and air bubbles- Molecular forces- Shape of liquid meniscus in capillary tube-Angle of contact- Capillary rise and energy consideration- Jaeger's method.

OSCILLATIONS Unit IV. Simple Harmonic Motion: Simple Harmonic Oscillator, Motion of simple and compound pendulum , loaded spring, Energy in simple harmonic motion. Superposition principle: (i) collinear SHM of same frequency, Standing wave on a stretched string (both ends fixed).. (ii) SHM of same frequency but perpendicular to each other and (iii) Lissajous figures .

Unit V. Damped Harmonic Motion: Equation of motion, Dead beat motion, Critically damped system, Lightly damped system: relaxation time, logarithmic decrement, quality factor. Forced Oscillations: Equation of motion, complete solution, Steady state solution, Resonance, Sharpness of resonance, Quality factor. Wave Motion: One dimensional plane wave; Classical wave equation;;

Books for study 1. Properties of Matter - Brijlal & Subramaniam. 2. Properties of Matter - D.S. Mathur 3. Properties of Matter - Murugesan 4. Waves & Oscillations - Brijlal & Subramaniam 5. Satya Prakash and Akash Saluja- oscillations and waves- pragati prakashan (2002) Books for Reference

1. Physics, Robert Resnick, David Halliday, Jearl Walker Wiley and Sons Inc., Sixth Edition. 2. Waves and Oscillations, Berkeley Physics Course, Vol. 3. F. S. Crawford, Tata McGraw Hill 3. H.R Gulati- fundamental of general properties of matter- R.Chand and co- fifth edition (1977) 4. N.k Bajaj- The physics of waves and oscillations- Tata McGraw-Hill (1988)

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 16.06.2017
1-L1	**Unit I. ELASTICITY**
2-L2	**Modulus of elasticity- Poisson's ratio**
3- L3	**Relation between elastic constants and Poisson's ratio- Twisting couple on a cylinder**
4-L4	**Energy stored in a twisted wire- - Torsional pendulum (with and without weights)**
5-L5	**Torsional pendulum (with and without weights)- Bending of beams- Bending moment- Cantilever loading-**
6-L6	**Bending of beams- Bending moment- Cantilever loading- -Non-uniform and uniform bending of a beam**

7-L7	**UnitII.Viscosity and low pressure**
8- P1	**Welcoming of First year and Inauguration of physics Association**
9- L8	**Newton's law- Poiseuilles flow- Stoke's fall**
10- L9	**Rotation viscometer- Ostwald viscometer- Meyer's formula for viscosity of gas-Rankine's method- Effect of temperature and pressure on viscosity**
11-L10	**Vacuum pump- Rotary oil pump-Mercury diffusion pump- Knudsen Gauge.**
12-L11	**Unit III. SURFACE TENSION**
13-L12	**- Molecular interpretation- surface energy- Pressure difference across a curved surface**
14-L13	**Excess pressure in liquid drops and air bubbles-Molecular forces- Shape of liquid meniscus in capillary tube**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**Angle of contact- Capillary rise and energy consideration- Jaeger's method.**
17-IT-1	**Internal Test-I**
18-L16	**Unit IV- OSCILLATIONS Simple Harmonic Motion**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**, Motion of simple and compound pendulum , loaded spring,.:**
21- L19	**. Superposition principle: (i) collinear SHM of same frequency but perpendicular to each other.**
22- P2	**College level meeting/Cell function**
23-L20	**, Energy in simple harmonic motion. Superposition principle**
24-L21	**Lissajous figures**
25-L22	**Simple Harmonic Oscillator**
26-L23	**(i) collinear SHM of same frequency**
27-L24	**Unit V. Damped Harmonic Motion**
28-L25	**Equation of motion**
29-L26	**Dead beat motion**
30-L27	**Critically damped system,**
31-L28	**relaxation time, logarithmic decrement**
32-L29	Problem solving
33-L30	**relaxation time, logarithmic decrement**
34- P3	**Department Seminar**
35-L31	**logarithmic decrement,**
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**quality factor. Forced Oscillations**
38- IT-II	**Internal Test-II**
39-L34	Problem solving
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**Equation of motion, complete solution**
42- L37	**Dead beat motion**
43- L38	**, Energy in simple harmonic motion. Superposition principle**

44- P4	**College level meeting/ function**
45-L39	**Energy in simple harmonic motion. Superposition principle**
46-L40	**Superposition principle**
47-L41	**Sharpness of resonance**
48-L42	**Quality factor. Wave Motion**
49-L43	**Wave Motion: One dimensional plane wave**
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**Classical wave equation**
52- L46	Problem solving
53-IT-III	**Internal Test-III**
54-L47	**Energy in simple harmonic motion**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 06.11.2017

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Properties Of Matter
Course Code	SMPH12
Class	I year (2018-2019)
Semester	Odd
Staff Name	Mr.Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

Paper I Properties of Matter and Oscillations

Unit I. ELASTICITY: - Modulus of elasticity- Poisson's ratio- Relation between elastic constants and Poisson's ratio- Twisting couple on a cylinder -Energy stored in a twisted wire- - Torsional pendulum (with and without weights)- Bending of beams- Bending moment- Cantilever loading- -Non-uniform and uniform bending of a beam

Bending of beams- Bending moment- Cantilever loading- -Non-uniform and uniform bending of a beam

UnitII.Viscosity and low pressure : - Newton's law- Poiseuilles flow- Stoke's fall- Rotation viscometer- Ostwald viscometer- Meyer's formula for viscosity of gas- Rankine's method- Effect of temperature and pressure on viscosity- Vacuum pump- Rotary oil pump-Mercury diffusion pump- Knudsen Gauge.

Unit III. SURFACE TENSION: - Molecular interpretation- surface energy- Pressure difference across a curved surface- Excess pressure in liquid drops and air bubbles- Molecular forces- Shape of liquid meniscus in capillary tube-Angle of contact- Capillary rise and energy consideration- Jaeger's method.

OSCILLATIONS Unit IV. Simple Harmonic Motion: Simple Harmonic Oscillator, Motion of simple and compound pendulum , loaded spring, Energy in simple harmonic motion. Superposition principle: (i) collinear SHM of same frequency, Standing wave on a stretched string (both ends fixed).. (ii) SHM of same frequency but perpendicular to each other and (iii) Lissajous figures .

Unit V. Damped Harmonic Motion: Equation of motion, Dead beat motion, Critically damped system, Lightly damped system: relaxation time, logarithmic decrement, quality factor. Forced Oscillations: Equation of motion, complete solution, Steady state solution, Resonance, Sharpness of resonance, Quality factor. Wave Motion: One dimensional plane wave; Classical wave equation;;

Books for study 1. Properties of Matter - Brijlal & Subramaniam. 2. Properties of Matter - D.S. Mathur 3. Properties of Matter - Murugesan 4. Waves & Oscillations - Brijlal & Subramaniam 5. Satya Prakash and Akash Saluja- oscillations and waves- pragati prakashan (2002) Books for Reference

1. Physics, Robert Resnick, David Halliday, Jearl Walker Wiley and Sons Inc., Sixth Edition. 2. Waves and Oscillations, Berkeley Physics Course, Vol. 3. F. S. Crawford, Tata McGraw Hill 3. H.R Gulati- fundamental of general properties of matter- R.Chand and co- fifth edition (1977) 4. N.k Bajaj- The physics of waves and oscillations- Tata McGraw-Hill (1988)

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2018
1-L1	**Unit I. ELASTICITY**
2-L2	**Modulus of elasticity- Poisson's ratio**
3- L3	**Relation between elastic constants and Poisson's ratio- Twisting couple on a cylinder**
4-L4	**Energy stored in a twisted wire- - Torsional pendulum (with and without weights)**
5-L5	**Torsional pendulum (with and without weights)- Bending of beams- Bending moment- Cantilever loading-**
6-L6	**Bending of beams- Bending moment- Cantilever loading- -Non-uniform and uniform bending of a beam**

7-L7	**UnitII.Viscosity and low pressure**
8- P1	**Welcoming of First year and Inauguration of physics Association**
9- L8	**Newton's law- Poiseuilles flow- Stoke's fall**
10- L9	**Rotation viscometer- Ostwald viscometer- Meyer's formula for viscosity of gas-Rankine's method- Effect of temperature and pressure on viscosity**
11-L10	**Vacuum pump- Rotary oil pump-Mercury diffusion pump- Knudsen Gauge.**
12-L11	**Unit III. SURFACE TENSION**
13-L12	**- Molecular interpretation- surface energy- Pressure difference across a curved surface**
14-L13	**Excess pressure in liquid drops and air bubbles-Molecular forces- Shape of liquid meniscus in capillary tube**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**Angle of contact- Capillary rise and energy consideration- Jaeger's method.**
17-IT-1	**Internal Test-I**
18-L16	**Unit IV- OSCILLATIONS Simple Harmonic Motion**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**, Motion of simple and compound pendulum , loaded spring,.:**
21- L19	**. Superposition principle: (i) collinear SHM of same frequency but perpendicular to each other.**
22- P2	**College level meeting/Cell function**
23-L20	**, Energy in simple harmonic motion. Superposition principle**
24-L21	**Lissajous figures**
25-L22	**Simple Harmonic Oscillator**
26-L23	**(i) collinear SHM of same frequency**
27-L24	**Unit V. Damped Harmonic Motion**
28-L25	**Equation of motion**
29-L26	**Dead beat motion**
30-L27	**Critically damped system,**
31-L28	**relaxation time, logarithmic decrement**
32-L29	Problem solving
33-L30	**relaxation time, logarithmic decrement**
34- P3	**Department Seminar**
35-L31	**logarithmic decrement,**
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**quality factor. Forced Oscillations**
38- IT-II	**Internal Test-II**
39-L34	Problem solving
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**Equation of motion, complete solution**
42- L37	**Dead beat motion**
43- L38	**, Energy in simple harmonic motion. Superposition principle**

44- P4	**College level meeting/ function**
45-L39	**Energy in simple harmonic motion. Superposition principle**
46-L40	**Superposition principle**
47-L41	**Sharpness of resonance**
48-L42	**Quality factor. Wave Motion**
49-L43	**Wave Motion: One dimensional plane wave**
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**Classical wave equation**
52- L46	Problem solving
53-IT-III	**Internal Test-III**
54-L47	**Energy in simple harmonic motion**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.11.2018

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Properties Of Matter
Course Code	SMPH12
Class	I year (2019-2020)
Semester	Odd
Staff Name	Mrs. R. Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

Paper I Properties of Matter and Oscillations

Unit I. ELASTICITY: - Modulus of elasticity- Poisson's ratio- Relation between elastic constants and Poisson's ratio- Twisting couple on a cylinder -Energy stored in a twisted wire- - Torsional pendulum (with and without weights)- Bending of beams- Bending moment- Cantilever loading- -Non-uniform and uniform bending of a beam

Bending of beams- Bending moment- Cantilever loading- -Non-uniform and uniform bending of a beam

UnitII.Viscosity and low pressure : - Newton's law- Poiseuilles flow- Stoke's fall- Rotation viscometer- Ostwald viscometer- Meyer's formula for viscosity of gas- Rankine's method- Effect of temperature and pressure on viscosity- Vacuum pump- Rotary oil pump-Mercury diffusion pump- Knudsen Gauge.

Unit III. SURFACE TENSION: - Molecular interpretation- surface energy- Pressure difference across a curved surface- Excess pressure in liquid drops and air bubbles- Molecular forces- Shape of liquid meniscus in capillary tube-Angle of contact- Capillary rise and energy consideration- Jaeger's method.

OSCILLATIONS Unit IV. Simple Harmonic Motion: Simple Harmonic Oscillator, Motion of simple and compound pendulum , loaded spring, Energy in simple harmonic motion. Superposition principle: (i) collinear SHM of same frequency, Standing wave on a stretched string (both ends fixed).. (ii) SHM of same frequency but perpendicular to each other and (iii) Lissajous figures .

Unit V. Damped Harmonic Motion: Equation of motion, Dead beat motion, Critically damped system, Lightly damped system: relaxation time, logarithmic decrement, quality factor. Forced Oscillations: Equation of motion, complete solution, Steady state solution, Resonance, Sharpness of resonance, Quality factor. Wave Motion: One dimensional plane wave; Classical wave equation;;

Books for study 1. Properties of Matter - Brijlal & Subramaniam. 2. Properties of Matter - D.S. Mathur 3. Properties of Matter - Murugesan 4. Waves & Oscillations - Brijlal & Subramaniam 5. Satya Prakash and Akash Saluja- oscillations and waves- pragati prakashan (2002) Books for Reference

1. Physics, Robert Resnick, David Halliday, Jearl Walker Wiley and Sons Inc., Sixth Edition. 2. Waves and Oscillations, Berkeley Physics Course, Vol. 3. F. S. Crawford, Tata McGraw Hill 3. H.R Gulati- fundamental of general properties of matter- R.Chand and co- fifth edition (1977) 4. N.k Bajaj- The physics of waves and oscillations- Tata McGraw-Hill (1988)

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 17.06.2019
1-L1	**Unit I. ELASTICITY**
2-L2	**Modulus of elasticity- Poisson's ratio**
3- L3	**Relation between elastic constants and Poisson's ratio- Twisting couple on a cylinder**
4-L4	**Energy stored in a twisted wire- - Torsional pendulum (with and without weights)**
5-L5	**Torsional pendulum (with and without weights)- Bending of beams- Bending moment- Cantilever loading-**
6-L6	**Bending of beams- Bending moment- Cantilever loading- -Non-uniform and uniform bending of a beam**

7-L7	**UnitII.Viscosity and low pressure**
8- P1	**Welcoming of First year and Inauguration of physics Association**
9- L8	**Newton's law- Poiseuilles flow- Stoke's fall**
10- L9	**Rotation viscometer- Ostwald viscometer- Meyer's formula for viscosity of gas-Rankine's method- Effect of temperature and pressure on viscosity**
11-L10	**Vacuum pump- Rotary oil pump-Mercury diffusion pump- Knudsen Gauge.**
12-L11	**Unit III. SURFACE TENSION**
13-L12	**- Molecular interpretation- surface energy- Pressure difference across a curved surface**
14-L13	**Excess pressure in liquid drops and air bubbles-Molecular forces- Shape of liquid meniscus in capillary tube**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**Angle of contact- Capillary rise and energy consideration- Jaeger's method.**
17-IT-1	**Internal Test-I**
18-L16	**Unit IV- OSCILLATIONS Simple Harmonic Motion**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**, Motion of simple and compound pendulum , loaded spring,.:**
21- L19	**. Superposition principle: (i) collinear SHM of same frequency but perpendicular to each other.**
22- P2	**College level meeting/Cell function**
23-L20	**, Energy in simple harmonic motion. Superposition principle**
24-L21	**Lissajous figures**
25-L22	**Simple Harmonic Oscillator**
26-L23	**(i) collinear SHM of same frequency**
27-L24	**Unit V. Damped Harmonic Motion**
28-L25	**Equation of motion**
29-L26	**Dead beat motion**
30-L27	**Critically damped system,**
31-L28	**relaxation time, logarithmic decrement**
32-L29	Problem solving
33-L30	**relaxation time, logarithmic decrement**
34- P3	**Department Seminar**
35-L31	**logarithmic decrement,**
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**quality factor. Forced Oscillations**
38- IT-II	**Internal Test-II**
39-L34	Problem solving
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**Equation of motion, complete solution**
42- L37	**Dead beat motion**
43- L38	**, Energy in simple harmonic motion. Superposition principle**

44- P4	**College level meeting/ function**
45-L39	**Energy in simple harmonic motion. Superposition principle**
46-L40	**Superposition principle**
47-L41	**Sharpness of resonance**
48-L42	**Quality factor. Wave Motion**
49-L43	**Wave Motion: One dimensional plane wave**
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**Classical wave equation**
52- L46	Problem solving
53-IT-III	**Internal Test-III**
54-L47	**Energy in simple harmonic motion**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.10.2019

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Quantum Mechanics
Course Code	GMPH5B
Class	III year (2014-2015)
Semester	Odd
Staff Name	Dr.S.John Kennedy Vedhanathan
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

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Syllabus

QUANTUM MECHANICS
(Major Elective Paper)
Unit I
Quantum Theory: Limitations of classical theory – Black body radiation – Black body radiation - Max Planck's theory of quantum radiation – Einstein's theory of Photo electric effect
– Compton effect – specific heat of solids – Bohr model of hydrogen atom – inadequacy of quantum theory – De Broglie's wave nature of particles – wave packet and its significance – wave packet and its motion.
Unit II
Wave Mechanics: The uncertainty principle – single slit experiment – Uncertainty for other variables – Applications of Uncertainty principle – Schrodinger wave equation – Time

dependent and Time independent forms – Interpretations of wave function – Probability current density – Expectation values – Ehrenfest‘s theorm.

Unit III

Quantum Mechanics: Linear vector space – Orthogonal functions – eigan functions and eigan values – Orthonormality of eigan functions – energy eigan values are real – linear operator

Hermitian operator– Postulates of Quantum mechanics – Simultaneous measurements and commutating operators – The adjoint or self adjoint of an operator – Dirac‘s notation – Equations of motion in Schrodinger representation

Unit IV

Simple applications: Particle in one dimensional Square well with infinite walls - Square well with finite walls – Potential step – Square potential barrier – barrier penetration – Alpha emission

Unit V

Simple applications: Bloch waves in periodic potential –Kronig – Penny square well periodic potential – linear Harmonic Oscillator – Schrodinger method – Operator method – The free particle.

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2014
1-L1	Quantum Theory: Limitations of classical theory
2-L2	Max Planck‘s theory of quantum radiation
3- L3	Einstein‘s theory of Photo electric effect
4-L4	Compton effect – specific heat of solids
5-L5	Bohr model of hydrogen atom
6-L6	De Broglie‘s wave nature of particles
7-L7	wave packet and its motion.
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	wave packet and its significance
10- L9	Unit II-Wave Mechanics: Introduction
11-L10	Schrodinger wave equation
12-L11	Time dependent and Time independent forms
13-L12	Interpretations of wave function
14-L13	Uncertainty for other variables
15-L14	Probability current density – Expectation values
16-L15	Ehrenfest‘s theorm
17- L16	single slit experiment
18- L17	Applications of Uncertainty principle
19- L18	Class test
20- L19	Problem solving
21- L20	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins

22- L21	Quantum Mechanics: Introduction
23- IT-1	**Internal Test-I**
24- L22	Orthogonal functions
25- L23	eigan functions
26- L24	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Orthonormality of eigan functions
28- L26	energy eigan values are real
29- L27	Hermitian operator
30- P2	**College level meeting/Cell function**
31-L28	Postulates of Quantum mechanics
32-L29	Simultaneous measurements
33-L30	The adjoint or self adjoint of an operator
34- L31	Dirac‘s notation
35- L32	Equations of motion in Schrodinger representation
36- L33	commutating operators
37- L34	linear operator
38-L35	eigan values
39- L36	Linear vector space
40- L37	The uncertainty principle
41- L38	inadequacy of quantum theory
42-P3	**Department Seminar**
43- L39	Black body radiation
44- L40	Problem solving
45- L41	Class test
46- L42	Revision
47- L43	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
48- L44	Unit IV Simple applications: Introduction
49-IT-II	**Internal Test-II**
50-L45	Particle in one dimensional Square well with infinite walls
51- L46	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Square well with finite walls
53- L48	Potential step
54- L49	Square potential barrier
55- L50	barrier penetration
56- L51	Alpha emission
57- L52	Problem solving
58- L53	Class Test
59-P4	**College level meeting/ function**
60- L54	**Problem Test**
61- L55	Unit V Simple applications: Introduction
62- L56	Bloch waves in periodic potential
63- L57	Kronig – Penny square well periodic potential

64- L58	- **Allotting portion for Internal Test-III**
	Internal Test III begins
65- L59	linear Harmonic Oscillator
66- L60	Operator method
67-IT-III	**Internal Test-III**
68- L61	Schrodinger method
69- L62	The free particle.
70- L63	____ - **Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
71-MT	**Model Test**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2014

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

\# Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

\# For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Quantum Mechanics
Course Code	GMPH5B
Class	III year (2015-2016)
Semester	Odd
Staff Name	Dr.S.John Kennedy Vedhanathan
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

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Syllabus

QUANTUM MECHANICS
(Major Elective Paper)
Unit I
Quantum Theory: Limitations of classical theory – Black body radiation – Black body radiation - Max Planck's theory of quantum radiation – Einstein's theory of Photo electric effect
– Compton effect – specific heat of solids – Bohr model of hydrogen atom – inadequacy of quantum theory – De Broglie's wave nature of particles – wave packet and its significance – wave packet and its motion.
Unit II
Wave Mechanics: The uncertainty principle – single slit experiment – Uncertainty for other variables – Applications of Uncertainty principle – Schrodinger wave equation – Time

dependent and Time independent forms – Interpretations of wave function – Probability current density – Expectation values – Ehrenfest‘s theorm.

Unit III

Quantum Mechanics: Linear vector space – Orthogonal functions – eigan functions and eigan values – Orthonormality of eigan functions – energy eigan values are real – linear operator

Hermitian operator– Postulates of Quantum mechanics – Simultaneous measurements and commutating operators – The adjoint or self adjoint of an operator – Dirac‘s notation – Equations of motion in Schrodinger representation

Unit IV

Simple applications: Particle in one dimensional Square well with infinite walls - Square well with finite walls – Potential step – Square potential barrier – barrier penetration – Alpha emission

Unit V

Simple applications: Bloch waves in periodic potential –Kronig – Penny square well periodic potential – linear Harmonic Oscillator – Schrodinger method – Operator method – The free particle.

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2015
1-L1	Quantum Theory: Limitations of classical theory
2-L2	Max Planck‘s theory of quantum radiation
3- L3	Einstein‘s theory of Photo electric effect
4-L4	Compton effect – specific heat of solids
5-L5	Bohr model of hydrogen atom
6-L6	De Broglie‘s wave nature of particles
7-L7	wave packet and its motion.
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	wave packet and its significance
10- L9	Unit II-Wave Mechanics: Introduction
11-L10	Schrodinger wave equation
12-L11	Time dependent and Time independent forms
13-L12	Interpretations of wave function
14-L13	Uncertainty for other variables
15-L14	Probability current density – Expectation values
16-L15	Ehrenfest‘s theorm
17- L16	single slit experiment
18- L17	Applications of Uncertainty principle
19- L18	Class test
20- L19	Problem solving
21- L20	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins

22- L21	Quantum Mechanics: Introduction
23- IT-1	**Internal Test-I**
24- L22	Orthogonal functions
25- L23	eigan functions
26- L24	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Orthonormality of eigan functions
28- L26	energy eigan values are real
29- L27	Hermitian operator
30- P2	**College level meeting/Cell function**
31-L28	Postulates of Quantum mechanics
32-L29	Simultaneous measurements
33-L30	The adjoint or self adjoint of an operator
34- L31	Dirac's notation
35- L32	Equations of motion in Schrodinger representation
36- L33	commutating operators
37- L34	linear operator
38-L35	eigan values
39- L36	Linear vector space
40- L37	The uncertainty principle
41- L38	inadequacy of quantum theory
42-P3	**Department Seminar**
43- L39	Black body radiation
44- L40	Problem solving
45- L41	Class test
46- L42	Revision
47- L43	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
48- L44	Unit IV Simple applications: Introduction
49-IT-II	**Internal Test-II**
50-L45	Particle in one dimensional Square well with infinite walls
51- L46	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Square well with finite walls
53- L48	Potential step
54- L49	Square potential barrier
55- L50	barrier penetration
56- L51	Alpha emission
57- L52	Problem solving
58- L53	Class Test
59-P4	**College level meeting/ function**
60- L54	**Problem Test**
61- L55	Unit V Simple applications: Introduction
62- L56	Bloch waves in periodic potential
63- L57	Kronig – Penny square well periodic potential

64- L58	- **Allotting portion for Internal Test-III**
	Internal Test III begins
65- L59	linear Harmonic Oscillator
66- L60	Operator method
67-IT-III	**Internal Test-III**
68- L61	Schrodinger method
69- L62	The free particle.
70- L63	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
71-MT	**Model Test**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 29.10.2015

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Quantum Mechanics
Course Code	GMPH5B
Class	III year (2016-2017)
Semester	Odd
Staff Name	Dr.S.John Kennedy Vedhanathan
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

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Syllabus

QUANTUM MECHANICS
(Major Elective Paper)
Unit I
Quantum Theory: Limitations of classical theory – Black body radiation – Black body radiation - Max Planck's theory of quantum radiation – Einstein's theory of Photo electric effect
– Compton effect – specific heat of solids – Bohr model of hydrogen atom – inadequacy of quantum theory – De Broglie's wave nature of particles – wave packet and its significance – wave packet and its motion.
Unit II
Wave Mechanics: The uncertainty principle – single slit experiment – Uncertainty for other variables – Applications of Uncertainty principle – Schrodinger wave equation – Time

dependent and Time independent forms – Interpretations of wave function – Probability current density – Expectation values – Ehrenfest‘s theorm.

Unit III

Quantum Mechanics: Linear vector space – Orthogonal functions – eigan functions and eigan values – Orthonormality of eigan functions – energy eigan values are real – linear operator

Hermitian operator– Postulates of Quantum mechanics – Simultaneous measurements and commutating operators – The adjoint or self adjoint of an operator – Dirac‘s notation – Equations of motion in Schrodinger representation

Unit IV

Simple applications: Particle in one dimensional Square well with infinite walls - Square well with finite walls – Potential step – Square potential barrier – barrier penetration – Alpha emission

Unit V

Simple applications: Bloch waves in periodic potential –Kronig – Penny square well periodic potential – linear Harmonic Oscillator – Schrodinger method – Operator method – The free particle.

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 16.06.2016
1-L1	Quantum Theory: Limitations of classical theory
2-L2	Max Planck‘s theory of quantum radiation
3- L3	Einstein‘s theory of Photo electric effect
4-L4	Compton effect – specific heat of solids
5-L5	Bohr model of hydrogen atom
6-L6	De Broglie‘s wave nature of particles
7-L7	wave packet and its motion.
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	wave packet and its significance
10- L9	Unit II-Wave Mechanics: Introduction
11-L10	Schrodinger wave equation
12-L11	Time dependent and Time independent forms
13-L12	Interpretations of wave function
14-L13	Uncertainty for other variables
15-L14	Probability current density – Expectation values
16-L15	Ehrenfest‘s theorm
17- L16	single slit experiment
18- L17	Applications of Uncertainty principle
19- L18	Class test
20- L19	Problem solving
21- L20	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins

22- L21	Quantum Mechanics: Introduction
23- IT-1	**Internal Test-I**
24- L22	Orthogonal functions
25- L23	eigan functions
26- L24	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Orthonormality of eigan functions
28- L26	energy eigan values are real
29- L27	Hermitian operator
30- P2	**College level meeting/Cell function**
31-L28	Postulates of Quantum mechanics
32-L29	Simultaneous measurements
33-L30	The adjoint or self adjoint of an operator
34- L31	Dirac‘s notation
35- L32	Equations of motion in Schrodinger representation
36- L33	commutating operators
37- L34	linear operator
38-L35	eigan values
39- L36	Linear vector space
40- L37	The uncertainty principle
41- L38	inadequacy of quantum theory
42-P3	**Department Seminar**
43- L39	Black body radiation
44- L40	Problem solving
45- L41	Class test
46- L42	Revision
47- L43	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
48- L44	Unit IV Simple applications: Introduction
49-IT-II	**Internal Test-II**
50-L45	Particle in one dimensional Square well with infinite walls
51- L46	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Square well with finite walls
53- L48	Potential step
54- L49	Square potential barrier
55- L50	barrier penetration
56- L51	Alpha emission
57- L52	Problem solving
58- L53	Class Test
59-P4	**College level meeting/ function**
60- L54	**Problem Test**
61- L55	Unit V Simple applications: Introduction
62- L56	Bloch waves in periodic potential
63- L57	Kronig – Penny square well periodic potential

64- L58	- **Allotting portion for Internal Test-III**
	Internal Test III begins
65- L59	linear Harmonic Oscillator
66- L60	Operator method
67-IT-III	**Internal Test-III**
68- L61	Schrodinger method
69- L62	The free particle.
70- L63	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
71-MT	**Model Test**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.11.2016

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Quantum Mechanics
Course Code	GMPH5B
Class	III year (2017-2018)
Semester	Odd
Staff Name	Dr.S.John Kennedy Vedhanathan
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

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Syllabus

QUANTUM MECHANICS
(Major Elective Paper)
Unit I
Quantum Theory: Limitations of classical theory – Black body radiation – Black body radiation - Max Planck's theory of quantum radiation – Einstein's theory of Photo electric effect
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dependent and Time independent forms – Interpretations of wave function – Probability current density – Expectation values – Ehrenfest‘s theorm.

Unit III

Quantum Mechanics: Linear vector space – Orthogonal functions – eigan functions and eigan values – Orthonormality of eigan functions – energy eigan values are real – linear operator

Hermitian operator– Postulates of Quantum mechanics – Simultaneous measurements and commutating operators – The adjoint or self adjoint of an operator – Dirac‘s notation – Equations of motion in Schrodinger representation

Unit IV

Simple applications: Particle in one dimensional Square well with infinite walls - Square well with finite walls – Potential step – Square potential barrier – barrier penetration – Alpha emission

Unit V

Simple applications: Bloch waves in periodic potential –Kronig – Penny square well periodic potential – linear Harmonic Oscillator – Schrodinger method – Operator method – The free particle.

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 16.06.2017
1-L1	Quantum Theory: Limitations of classical theory
2-L2	Max Planck‘s theory of quantum radiation
3- L3	Einstein‘s theory of Photo electric effect
4-L4	Compton effect – specific heat of solids
5-L5	Bohr model of hydrogen atom
6-L6	De Broglie‘s wave nature of particles
7-L7	wave packet and its motion.
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	wave packet and its significance
10- L9	Unit II-Wave Mechanics: Introduction
11-L10	Schrodinger wave equation
12-L11	Time dependent and Time independent forms
13-L12	Interpretations of wave function
14-L13	Uncertainty for other variables
15-L14	Probability current density – Expectation values
16-L15	Ehrenfest‘s theorm
17- L16	single slit experiment
18- L17	Applications of Uncertainty principle
19- L18	Class test
20- L19	Problem solving
21- L20	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins

22- L21	Quantum Mechanics: Introduction
23- IT-1	**Internal Test-I**
24- L22	Orthogonal functions
25- L23	eigan functions
26- L24	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Orthonormality of eigan functions
28- L26	energy eigan values are real
29- L27	Hermitian operator
30- P2	**College level meeting/Cell function**
31-L28	Postulates of Quantum mechanics
32-L29	Simultaneous measurements
33-L30	The adjoint or self adjoint of an operator
34- L31	Dirac‘s notation
35- L32	Equations of motion in Schrodinger representation
36- L33	commutating operators
37- L34	linear operator
38-L35	eigan values
39- L36	Linear vector space
40- L37	The uncertainty principle
41- L38	inadequacy of quantum theory
42-P3	**Department Seminar**
43- L39	Black body radiation
44- L40	Problem solving
45- L41	Class test
46- L42	Revision
47- L43	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
48- L44	Unit IV Simple applications: Introduction
49-IT-II	**Internal Test-II**
50-L45	Particle in one dimensional Square well with infinite walls
51- L46	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Square well with finite walls
53- L48	Potential step
54- L49	Square potential barrier
55- L50	barrier penetration
56- L51	Alpha emission
57- L52	Problem solving
58- L53	Class Test
59-P4	**College level meeting/ function**
60- L54	**Problem Test**
61- L55	Unit V Simple applications: Introduction
62- L56	Bloch waves in periodic potential
63- L57	Kronig – Penny square well periodic potential

64- L58	- **Allotting portion for Internal Test-III**
	Internal Test III begins
65- L59	linear Harmonic Oscillator
66- L60	Operator method
67-IT-III	**Internal Test-III**
68- L61	Schrodinger method
69- L62	The free particle.
70- L63	____ - **Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
71-MT	**Model Test**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 06.11.2017

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Quantum Mechanics
Course Code	JMPH63
Class	III year (2018- 2019)
Semester	Even
Staff Name	Dr. S. John Kennnady and vedhanathan D. Priscilla Koilpillai
, Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

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Syllabus

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 of Group 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) cc

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 ψ*(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 1 D square well potential of finite Depth. (9L+6T) Books for Study 1. Elements of Quantum Mechanics, Kamal Singh & S P Singh-Chmechanics – Particle in and &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

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 3.12.2018
1-L1	**DEVELOPMENT OF QUANTUM MECHANICS**
2-L2	**Inadequacy of classical mechanics**
3- L3	**Black body radiation**
4-L4	**Theoretical laws of Black body**
5-L5	**radiation (Wein's displacement law**
6-L6	**Wein's Radiation formula**
7-L7	**Rayleigh Jeans law**
8- P1	**Planck's Quantum hypothesis**
9- L8	**– photoelectric effect-**
10- L9	**photoelectric effect**
11-L10	**Einstein's explanation**
12-L11	**Compton effect**
13-L12	**– Einstein's quantum**
14-L13	**theory of specific heat**
15-L14	Class Exam
16-L15	Preparation of Internal Class test
17- L16	**heat-Quantum**
18- L17	**states of energy**
19- L18	Unit II Introduction Class
20- L19	**UNIT II : WAVE PROPERTIES OF MATTER**
21- L20	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
22- L21	Wave Properties of Matters
23- IT-1	**Internal Test-I**
24- L22	**Wave particle duality**
25- L23	**Phase and Group Velocity**
26- L24	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	**Phase and Group Velocity waves**
28- L26	**– Wave packets formed**
29- L27	**by Superposition**
30- P2	**of Number of Plane waves**
31-L28	**of Number of Plane waves**
32-L29	**De Broglie Hypothesis**
33-L30	**Derivation of De Broglie relation**
34- L31	**Phase velocity**
35- L32	**of De Broglie Waves**
36- L33	**Relation between De Broglie wave**
37- L34	**and Phase velocity**
38-L35	**– Davision and Germer's experiment**
39- L36	Class Test
40- L37	**on electron diffraction-**

41- L38	**Diffraction of Atoms and Molecules**
42-P3	**Department Seminar**
43- L39	Introduction for the III Unit
44- L40	**UNIT III : HEISENBERG UNCERTAINTY PRINCIPLE**
45- L41	**Uncertainty Principle**
46- L42	**Elementary Proof**
47- L43	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
48- L44	**of Heisenberg's Uncertainty**
49-IT-II	**Internal Test-II**
50-L45	**Relation and its Physical significance –Illustration by Thought experiments- consequences .**
51- L46	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Introduction for the IV Init
53- L48	**UNIT IV: SCHRODINGER'S WAVE EQUATION:**
54- L49	**Basic postulates of Quantum mechanics Ehrenfest's Theorem – Momentum wave**
55- L50	**Schrodinger's equation Eigen Function, Eigen value and Eigen Value equation**
56- L51	**1D and 3D wave Physical Interpretation of the Wave Function ψ – Operators in quantum**
57- L52	**equation into the Time-dependent and Time-independent part**
58- L53	**– Function, Eigen value and Eigen Value equation – Expectation values – Orthogonality of Energy Eigen function - Schrodinger's**
59-P4	**College level meeting/ function**
60- L54	**Wave equation for the Complex Conjugate Wave function ψ*(x, y, z, t) – Probability current Density – function for free**
61- L55	**Momentum Eigen function – Exact statement and proof of Uncertainty principle for one dimensional wave packet**
62- L56	**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**
63- L57	**Particle in 3D box – Simple harmonic oscillator – 1D simple harmonic o**
64- L58	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
65- L59	**oscillator in quantum**
66- L60	**mechanics – Particle**
67-IT-III	**Internal Test-III**
68- L61	**1 D square well potential of finite Depth**
69- L62	Model Exam Preparation
70- L63	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
71-MT	**Model Test**
72-MT	**Model Test**

73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.4.2019

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Quantum Mechanics
Course Code	SMPH63
Class	III year (2019- 2020)
Semester	Even
Staff Name	Dr. S. John Kennnady and vedhanathan D. Priscilla Koilpillai
, Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

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Syllabus

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 of Group 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) cc

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 ψ*(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 1 D square well potential of finite Depth. (9L+6T) Books for Study 1. Elements of Quantum Mechanics, Kamal Singh & S P Singh-Chmechanics – Particle in and &Co; Books for Reference

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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

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 02.12.2019

1-L1	**DEVELOPMENT OF QUANTUM MECHANICS**
2-L2	**Inadequacy of classical mechanics**
3- L3	**Black body radiation**
4-L4	**Theoretical laws of Black body**
5-L5	**radiation (Wein's displacement law**
6-L6	**Wein's Radiation formula**
7-L7	**Rayleigh Jeans law**
8- P1	**Planck's Quantum hypothesis**
9- L8	**– photoelectric effect-**
10- L9	**photoelectric effect**
11-L10	**Einstein's explanation**
12-L11	**Compton effect**
13-L12	**– Einstein's quantum**
14-L13	**theory of specific heat**
15-L14	Class Exam
16-L15	Preparation of Internal Class test
17- L16	**heat-Quantum**
18- L17	**states of energy**
19- L18	Unit II Introduction Class
20- L19	**UNIT II : WAVE PROPERTIES OF MATTER**
21- L20	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
22- L21	Wave Properties of Matters
23- IT-1	**Internal Test-I**
24- L22	**Wave particle duality**
25- L23	**Phase and Group Velocity**
26- L24	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	**Phase and Group Velocity waves**
28- L26	**– Wave packets formed**
29- L27	**by Superposition**
30- P2	**of Number of Plane waves**
31-L28	**of Number of Plane waves**
32-L29	**De Broglie Hypothesis**
33-L30	**Derivation of De Broglie relation**
34- L31	**Phase velocity**
35- L32	**of De Broglie Waves**
36- L33	**Relation between De Broglie wave**
37- L34	**and Phase velocity**
38-L35	**– Davision and Germer's experiment**
39- L36	Class Test
40- L37	**on electron diffraction-**
41- L38	**Diffraction of Atoms and Molecules**
42-P3	**Department Seminar**
43- L39	Introduction for the III Unit

44- L40	**UNIT III : HEISENBERG UNCERTAINTY PRINCIPLE**
45- L41	**Uncertainty Principle**
46- L42	**Elementary Proof**
47- L43	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
48- L44	**of Heisenberg's Uncertainty**
49-IT-II	**Internal Test-II**
50-L45	**Relation and its Physical significance –Illustration by Thought experiments- consequences .**
51- L46	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Introduction for the IV Init
53- L48	**UNIT IV: SCHRODINGER'S WAVE EQUATION:**
54- L49	**Basic postulates of Quantum mechanics Ehrenfest's Theorem – Momentum wave**
55- L50	**Schrodinger's equation Eigen Function, Eigen value and Eigen Value equation**
56- L51	**1D and 3D wave Physical Interpretation of the Wave Function ψ – Operators in quantum**
57- L52	**equation into the Time-dependent and Time-independent part**
58- L53	**– Function, Eigen value and Eigen Value equation – Expectation values – Orthogonality of Energy Eigen function - Schrodinger's**
59-P4	**College level meeting/ function**
60- L54	**Wave equation for the Complex Conjugate Wave function ψ*(x, y, z, t) – Probability current Density – function for free**
61- L55	**Momentum Eigen function – Exact statement and proof of Uncertainty principle for one dimensional wave packet**
62- L56	**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**
63- L57	**Particle in 3D box – Simple harmonic oscillator – 1D simple harmonic o**
64- L58	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
65- L59	**oscillator in quantum**
66- L60	**mechanics – Particle**
67-IT-III	**Internal Test-III**
68- L61	**1 D square well potential of finite Depth**
69- L62	Model Exam Preparation
70- L63	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
71-MT	**Model Test**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**

75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 27.4.2020

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Solid State Physics
Course Code	GMPH5C
Class	III year (2014-2015)
Semester	ODD
Staff Name	R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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-
-
-

Syllabus

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 Paramagnetism - 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)

4 Hrs

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

Course Calendar

Hour allotment	Class Schedule

	Odd Semester Begin on18.06.2014
1-L1	Introduction-seven classes of crystals
2-L2	Bravais lattice in three dimensions
3- L3	Crystal structure - Simple cubic, Face centered cubic
4-L4	Body centered cubic and Hexagonal close packed structure
5-L5	Sodium Chrloride, Zinc Blende and Diamond Structures
6-L6	Miller Indices and crystal planes
7-L7	Procedure for finding Miller Indices
8- P1	Problem solving
9- L8	Inter planar spacing - Diffraction of X-Rays
10- L9	Bragg's Law - reciprocal lattices
11-L10	Reciprocal lattice to SCC, BCC and FCC lattices
12-L11	Introduction -classical theory of Diamagnetism
13-L12	Langevin's theory of Paramagnetism
14-L13	Weiss Theory of Para magnetism – Ferromagnetism
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Explanation of Heisenberg's internal field and quantum theory of ferromagnetism
17-IT-1	**Internal Test-I**
18-L16	Do maintheory of ferromagnetism - Anti ferromagnetism - ferrites
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Fundamental Definitions of Dielectrics
21- L19	Different types of Electric Polarizations
22- P2	**College level meeting/Cell function**
23-L20	Electronic, ionic, orientation and space charge Polarization
24-L21	Dielectric Loss – Internal - Field Clausius – Mosotti Relation
25-L22	Types of bonds in crystals - Ionic, covalent, Metallic, Vander waal's and Hydrogen Bonding
26-L23	Bond energy of sodium chloride molecule
27-L24	Comparison between ionic and covalent solids
28-L25	Variation of inter atomic force with inter atomic
29-L26	Cohesive energy - cohesive energy of ionic solids Application to sodium
30-L27	Chloride crystal - evaluation of Madelung constant for sodium chloride
31-L28	Introduction - General Properties of Superconductors
32-L29	Effect of magnetic field -Meissner effect - effect of current -
33-L30	Thermal properties –entropy - specific heat- energy gap - isotope effect
34- P3	**Department Seminar**
35-L31	London equations - AC & DC Josephson effects Applications

36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Type–I and Type–II Superconductors - Explanation for the Occurrence of Super Conductivity
38- IT-II	**Internal Test-II**
39-L34	BCS theory- Application of Superconductors High T_C superconductors
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Nanomaterials - synthesis and classification
42- L37	Techniques used in synthesis of nanomaterials
43- L38	Chemical vapour deposition
44- P4	**College level meeting/ function**
45-L39	Sol-gel technique-electro deposition method-Charecteristics
46-L40	Problem Solving
47-L41	Properties and applications of Nanomaterials
48-L42	fullerence, graphine and carbon nanotubes
49-L43	Problem Solving
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Revision
52- L46	Problem Solving
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on31.10.2014

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	

CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Solid State Physics
Course Code	GMPH5C
Class	III year (2015-2016)
Semester	Odd
Staff Name	R. Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

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 Paramagnetism - 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)

4 Hrs

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

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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

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on18.06.2015

1-L1	Introduction-seven classes of crystals
2-L2	Bravais lattice in three dimensions
3- L3	Crystal structure - Simple cubic, Face centered cubic
4-L4	Body centered cubic and Hexagonal close packed structure
5-L5	Sodium Chrloride, Zinc Blende and Diamond Structures
6-L6	Miller Indices and crystal planes
7-L7	Procedure for finding Miller Indices
8- P1	Problem solving
9- L8	Inter planar spacing - Diffraction of X-Rays
10- L9	Bragg's Law - reciprocal lattices
11-L10	Reciprocal lattice to SCC, BCC and FCC lattices
12-L11	Introduction -classical theory of Diamagnetism
13-L12	Langevin's theory of Paramagnetism
14-L13	Weiss Theory of Para magnetism – Ferromagnetism
15-L14	____ - **Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Explanation of Heisenberg's internal field and quantum theory of ferromagnetism
17-IT-1	**Internal Test-I**
18-L16	Do maintheory of ferromagnetism - Anti ferromagnetism - ferrites
19-L17	____ **-Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Fundamental Definitions of Dielectrics
21- L19	Different types of Electric Polarizations
22- P2	**College level meeting/Cell function**
23-L20	Electronic, ionic, orientation and space charge Polarization
24-L21	Dielectric Loss – Internal - Field Clausius – Mosotti Relation
25-L22	Types of bonds in crystals - Ionic, covalent, Metallic, Vander waal's and Hydrogen Bonding
26-L23	Bond energy of sodium chloride molecule
27-L24	Comparison between ionic and covalent solids
28-L25	Variation of inter atomic force with inter atomic
29-L26	Cohesive energy - cohesive energy of ionic solids Application to sodium
30-L27	Chloride crystal - evaluation of Madelung constant for sodium chloride
31-L28	Introduction - General Properties of Superconductors
32-L29	Effect of magnetic field -Meissner effect - effect of current -
33-L30	Thermal properties –entropy - specific heat- energy gap - isotope effect
34- P3	**Department Seminar**
35-L31	London equations - AC & DC Josephson effects Applications
36-L32	____ - **Allotting portion for Internal Test-II**

	Internal Test II begins
37- L33	Type–I and Type–II Superconductors - Explanation for the Occurrence of Super Conductivity
38- IT-II	**Internal Test-II**
39-L34	BCS theory- Application of Superconductors High T_C superconductors
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Nanomaterials - synthesis and classification
42- L37	Techniques used in synthesis of nanomaterials
43- L38	Chemical vapour deposition
44- P4	**College level meeting/ function**
45-L39	Sol-gel technique-electro deposition method-Charecteristics
46-L40	Problem Solving
47-L41	Properties and applications of Nanomaterials
48-L42	fullerence, graphine and carbon nanotubes
49-L43	Problem Solving
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Revision
52- L46	Problem Solving
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 29.10.2015

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	

CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Solid State Physics
Course Code	GMPH5C
Class	III year (2016-2017)
Semester	ODD
Staff Name	R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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-
-
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Syllabus

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 Paramagnetism - 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)

4 Hrs

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)

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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

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on16.06.2016

1-L1	Introduction-seven classes of crystals
2-L2	Bravais lattice in three dimensions
3- L3	Crystal structure - Simple cubic, Face centered cubic
4-L4	Body centered cubic and Hexagonal close packed structure
5-L5	Sodium Chrloride, Zinc Blende and Diamond Structures
6-L6	Miller Indices and crystal planes
7-L7	Procedure for finding Miller Indices
8- P1	Problem solving
9- L8	Inter planar spacing - Diffraction of X-Rays
10- L9	Bragg's Law - reciprocal lattices
11-L10	Reciprocal lattice to SCC, BCC and FCC lattices
12-L11	Introduction -classical theory of Diamagnetism
13-L12	Langevin's theory of Paramagnetism
14-L13	Weiss Theory of Para magnetism – Ferromagnetism
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Explanation of Heisenberg's internal field and quantum theory of ferromagnetism
17-IT-1	**Internal Test-I**
18-L16	Do maintheory of ferromagnetism - Anti ferromagnetism - ferrites
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Fundamental Definitions of Dielectrics
21- L19	Different types of Electric Polarizations
22- P2	**College level meeting/Cell function**
23-L20	Electronic, ionic, orientation and space charge Polarization
24-L21	Dielectric Loss – Internal - Field Clausius – Mosotti Relation
25-L22	Types of bonds in crystals - Ionic, covalent, Metallic, Vander waal's and Hydrogen Bonding
26-L23	Bond energy of sodium chloride molecule
27-L24	Comparison between ionic and covalent solids
28-L25	Variation of inter atomic force with inter atomic
29-L26	Cohesive energy - cohesive energy of ionic solids Application to sodium
30-L27	Chloride crystal - evaluation of Madelung constant for sodium chloride
31-L28	Introduction - General Properties of Superconductors
32-L29	Effect of magnetic field -Meissner effect - effect of current -
33-L30	Thermal properties –entropy - specific heat- energy gap - isotope effect
34- P3	**Department Seminar**
35-L31	London equations - AC & DC Josephson effects Applications
36-L32	**____ - Allotting portion for Internal Test-II**

	Internal Test II begins
37- L33	Type–I and Type–II Superconductors - Explanation for the Occurrence of Super Conductivity
38- IT-II	**Internal Test-II**
39-L34	BCS theory- Application of Superconductors High Tc superconductors
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Nanomaterials - synthesis and classification
42- L37	Techniques used in synthesis of nanomaterials
43- L38	Chemical vapour deposition
44- P4	**College level meeting/ function**
45-L39	Sol-gel technique-electro deposition method-Charecteristics
46-L40	Problem Solving
47-L41	Properties and applications of Nanomaterials
48-L42	fullerence, graphine and carbon nanotubes
49-L43	Problem Solving
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Revision
52- L46	Problem Solving
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on30.11.2016

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	

CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Solid State Physics
Course Code	GMPH5C
Class	III year (2017-2018)
Semester	ODD
Staff Name	R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

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 Paramagnetism - 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)

4 Hrs

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)

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3. Introduction to Solids -Azaroff - TMH
4. Material Science - M.Arumugam - Anuradha Publishers
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6. Principles of Nanoscience and technology - Shah M.A.Ahmed,Narosha publishing house pvt.Ltd.

PAPER XVI: MAJOR

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on16.06 2017

1-L1	Introduction-seven classes of crystals
2-L2	Bravais lattice in three dimensions
3- L3	Crystal structure - Simple cubic, Face centered cubic
4-L4	Body centered cubic and Hexagonal close packed structure
5-L5	Sodium Chrloride, Zinc Blende and Diamond Structures
6-L6	Miller Indices and crystal planes
7-L7	Procedure for finding Miller Indices
8- P1	Problem solving
9- L8	Inter planar spacing - Diffraction of X-Rays
10- L9	Bragg's Law - reciprocal lattices
11-L10	Reciprocal lattice to SCC, BCC and FCC lattices
12-L11	Introduction -classical theory of Diamagnetism
13-L12	Langevin's theory of Paramagnetism
14-L13	Weiss Theory of Para magnetism – Ferromagnetism
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Explanation of Heisenberg's internal field and quantum theory of ferromagnetism
17-IT-1	**Internal Test-I**
18-L16	Do maintheory of ferromagnetism - Anti ferromagnetism - ferrites
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Fundamental Definitions of Dielectrics
21- L19	Different types of Electric Polarizations
22- P2	**College level meeting/Cell function**
23-L20	Electronic, ionic, orientation and space charge Polarization
24-L21	Dielectric Loss – Internal - Field Clausius – Mosotti Relation
25-L22	Types of bonds in crystals - Ionic, covalent, Metallic, Vander waal's and Hydrogen Bonding
26-L23	Bond energy of sodium chloride molecule
27-L24	Comparison between ionic and covalent solids
28-L25	Variation of inter atomic force with inter atomic
29-L26	Cohesive energy - cohesive energy of ionic solids Application to sodium
30-L27	Chloride crystal - evaluation of Madelung constant for sodium chloride
31-L28	Introduction - General Properties of Superconductors
32-L29	Effect of magnetic field -Meissner effect - effect of current -
33-L30	Thermal properties –entropy - specific heat- energy gap - isotope effect
34- P3	**Department Seminar**
35-L31	London equations - AC & DC Josephson effects Applications
36-L32	**____ - Allotting portion for Internal Test-II**

	Internal Test II begins
37- L33	Type–I and Type–II Superconductors - Explanation for the Occurrence of Super Conductivity
38- IT-II	**Internal Test-II**
39-L34	BCS theory- Application of Superconductors High T_C superconductors
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Nanomaterials - synthesis and classification
42- L37	Techniques used in synthesis of nanomaterials
43- L38	Chemical vapour deposition
44- P4	**College level meeting/ function**
45-L39	Sol-gel technique-electro deposition method-Charecteristics
46-L40	Problem Solving
47-L41	Properties and applications of Nanomaterials
48-L42	fullerence, graphine and carbon nanotubes
49-L43	Problem Solving
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Revision
52- L46	Problem Solving
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on06.11.2017

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	

CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Solid State Physics
Course Code	JMPH52
Class	III year (2018-2019)
Semester	ODD
Staff Name	R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

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 Paramagnetism - 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)

4 Hrs

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

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6. Principles of Nanoscience and technology - Shah M.A.Ahmed,Narosha publishing house pvt.Ltd.

PAPER XVI: MAJOR

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on18.06.2018

1-L1	Introduction-seven classes of crystals
2-L2	Bravais lattice in three dimensions
3- L3	Crystal structure - Simple cubic, Face centered cubic
4-L4	Body centered cubic and Hexagonal close packed structure
5-L5	Sodium Chrloride, Zinc Blende and Diamond Structures
6-L6	Miller Indices and crystal planes
7-L7	Procedure for finding Miller Indices
8- P1	Problem solving
9- L8	Inter planar spacing - Diffraction of X-Rays
10- L9	Bragg's Law - reciprocal lattices
11-L10	Reciprocal lattice to SCC, BCC and FCC lattices
12-L11	Introduction -classical theory of Diamagnetism
13-L12	Langevin's theory of Paramagnetism
14-L13	Weiss Theory of Para magnetism – Ferromagnetism
15-L14	____ - **Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Explanation of Heisenberg's internal field and quantum theory of ferromagnetism
17-IT-1	**Internal Test-I**
18-L16	Do maintheory of ferromagnetism - Anti ferromagnetism - ferrites
19-L17	____ **-Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Fundamental Definitions of Dielectrics
21- L19	Different types of Electric Polarizations
22- P2	**College level meeting/Cell function**
23-L20	Electronic, ionic, orientation and space charge Polarization
24-L21	Dielectric Loss – Internal - Field Clausius – Mosotti Relation
25-L22	Types of bonds in crystals - Ionic, covalent, Metallic, Vander waal's and Hydrogen Bonding
26-L23	Bond energy of sodium chloride molecule
27-L24	Comparison between ionic and covalent solids
28-L25	Variation of inter atomic force with inter atomic
29-L26	Cohesive energy - cohesive energy of ionic solids Application to sodium
30-L27	Chloride crystal - evaluation of Madelung constant for sodium chloride
31-L28	Introduction - General Properties of Superconductors
32-L29	Effect of magnetic field -Meissner effect - effect of current -
33-L30	Thermal properties –entropy - specific heat- energy gap - isotope effect
34- P3	**Department Seminar**
35-L31	London equations - AC & DC Josephson effects Applications
36-L32	____ - **Allotting portion for Internal Test-II**

	Internal Test II begins
37- L33	Type–I and Type–II Superconductors - Explanation for the Occurrence of Super Conductivity
38- IT-II	**Internal Test-II**
39-L34	BCS theory- Application of Superconductors High T_C superconductors
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Nanomaterials - synthesis and classification
42- L37	Techniques used in synthesis of nanomaterials
43- L38	Chemical vapour deposition
44- P4	**College level meeting/ function**
45-L39	Sol-gel technique-electro deposition method-Charecteristics
46-L40	Problem Solving
47-L41	Properties and applications of Nanomaterials
48-L42	fullerence, graphine and carbon nanotubes
49-L43	Problem Solving
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Revision
52- L46	Problem Solving
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.11.2018

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	

CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Solid State Physics
Course Code	SMPH64
Class	III year (2019-2020)
Semester	Even
Staff Name	R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

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 Paramagnetism - 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)

4 Hrs

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

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on02.12.2019

1-L1	Introduction-seven classes of crystals
2-L2	Bravais lattice in three dimensions
3- L3	Crystal structure - Simple cubic, Face centered cubic
4-L4	Body centered cubic and Hexagonal close packed structure
5-L5	Sodium Chrloride, Zinc Blende and Diamond Structures
6-L6	Miller Indices and crystal planes
7-L7	Procedure for finding Miller Indices
8- P1	Problem solving
9- L8	Inter planar spacing - Diffraction of X-Rays
10- L9	Bragg's Law - reciprocal lattices
11-L10	Reciprocal lattice to SCC, BCC and FCC lattices
12-L11	Introduction -classical theory of Diamagnetism
13-L12	Langevin's theory of Paramagnetism
14-L13	Weiss Theory of Para magnetism – Ferromagnetism
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Explanation of Heisenberg's internal field and quantum theory of ferromagnetism
17-IT-1	**Internal Test-I**
18-L16	Do maintheory of ferromagnetism - Anti ferromagnetism - ferrites
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Fundamental Definitions of Dielectrics
21- L19	Different types of Electric Polarizations
22- P2	**College level meeting/Cell function**
23-L20	Electronic, ionic, orientation and space charge Polarization
24-L21	Dielectric Loss – Internal - Field Clausius – Mosotti Relation
25-L22	Types of bonds in crystals - Ionic, covalent, Metallic, Vander waal's and Hydrogen Bonding
26-L23	Bond energy of sodium chloride molecule
27-L24	Comparison between ionic and covalent solids
28-L25	Variation of inter atomic force with inter atomic
29-L26	Cohesive energy - cohesive energy of ionic solids Application to sodium
30-L27	Chloride crystal - evaluation of Madelung constant for sodium chloride
31-L28	Introduction - General Properties of Superconductors
32-L29	Effect of magnetic field -Meissner effect - effect of current -
33-L30	Thermal properties –entropy - specific heat- energy gap - isotope effect
34- P3	**Department Seminar**
35-L31	London equations - AC & DC Josephson effects Applications
36-L32	**____ - Allotting portion for Internal Test-II**

	Internal Test II begins
37- L33	Type–I and Type–II Superconductors - Explanation for the Occurrence of Super Conductivity
38- IT-II	**Internal Test-II**
39-L34	BCS theory- Application of Superconductors High Tc superconductors
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Nanomaterials - synthesis and classification
42- L37	Techniques used in synthesis of nanomaterials
43- L38	Chemical vapour deposition
44- P4	**College level meeting/ function**
45-L39	Sol-gel technique-electro deposition method-Charecteristics
46-L40	Problem Solving
47-L41	Properties and applications of Nanomaterials
48-L42	fullerence, graphine and carbon nanotubes
49-L43	Problem Solving
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Revision
52- L46	Problem Solving
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 27.04.2020

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	

CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Spectroscopy
Course Code	GMPH62
Class	III year (2014-2015)
Semester	EVEN
Staff Name	R. Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

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. (14L)

UNIT II: INFRARED SPECTROSCOPY

I.R. spectroscopy – Vibrating diatomic molecules – Simple Harmonic Oscillator -Anharmonic oscillator – Diatomic vibrating rotator – IR spectrum of

carbonmonoxide - 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.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on03.12.2014
1-L1	Rotation of molecules – Classification of molecules
2-L2	Rotation spectra of diatomic molecules
3- L3	Intensities of spectral lines – Effect of isotopic substitution
4-L4	Non-rigid rotator

5-L5	Spectrum of a non-rigid rotator
6-L6	Polyatomic molecules
7-L7	Symmetric top molecules
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	Asymmetric top molecules
10- L9	Problem solving
11-L10	Techniques and Instrumentation
12-L11	Chemical analysis by microwave spectroscopy
13-L12	Introduction to IR Spectroscopy
14-L13	I.R. spectroscopy – Vibrating diatomic molecules
15-L14	**____- Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	revision
17-IT-1	**Internal Test-I**
18-L16	Problem Solving
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Simple Harmonic Oscillator
21- L19	An harmonic oscillator
22- P2	**College level meeting/Cell function**
23-L20	Diatomic vibrating rotator
24-L21	IR spectrum of carbon monoxide
25-L22	Interaction of rotations and vibrations
26-L23	Vibration of polyatomic molecules
27-L24	Analysis by IR techniques.
28-L25	Raman effect-discovery – Quantum theory of Raman effect
29-L26	Quantum theory of Raman effect
30-L27	Classicaltheory of Raman Effect –Pure rotational Raman spectra- Linear molecules
31-L28	Raman spectrum of symmetric top molecules ,Vibrational Raman spectra
32-L29	Rule of mutual exclusion – Overtone and combinational vibrations - Rotational fine structure
33-L30	Polarization of light and the Raman Effect -
34- P3	**Department Seminar**
35-L31	Structure determination from IR and Raman spectroscopy.
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	revision
38- IT-II	**Internal Test-II**
39-L34	Born - Oppenheimer approximation – vibrational coarse structure
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal

41-L36	Progressions – Frank-Condon principle
42- L37	Dissociation energy and Dissociation products – Rotational fine structure -
43- L38	Electronic vibration transitions - Fortrat diagram
44- P4	**College level meeting/ function**
45-L39	Predissociation – Diatomic molecules
46-L40	Instrumentation and techniques in Infrared spectroscopy
47-L41	Sources – Monochromators
48-L42	Sample cells – Detectors
49-L43	Single beam Infra red spectrometer – Double beam Infra red spectrometer (10L)
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Problem Solving
52- L46	Revision
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on23.04.2015

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	

EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Spectroscopy
Course Code	GMPH62
Class	III year (2015-2016)
Semester	EVEN
Staff Name	R. Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

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. (14L)

UNIT II: INFRARED SPECTROSCOPY

I.R. spectroscopy – Vibrating diatomic molecules – Simple Harmonic Oscillator -Anharmonic oscillator – Diatomic vibrating rotator – IR spectrum of

carbonmonoxide - 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.

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 02.12.2015
1-L1	Rotation of molecules – Classification of molecules
2-L2	Rotation spectra of diatomic molecules
3- L3	Intensities of spectral lines – Effect of isotopic substitution
4-L4	Non-rigid rotator

5-L5	Spectrum of a non-rigid rotator
6-L6	Polyatomic molecules
7-L7	Symmetric top molecules
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	Asymmetric top molecules
10- L9	Problem solving
11-L10	Techniques and Instrumentation
12-L11	Chemical analysis by microwave spectroscopy
13-L12	Introduction to IR Spectroscopy
14-L13	I.R. spectroscopy – Vibrating diatomic molecules
15-L14	____- **Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	revision
17-IT-1	**Internal Test-I**
18-L16	Problem Solving
19-L17	____ -**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Simple Harmonic Oscillator
21- L19	An harmonic oscillator
22- P2	**College level meeting/Cell function**
23-L20	Diatomic vibrating rotator
24-L21	IR spectrum of carbon monoxide
25-L22	Interaction of rotations and vibrations
26-L23	Vibration of polyatomic molecules
27-L24	Analysis by IR techniques.
28-L25	Raman effect-discovery – Quantum theory of Raman effect
29-L26	Quantum theory of Raman effect
30-L27	Classicaltheory of Raman Effect –Pure rotational Raman spectra-Linear molecules
31-L28	Raman spectrum of symmetric top molecules ,Vibrational Raman spectra
32-L29	Rule of mutual exclusion – Overtone and combinational vibrations - Rotational fine structure
33-L30	Polarization of light and the Raman Effect -
34- P3	**Department Seminar**
35-L31	Structure determination from IR and Raman spectroscopy.
36-L32	____ - **Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	revision
38- IT-II	**Internal Test-II**
39-L34	Born - Oppenheimer approximation – vibrational coarse structure
40-L35	____ -**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal

41-L36	Progressions – Frank-Condon principle
42- L37	Dissociation energy and Dissociation products – Rotational fine structure -
43- L38	Electronic vibration transitions - Fortrat diagram
44- P4	**College level meeting/ function**
45-L39	Predissociation – Diatomic molecules
46-L40	Instrumentation and techniques in Infrared spectroscopy
47-L41	Sources – Monochromators
48-L42	Sample cells – Detectors
49-L43	Single beam Infra red spectrometer – Double beam Infra red spectrometer (10L)
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Problem Solving
52- L46	Revision
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 22.04.2016

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	

EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

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For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Spectroscopy
Course Code	GMPH62
Class	III year (2016-2017)
Semester	EVEN
Staff Name	R. Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

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. (14L)

UNIT II: INFRARED SPECTROSCOPY

I.R. spectroscopy – Vibrating diatomic molecules – Simple Harmonic Oscillator -Anharmonic oscillator – Diatomic vibrating rotator – IR spectrum of

carbonmonoxide - 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

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Book For Reference

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3.Spectroscopy -G.R. Chatwal and S.K. Anand, Himalaya publishing House, New
Delhi.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 01.12.2016
1-L1	Rotation of molecules – Classification of molecules
2-L2	Rotation spectra of diatomic molecules
3- L3	Intensities of spectral lines – Effect of isotopic substitution
4-L4	Non-rigid rotator

5-L5	Spectrum of a non-rigid rotator
6-L6	Polyatomic molecules
7-L7	Symmetric top molecules
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	Asymmetric top molecules
10- L9	Problem solving
11-L10	Techniques and Instrumentation
12-L11	Chemical analysis by microwave spectroscopy
13-L12	Introduction to IR Spectroscopy
14-L13	I.R. spectroscopy – Vibrating diatomic molecules
15-L14	**____- Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	revision
17-IT-1	**Internal Test-I**
18-L16	Problem Solving
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Simple Harmonic Oscillator
21- L19	An harmonic oscillator
22- P2	**College level meeting/Cell function**
23-L20	Diatomic vibrating rotator
24-L21	IR spectrum of carbon monoxide
25-L22	Interaction of rotations and vibrations
26-L23	Vibration of polyatomic molecules
27-L24	Analysis by IR techniques.
28-L25	Raman effect-discovery – Quantum theory of Raman effect
29-L26	Quantum theory of Raman effect
30-L27	Classicaltheory of Raman Effect –Pure rotational Raman spectra- Linear molecules
31-L28	Raman spectrum of symmetric top molecules ,Vibrational Raman spectra
32-L29	Rule of mutual exclusion – Overtone and combinational vibrations - Rotational fine structure
33-L30	Polarization of light and the Raman Effect -
34- P3	**Department Seminar**
35-L31	Structure determination from IR and Raman spectroscopy.
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	revision
38- IT-II	**Internal Test-II**
39-L34	Born - Oppenheimer approximation – vibrational coarse structure
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal

41-L36	Progressions – Frank-Condon principle
42- L37	Dissociation energy and Dissociation products – Rotational fine structure -
43- L38	Electronic vibration transitions - Fortrat diagram
44- P4	**College level meeting/ function**
45-L39	Predissociation – Diatomic molecules
46-L40	Instrumentation and techniques in Infrared spectroscopy
47-L41	Sources – Monochromators
48-L42	Sample cells – Detectors
49-L43	Single beam Infra red spectrometer – Double beam Infra red spectrometer (10L)
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Problem Solving
52- L46	Revision
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 21.04.2017

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	

EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Spectroscopy
Course Code	GMPH62
Class	III year (2016-2017)
Semester	EVEN
Staff Name	R. Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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-
-
-

Syllabus

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. (14L)

UNIT II: INFRARED SPECTROSCOPY

I.R. spectroscopy – Vibrating diatomic molecules – Simple Harmonic Oscillator -Anharmonic oscillator – Diatomic vibrating rotator – IR spectrum of

carbonmonoxide - 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.

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 07.12.2017
1-L1	Rotation of molecules – Classification of molecules
2-L2	Rotation spectra of diatomic molecules
3- L3	Intensities of spectral lines – Effect of isotopic substitution
4-L4	Non-rigid rotator

5-L5	Spectrum of a non-rigid rotator
6-L6	Polyatomic molecules
7-L7	Symmetric top molecules
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	Asymmetric top molecules
10- L9	Problem solving
11-L10	Techniques and Instrumentation
12-L11	Chemical analysis by microwave spectroscopy
13-L12	Introduction to IR Spectroscopy
14-L13	I.R. spectroscopy – Vibrating diatomic molecules
15-L14	**____- Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	revision
17-IT-1	**Internal Test-I**
18-L16	Problem Solving
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Simple Harmonic Oscillator
21- L19	An harmonic oscillator
22- P2	**College level meeting/Cell function**
23-L20	Diatomic vibrating rotator
24-L21	IR spectrum of carbon monoxide
25-L22	Interaction of rotations and vibrations
26-L23	Vibration of polyatomic molecules
27-L24	Analysis by IR techniques.
28-L25	Raman effect-discovery – Quantum theory of Raman effect
29-L26	Quantum theory of Raman effect
30-L27	Classicaltheory of Raman Effect –Pure rotational Raman spectra-Linear molecules
31-L28	Raman spectrum of symmetric top molecules ,Vibrational Raman spectra
32-L29	Rule of mutual exclusion – Overtone and combinational vibrations -Rotational fine structure
33-L30	Polarization of light and the Raman Effect -
34- P3	**Department Seminar**
35-L31	Structure determination from IR and Raman spectroscopy.
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	revision
38- IT-II	**Internal Test-II**
39-L34	Born - Oppenheimer approximation – vibrational coarse structure
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal

41-L36	Progressions – Frank-Condon principle
42- L37	Dissociation energy and Dissociation products – Rotational fine structure -
43- L38	Electronic vibration transitions - Fortrat diagram
44- P4	**College level meeting/ function**
45-L39	Predissociation – Diatomic molecules
46-L40	Instrumentation and techniques in Infrared spectroscopy
47-L41	Sources – Monochromators
48-L42	Sample cells – Detectors
49-L43	Single beam Infra red spectrometer – Double beam Infra red spectrometer (10L)
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Problem Solving
52- L46	Revision
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2018

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	

EL3	
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Spectroscopy
Course Code	JMPH5A
Class	III (year)
Semester	Odd
Staff Name	R. Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

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. (14L)

UNIT II: INFRARED SPECTROSCOPY

I.R. spectroscopy – Vibrating diatomic molecules – Simple Harmonic Oscillator -Anharmonic oscillator – Diatomic vibrating rotator – IR spectrum of

carbonmonoxide - 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.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2018
1-L1	Rotation of molecules – Classification of molecules
2-L2	Rotation spectra of diatomic molecules
3- L3	Intensities of spectral lines – Effect of isotopic substitution
4-L4	Non-rigid rotator

5-L5	Spectrum of a non-rigid rotator
6-L6	Polyatomic molecules
7-L7	Symmetric top molecules
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	Asymmetric top molecules
10- L9	Problem solving
11-L10	Techniques and Instrumentation
12-L11	Chemical analysis by microwave spectroscopy
13-L12	Introduction to IR Spectroscopy
14-L13	I.R. spectroscopy – Vibrating diatomic molecules
15-L14	____- **Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	revision
17-IT-1	**Internal Test-I**
18-L16	Problem Solving
19-L17	____ -**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Simple Harmonic Oscillator
21- L19	An harmonic oscillator
22- P2	**College level meeting/Cell function**
23-L20	Diatomic vibrating rotator
24-L21	IR spectrum of carbon monoxide
25-L22	Interaction of rotations and vibrations
26-L23	Vibration of polyatomic molecules
27-L24	Analysis by IR techniques.
28-L25	Raman effect-discovery – Quantum theory of Raman effect
29-L26	Quantum theory of Raman effect
30-L27	Classicaltheory of Raman Effect –Pure rotational Raman spectra-Linear molecules
31-L28	Raman spectrum of symmetric top molecules ,Vibrational Raman spectra
32-L29	Rule of mutual exclusion – Overtone and combinational vibrations - Rotational fine structure
33-L30	Polarization of light and the Raman Effect -
34- P3	**Department Seminar**
35-L31	Structure determination from IR and Raman spectroscopy.
36-L32	____ - **Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	revision
38- IT-II	**Internal Test-II**
39-L34	Born - Oppenheimer approximation – vibrational coarse structure
40-L35	____ -**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal

41-L36	Progressions – Frank-Condon principle
42- L37	Dissociation energy and Dissociation products – Rotational fine structure -
43- L38	Electronic vibration transitions - Fortrat diagram
44- P4	**College level meeting/ function**
45-L39	Predissociation – Diatomic molecules
46-L40	Instrumentation and techniques in Infrared spectroscopy
47-L41	Sources – Monochromators
48-L42	Sample cells – Detectors
49-L43	Single beam Infra red spectrometer – Double beam Infra red spectrometer (10L)
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Problem Solving
52- L46	Revision
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on23.11.2018

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	

EL3	
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Spectroscopy
Course Code	SMPH5B
Class	III (year)
Semester	Odd
Staff Name	R. Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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-
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Syllabus

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. (14L)

UNIT II: INFRARED SPECTROSCOPY

I.R. spectroscopy – Vibrating diatomic molecules – Simple Harmonic Oscillator -Anharmonic oscillator – Diatomic vibrating rotator – IR spectrum of

carbonmonoxide - 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.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on17.06.2019
1-L1	Rotation of molecules – Classification of molecules
2-L2	Rotation spectra of diatomic molecules
3- L3	Intensities of spectral lines – Effect of isotopic substitution
4-L4	Non-rigid rotator

5-L5	Spectrum of a non-rigid rotator
6-L6	Polyatomic molecules
7-L7	Symmetric top molecules
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	Asymmetric top molecules
10- L9	Problem solving
11-L10	Techniques and Instrumentation
12-L11	Chemical analysis by microwave spectroscopy
13-L12	Introduction to IR Spectroscopy
14-L13	I.R. spectroscopy – Vibrating diatomic molecules
15-L14	____- **Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	revision
17-IT-1	**Internal Test-I**
18-L16	Problem Solving
19-L17	____ -**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Simple Harmonic Oscillator
21- L19	An harmonic oscillator
22- P2	**College level meeting/Cell function**
23-L20	Diatomic vibrating rotator
24-L21	IR spectrum of carbon monoxide
25-L22	Interaction of rotations and vibrations
26-L23	Vibration of polyatomic molecules
27-L24	Analysis by IR techniques.
28-L25	Raman effect-discovery – Quantum theory of Raman effect
29-L26	Quantum theory of Raman effect
30-L27	Classicaltheory of Raman Effect –Pure rotational Raman spectra-Linear molecules
31-L28	Raman spectrum of symmetric top molecules ,Vibrational Raman spectra
32-L29	Rule of mutual exclusion – Overtone and combinational vibrations - Rotational fine structure
33-L30	Polarization of light and the Raman Effect -
34- P3	**Department Seminar**
35-L31	Structure determination from IR and Raman spectroscopy.
36-L32	____ - **Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	revision
38- IT-II	**Internal Test-II**
39-L34	Born - Oppenheimer approximation – vibrational coarse structure
40-L35	____ -**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal

41-L36	Progressions – Frank-Condon principle
42- L37	Dissociation energy and Dissociation products – Rotational fine structure -
43- L38	Electronic vibration transitions - Fortrat diagram
44- P4	**College level meeting/ function**
45-L39	Predissociation – Diatomic molecules
46-L40	Instrumentation and techniques in Infrared spectroscopy
47-L41	Sources – Monochromators
48-L42	Sample cells – Detectors
49-L43	Single beam Infra red spectrometer – Double beam Infra red spectrometer (10L)
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Problem Solving
52- L46	Revision
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on30.10.2019

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	

EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Statistical Mechanics
Course Code	GMPH6A
Class	III year (2014-2015)
Semester	Even
Staff Name	Mr. A. Arul Gnanam
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

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-
-
-

Syllabus

STATISTICAL MECHANICS
(Major Elective Paper)
Unit I
Statistical basis- probability- principle of equal a priori probability -microstate and macro state- thermodynamic probability -constrains on a system -static and dynamic systems -most probable state (equilibrium state) -concept of a cell in a compartment -ensemble and average properties
Unit II
Degrees of freedom -position space -momentum space- phase space- the mu- space and gamma space- applications -fundamental postulates of statistical mechanics –density of quantum

states of enrgy of a particle-statistical ensembles- comparison of ensembles- theories based on
statistical mechanics -entropy and probability- Boltzmann‘s canonical distribution lawapplications
of Boltzmann‘s canonical distribution law-
Unit III
The law of equipartion of energy- statistical interpretation of second law of thermodynamics- partition function and its relation with thermodynamic quantities -entropy of
an ideal gas- Gibbs paradox
Unit IV
Three kinds of particles -M.B statistics applicable to ideal gas -Maxwell Boltzmann energy distribution law - applications of M.B distribution law -mean rms and most probable speeds-
Maxwell‘s distribution law of velocities-experimental verification Maxwellian distribution of molecular speeds

Unit V
Need of quantum statistics -development of quantum statistics- Bose Einstein distribution law- photon gas- Plank‘s radiation law -Fermi Dirac distribution law-free electrons in metal:electron gas= Fermi level and Fermi energy –EF for electrons in a metal-comparison of the three statistics -difference between classical and quantum statistics
Reference Book:
Heat thermodynamics and statistical physics: Brij Lal N.Subramanium P.S Hemne
S.Chand publications
Unit-1 Chapter 9.1-9.3 ,9.7,9.8, 9.10-9.12 9.14-9.15
Unit-2 Chapter 10.1-10.5 10.6-10.11, 10.14-10.17
Unit- 3Chapter 10.18-10.21
Unit-

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 03.12.2014
1-L1	Statistical basis- probability
2-L2	- principle of equal a priori probability
3- L3	microstate and macrostate
4-L4	- thermodynamic probability
5-L5	constrains on a system
6-L6	static and dynamic systems
7-L7	mostprobable state (equilibrium state)
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	concept of a cell in a compartment
10- L9	ensemble and averageproperties
11-L10	Unit II Degrees of freedom
12-L11	position space -momentum space
13-L12	mu- space and gamma space

14-L13	applications -fundamental postulates of statistical mechanics
15-L14	density of quantum
16-L15	states of enrgy of a particle-statistical ensembles
17- L16	comparison of ensembles- theories based on
18- L17	statistical mechanics -entropy and probability
19- L18	- Boltzmann‘s canonical distribution lawapplications
20- L19	Boltzmann‘s canonical distribution law
21- L20	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
22- L21	The law of equipartion of energy
23- IT-1	**Internal Test-I**
24- L22	- statistical interpretation
25- L23	statistical interpretation of second law of thermodynamics
26- L24	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	partition function
28- L26	its relation with thermodynamic quantities
29- L27	entropy of an ideal gas
30- P2	**College level meeting/Cell function**
31-L28	- Gibbs paradox
32-L29	Practical Explanation
33-L30	Three kinds of particles
34- L31	M.B statistics applicable to ideal gas
35- L32	Problems Explanation
36- L33	Practical Work
37- L34	Maxwell Boltzmann Explanation
38-L35	Maxwell‘s distribution law of velocities
39- L36	experimental verification Maxwellian distribution ofmolecular speeds
40- L37	Need of quantum statistics
41- L38	development of quantum statistics
42-P3	**Department Seminar**
43- L39	Bose Einstein distribution law
44- L40	- photon gas- Plank‘s radiation law
45- L41	Fermi Dirac distribution law
46- L42	
47- L43	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
48- L44	Fermi Dirac distribution law
49-IT-II	**Internal Test-II**
50-L45	free electrons in metal
51- L46	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	electron gas= Fermi level
53- L48	Fermi energy

54- L49	EF for electrons in a metal
55- L50	comparison of the three statistics
56- L51	difference between classical and quantum statistics
57- L52	Statistics and Explanation
58- L53	Practical Work
59-P4	**College level meeting/ function**
60- L54	Problems Solution
61- L55	Problems
62- L56	Fermi Energy Calculation
63- L57	Bose Einstein distribution law
64- L58	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
65- L59	Bose Einstein Law Explanation
66- L60	Theory Verification
67-IT-III	**Internal Test-III**
68- L61	Revision
69- L62	Revision Test
70- L63	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
71-MT	**Model Test**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2015

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	

IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Statistical Mechanics
Course Code	GMPH6A
Class	III year (2015-2016)
Semester	Even
Staff Name	Mr. A. Arul Gnanam
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

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Syllabus

STATISTICAL MECHANICS
(Major Elective Paper)
Unit I
Statistical basis- probability- principle of equal a priori probability -microstate and macro state- thermodynamic probability -constrains on a system -static and dynamic systems -most probable state (equilibrium state) -concept of a cell in a compartment -ensemble and average properties
Unit II
Degrees of freedom -position space -momentum space- phase space- the mu- space and gamma space- applications -fundamental postulates of statistical mechanics –density of quantum

states of enrgy of a particle-statistical ensembles- comparison of ensembles- theories based on
statistical mechanics -entropy and probability- Boltzmann‘s canonical distribution lawapplications
of Boltzmann‘s canonical distribution law-

Unit III

The law of equipartion of energy- statistical interpretation of second law of thermodynamics- partition function and its relation with thermodynamic quantities -entropy of
an ideal gas- Gibbs paradox

Unit IV

Three kinds of particles -M.B statistics applicable to ideal gas -Maxwell Boltzmann energy distribution law - applications of M.B distribution law -mean rms and most probable speeds-
Maxwell‘s distribution law of velocities-experimental verification Maxwellian distribution of molecular speeds

Unit V

Need of quantum statistics -development of quantum statistics- Bose Einstein distribution law- photon gas- Plank‘s radiation law -Fermi Dirac distribution law-free electrons in metal:electron gas= Fermi level and Fermi energy –EF for electrons in a metal-comparison of the three statistics -difference between classical and quantum statistics

Reference Book:

Heat thermodynamics and statistical physics: Brij Lal N.Subramanium P.S Hemne S.Chand publications

Unit-1 Chapter 9.1-9.3 ,9.7,9.8, 9.10-9.12 9.14-9.15
Unit-2 Chapter 10.1-10.5 10.6-10.11, 10.14-10.17
Unit- 3Chapter 10.18-10.21
Unit-

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 02.12.2015
1-L1	Statistical basis- probability
2-L2	- principle of equal a priori probability
3- L3	microstate and macrostate
4-L4	- thermodynamic probability
5-L5	constrains on a system
6-L6	static and dynamic systems
7-L7	mostprobable state (equilibrium state)
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	concept of a cell in a compartment
10- L9	ensemble and averageproperties
11-L10	Unit II Degrees of freedom
12-L11	position space -momentum space
13-L12	mu- space and gamma space

14-L13	applications -fundamental postulates of statistical mechanics
15-L14	density of quantum
16-L15	states of enrgy of a particle-statistical ensembles
17- L16	comparison of ensembles- theories based on
18- L17	statistical mechanics -entropy and probability
19- L18	- Boltzmann's canonical distribution lawapplications
20- L19	Boltzmann's canonical distribution law
21- L20	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
22- L21	The law of equipartion of energy
23- IT-1	**Internal Test-I**
24- L22	- statistical interpretation
25- L23	statistical interpretation of second law of thermodynamics
26- L24	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	partition function
28- L26	its relation with thermodynamic quantities
29- L27	entropy of an ideal gas
30- P2	**College level meeting/Cell function**
31-L28	- Gibbs paradox
32-L29	Practical Explanation
33-L30	Three kinds of particles
34- L31	M.B statistics applicable to ideal gas
35- L32	Problems Explanation
36- L33	Practical Work
37- L34	Maxwell Boltzmann Explanation
38-L35	Maxwell's distribution law of velocities
39- L36	experimental verification Maxwellian distribution ofmolecular speeds
40- L37	Need of quantum statistics
41- L38	development of quantum statistics
42-P3	**Department Seminar**
43- L39	Bose Einstein distribution law
44- L40	- photon gas- Plank's radiation law
45- L41	Fermi Dirac distribution law
46- L42	
47- L43	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
48- L44	Fermi Dirac distribution law
49-IT-II	**Internal Test-II**
50-L45	free electrons in metal
51- L46	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	electron gas= Fermi level
53- L48	Fermi energy

54- L49	EF for electrons in a metal
55- L50	comparison of the three statistics
56- L51	difference between classical and quantum statistics
57- L52	Statistics and Explanation
58- L53	Practical Work
59-P4	**College level meeting/ function**
60- L54	Problems Solution
61- L55	Problems
62- L56	Fermi Energy Calculation
63- L57	Bose Einstein distribution law
64- L58	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
65- L59	Bose Einstein Law Explanation
66- L60	Theory Verification
67-IT-III	**Internal Test-III**
68- L61	Revision
69- L62	Revision Test
70- L63	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
71-MT	**Model Test**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 22.04.2016

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	

IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Statistical Mechanics
Course Code	GMPH6A
Class	III year (2016-2017)
Semester	Even
Staff Name	Mr. A. Arul Gnanam
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

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Syllabus

STATISTICAL MECHANICS
(Major Elective Paper)
Unit I
Statistical basis- probability- principle of equal a priori probability -microstate and macro state- thermodynamic probability -constrains on a system -static and dynamic systems -most probable state (equilibrium state) -concept of a cell in a compartment -ensemble and average properties
Unit II
Degrees of freedom -position space -momentum space- phase space- the mu- space and gamma space- applications -fundamental postulates of statistical mechanics –density of quantum

states of enrgy of a particle-statistical ensembles- comparison of ensembles- theories based on
statistical mechanics -entropy and probability- Boltzmann‘s canonical distribution lawapplications
of Boltzmann‘s canonical distribution law-

Unit III

The law of equipartion of energy- statistical interpretation of second law of thermodynamics- partition function and its relation with thermodynamic quantities -entropy of
an ideal gas- Gibbs paradox

Unit IV

Three kinds of particles -M.B statistics applicable to ideal gas -Maxwell Boltzmann energy distribution law - applications of M.B distribution law -mean rms and most probable speeds-
Maxwell‘s distribution law of velocities-experimental verification Maxwellian distribution of molecular speeds

Unit V

Need of quantum statistics -development of quantum statistics- Bose Einstein distribution law- photon gas- Plank‘s radiation law -Fermi Dirac distribution law-free electrons in metal:electron gas= Fermi level and Fermi energy –EF for electrons in a metal-comparison of the three statistics -difference between classical and quantum statistics

Reference Book:

Heat thermodynamics and statistical physics: Brij Lal N.Subramanium P.S Hemne S.Chand publications

Unit-1 Chapter 9.1-9.3 ,9.7,9.8, 9.10-9.12 9.14-9.15

Unit-2 Chapter 10.1-10.5 10.6-10.11, 10.14-10.17

Unit- 3Chapter 10.18-10.21

Unit-

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 01.12.2016
1-L1	Statistical basis- probability
2-L2	- principle of equal a priori probability
3- L3	microstate and macrostate
4-L4	- thermodynamic probability
5-L5	constrains on a system
6-L6	static and dynamic systems
7-L7	mostprobable state (equilibrium state)
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	concept of a cell in a compartment
10- L9	ensemble and averageproperties
11-L10	Unit II Degrees of freedom
12-L11	position space -momentum space
13-L12	mu- space and gamma space

14-L13	applications -fundamental postulates of statistical mechanics
15-L14	density of quantum
16-L15	states of enrgy of a particle-statistical ensembles
17- L16	comparison of ensembles- theories based on
18- L17	statistical mechanics -entropy and probability
19- L18	- Boltzmann's canonical distribution lawapplications
20- L19	Boltzmann's canonical distribution law
21- L20	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
22- L21	The law of equipartion of energy
23- IT-1	**Internal Test-I**
24- L22	- statistical interpretation
25- L23	statistical interpretation of second law of thermodynamics
26- L24	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	partition function
28- L26	its relation with thermodynamic quantities
29- L27	entropy of an ideal gas
30- P2	**College level meeting/Cell function**
31-L28	- Gibbs paradox
32-L29	Practical Explanation
33-L30	Three kinds of particles
34- L31	M.B statistics applicable to ideal gas
35- L32	Problems Explanation
36- L33	Practical Work
37- L34	Maxwell Boltzmann Explanation
38-L35	Maxwell's distribution law of velocities
39- L36	experimental verification Maxwellian distribution ofmolecular speeds
40- L37	Need of quantum statistics
41- L38	development of quantum statistics
42-P3	**Department Seminar**
43- L39	Bose Einstein distribution law
44- L40	- photon gas- Plank's radiation law
45- L41	Fermi Dirac distribution law
46- L42	
47- L43	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
48- L44	Fermi Dirac distribution law
49-IT-II	**Internal Test-II**
50-L45	free electrons in metal
51- L46	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	electron gas= Fermi level
53- L48	Fermi energy

54- L49	EF for electrons in a metal
55- L50	comparison of the three statistics
56- L51	difference between classical and quantum statistics
57- L52	Statistics and Explanation
58- L53	Practical Work
59-P4	**College level meeting/ function**
60- L54	Problems Solution
61- L55	Problems
62- L56	Fermi Energy Calculation
63- L57	Bose Einstein distribution law
64- L58	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
65- L59	Bose Einstein Law Explanation
66- L60	Theory Verification
67-IT-III	**Internal Test-III**
68- L61	Revision
69- L62	Revision Test
70- L63	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
71-MT	**Model Test**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 21.04.2017

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	

IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Statistical Mechanics
Course Code	GMPH6A
Class	III year (2017-2018)
Semester	Even
Staff Name	Mr. A. Arul Gnanam
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

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Syllabus

STATISTICAL MECHANICS
(Major Elective Paper)
Unit I
Statistical basis- probability- principle of equal a priori probability -microstate and macro state- thermodynamic probability -constrains on a system -static and dynamic systems -most probable state (equilibrium state) -concept of a cell in a compartment -ensemble and average properties
Unit II
Degrees of freedom -position space -momentum space- phase space- the mu- space and gamma space- applications -fundamental postulates of statistical mechanics –density of quantum

states of enrgy of a particle-statistical ensembles- comparison of ensembles- theories based on
statistical mechanics -entropy and probability- Boltzmann‘s canonical distribution lawapplications
of Boltzmann‘s canonical distribution law-

Unit III

The law of equipartion of energy- statistical interpretation of second law of thermodynamics- partition function and its relation with thermodynamic quantities -entropy of
an ideal gas- Gibbs paradox

Unit IV

Three kinds of particles -M.B statistics applicable to ideal gas -Maxwell Boltzmann energy distribution law - applications of M.B distribution law -mean rms and most probable speeds-
Maxwell‘s distribution law of velocities-experimental verification Maxwellian distribution of molecular speeds

Unit V

Need of quantum statistics -development of quantum statistics- Bose Einstein distribution law- photon gas- Plank‘s radiation law -Fermi Dirac distribution law-free electrons in metal:electron gas= Fermi level and Fermi energy –EF for electrons in a metal-comparison of the three statistics -difference between classical and quantum statistics

Reference Book:

Heat thermodynamics and statistical physics: Brij Lal N.Subramanium P.S Hemne S.Chand publications

Unit-1 Chapter 9.1-9.3 ,9.7,9.8, 9.10-9.12 9.14-9.15
Unit-2 Chapter 10.1-10.5 10.6-10.11, 10.14-10.17
Unit- 3Chapter 10.18-10.21
Unit-

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 07.12.2017
1-L1	Statistical basis- probability
2-L2	- principle of equal a priori probability
3- L3	microstate and macrostate
4-L4	- thermodynamic probability
5-L5	constrains on a system
6-L6	static and dynamic systems
7-L7	mostprobable state (equilibrium state)
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	concept of a cell in a compartment
10- L9	ensemble and averageproperties
11-L10	Unit II Degrees of freedom
12-L11	position space -momentum space
13-L12	mu- space and gamma space

14-L13	applications -fundamental postulates of statistical mechanics
15-L14	density of quantum
16-L15	states of enrgy of a particle-statistical ensembles
17- L16	comparison of ensembles- theories based on
18- L17	statistical mechanics -entropy and probability
19- L18	- Boltzmann's canonical distribution lawapplications
20- L19	Boltzmann's canonical distribution law
21- L20	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
22- L21	The law of equipartion of energy
23- IT-1	**Internal Test-I**
24- L22	- statistical interpretation
25- L23	statistical interpretation of second law of thermodynamics
26- L24	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	partition function
28- L26	its relation with thermodynamic quantities
29- L27	entropy of an ideal gas
30- P2	**College level meeting/Cell function**
31-L28	- Gibbs paradox
32-L29	Practical Explanation
33-L30	Three kinds of particles
34- L31	M.B statistics applicable to ideal gas
35- L32	Problems Explanation
36- L33	Practical Work
37- L34	Maxwell Boltzmann Explanation
38-L35	Maxwell's distribution law of velocities
39- L36	experimental verification Maxwellian distribution ofmolecular speeds
40- L37	Need of quantum statistics
41- L38	development of quantum statistics
42-P3	**Department Seminar**
43- L39	Bose Einstein distribution law
44- L40	- photon gas- Plank's radiation law
45- L41	Fermi Dirac distribution law
46- L42	
47- L43	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
48- L44	Fermi Dirac distribution law
49-IT-II	**Internal Test-II**
50-L45	free electrons in metal
51- L46	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	electron gas= Fermi level
53- L48	Fermi energy

54- L49	EF for electrons in a metal
55- L50	comparison of the three statistics
56- L51	difference between classical and quantum statistics
57- L52	Statistics and Explanation
58- L53	Practical Work
59-P4	**College level meeting/ function**
60- L54	Problems Solution
61- L55	Problems
62- L56	Fermi Energy Calculation
63- L57	Bose Einstein distribution law
64- L58	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
65- L59	Bose Einstein Law Explanation
66- L60	Theory Verification
67-IT-III	**Internal Test-III**
68- L61	Revision
69- L62	Revision Test
70- L63	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
71-MT	**Model Test**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2018

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	

IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Thermal physics
Course Code	GMPH22
Class	I year (2015-2018)
Semester	Even
Staff Name	Mrs.D.Priscilla Koilpillai
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

Thermal Physics

Unit I. KINETIC THEORY OF GASES: Concept of heat and temperature –ideal and perfect gas – kinetic theory of gases – Expression for a pressure of a gas – interpretation of temperature – Gas laws – Gas equation – Avogadro's hypothesis – Graham's law of diffusion of gases – Maxwell's law of equi-partition of energy – atomicity of gases – Maxwell's law of distribution of velocity – experimental verification – mean free path – problems in all topics

Unit II. TRANSPORT PHEONOMENA : Transport of momentum - Transport of energy gases at high pressure- Tr of st ansport of matter – behavior of sure – Vander Waals equation ate – critical constants – experimental determination – Porous plug experiment – J-K effect – relation between temperatures - problems in all topics.

Unit III. THERMODYNAMICS I : Thermodynamic system – thermal equilibrium and concept of temperature – heat and work as path function – comparison – first law of thermodynamics – applications – isothermal process – adiabatic process – isochoric process – isobaric process – gas equation during adiabatic process – work done during isothermal and adiabatic processes – slopes of isothermal and adiabatic processes - problems in all topics.

Unit IV. THERMODYNAMICS II: Reversible and irreversible processes – second law of thermodynamics – Carnot's engine – refrigerator – Carnot's theorem – Thermodynamic scale of temperature - Clapeyron latent heat equation – entropy – second law of thermodynamics – change in entropy in a Carnot's cycle – change in entropy in an irreversible process – third law of thermodynamics – temperature-– entropy diagram entropy of a perfect gas - problems in all topics.

Unit V. THERMODYNAMICS III: Maxwell's thermodynamic relations – Helmholtz function – Gibb's function – enthalpy – Maxwell's relations from the above functions – equilibrium between liquid and its vapour – first order phase transition – second order phase transition – TdS equations – deduction of Clapeyron latent heat equation – relation between specific heat capacities for a perfect and Vander Waals gas – derivation of Clausius latent heat equation - problems in all topics.

Book for study:

1. Heat and Thermodynamics – Brijlal and Subramanium – S.Chand and company Ltd.

Book for reference:

1.Physics - Robert Resnick, David Halliday, Jearl Walker Wiley and Sons Inc., Sixth Edition

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 02.12.2015
1-L1	**Unit I. KINETIC THEORY OF GASES**
2-L2	**Concept of heat and temperature**
3- L3	**ideal and perfect gas – kinetic theory of gases**
4-L4	**Expression for a pressure of a gas – interpretation of temperature**
5-L5	**Gas laws – Gas equation**
6-L6	**Avogadro's hypothesis – Graham's law of diffusion of gases**
7-L7	**Maxwell's law of equi-partition of energy – atomicity of gases**
8- P1	**Maxwell's law of distribution of velocity – experimental verification**

9- L8	**mean free path -problems in all topics**
10- L9	**Unit II. TRANSPORT PHEONOMENA**
11-L10	**Transport of momentum - Transport of energy gases at high pressure**
12-L11	**Vander Waals equation ate – critical constants**
13-L12	**experimental determination – Porous plug experiment**
14-L13	**J-K effect – relation between temperatures**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**problems in all topics.**
17-IT-1	**Internal Test-I**
18-L16	**Unit III. THERMODYNAMICS I**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**Thermodynamic system – thermal equilibrium and concept of temperature**
21- L19	**heat and work as path function**
22- P2	**College level meeting/Cell function**
23-L20	**comparison – first law of thermodynamics – applications – isothermal process**
24-L21	**adiabatic process – isochoric process – isobaric process – gas equation during adiabatic process**
25-L22	**work done during isothermal and adiabatic processes**
26-L23	**slopes of isothermal and adiabatic processes**
27-L24	**problems in all topics.**
28-L25	**Unit IV. THERMODYNAMICS II**
29-L26	**Reversible and irreversible processes – second law of thermodynamics**
30-L27	**Carnot's engine – refrigerator – Carnot's theorem**
31-L28	**Thermodynamic scale of temperature**
32-L29	**Clapeyron latent heat equation**
33-L30	**entropy – second law of thermodynamics**
34- P3	**Department Seminar**
35-L31	**change in entropy in a Carnot's cycle**
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**change in entropy in an irreversible process**
38- IT-II	**Internal Test-II**
39-L34	**third law of thermodynamics**
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**temperature- entropy diagram**
42- L37	**entropy of a perfect gas**
43- L38	**problems in all topics.**
44- P4	**College level meeting/ function**
45-L39	**Unit V. THERMODYNAMICS III**
46-L40	**Maxwell's thermodynamic relations – Helmholtz function – Gibb's function**
47-L41	**enthalpy – Maxwell's relations from the above functions equilibrium between liquid and its vapour**
48-L42	**first order phase transition – second order phase transition**

49-L43	**TdS equations**
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**deduction of Clapeyron latent heat equation**
52- L46	**relation between specific heat capacities for a perfect and Vander Waals gas derivation of Clausius latent heat equation**
53-IT-III	**Internal Test-III**
54-L47	**problems in all topics.**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 22.04.2016

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Thermal physics
Course Code	GMPH22
Class	I year (2015-2018)
Semester	Even
Staff Name	Mrs.D.Priscilla Koilpillai
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

Thermal Physics

Unit I. KINETIC THEORY OF GASES: Concept of heat and temperature –ideal and perfect gas – kinetic theory of gases – Expression for a pressure of a gas – interpretation of temperature – Gas laws – Gas equation – Avogadro’s hypothesis – Graham’s law of diffusion of gases – Maxwell’s law of equi-partition of energy – atomicity of gases – Maxwell’s law of distribution of velocity – experimental verification – mean free path – problems in all topics

Unit II. TRANSPORT PHEONOMENA : Transport of momentum - Transport of energy gases at high pressure- Tr of st ansport of matter – behavior of sure – Vander Waals equation ate – critical constants – experimental determination – Porous plug experiment – J-K effect – relation between temperatures - problems in all topics.

Unit III. THERMODYNAMICS I : Thermodynamic system – thermal equilibrium and concept of temperature – heat and work as path function – comparison – first law of thermodynamics – applications – isothermal process – adiabatic process – isochoric process – isobaric process – gas equation during adiabatic process – work done during isothermal and adiabatic processes – slopes of isothermal and adiabatic processes - problems in all topics.

Unit IV. THERMODYNAMICS II: Reversible and irreversible processes – second law of thermodynamics – Carnot's engine – refrigerator – Carnot's theorem – Thermodynamic scale of temperature - Clapeyron latent heat equation – entropy – second law of thermodynamics – change in entropy in a Carnot's cycle – change in entropy in an irreversible process – third law of thermodynamics – temperature-– entropy diagram entropy of a perfect gas - problems in all topics.

Unit V. THERMODYNAMICS III: Maxwell's thermodynamic relations – Helmholtz function – Gibb's function – enthalpy – Maxwell's relations from the above functions – equilibrium between liquid and its vapour – first order phase transition – second order phase transition – TdS equations – deduction of Clapeyron latent heat equation – relation between specific heat capacities for a perfect and Vander Waals gas – derivation of Clausius latent heat equation - problems in all topics.

Book for study:

1. Heat and Thermodynamics – Brijlal and Subramanium – S.Chand and company Ltd.

Book for reference:

1.Physics - Robert Resnick, David Halliday, Jearl Walker Wiley and Sons Inc., Sixth Edition

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 02.12.2015
1-L1	**Unit I. KINETIC THEORY OF GASES**
2-L2	**Concept of heat and temperature**
3- L3	**ideal and perfect gas – kinetic theory of gases**
4-L4	**Expression for a pressure of a gas – interpretation of temperature**
5-L5	**Gas laws – Gas equation**
6-L6	**Avogadro's hypothesis – Graham's law of diffusion of gases**
7-L7	**Maxwell's law of equi-partition of energy – atomicity of gases**
8- P1	**Maxwell's law of distribution of velocity – experimental verification**

9- L8	**mean free path -problems in all topics**
10- L9	**Unit II. TRANSPORT PHEONOMENA**
11-L10	**Transport of momentum - Transport of energy gases at high pressure**
12-L11	**Vander Waals equation ate – critical constants**
13-L12	**experimental determination – Porous plug experiment**
14-L13	**J-K effect – relation between temperatures**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**problems in all topics.**
17-IT-1	**Internal Test-I**
18-L16	**Unit III. THERMODYNAMICS I**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**Thermodynamic system – thermal equilibrium and concept of temperature**
21- L19	**heat and work as path function**
22- P2	**College level meeting/Cell function**
23-L20	**comparison – first law of thermodynamics – applications – isothermal process**
24-L21	**adiabatic process – isochoric process – isobaric process – gas equation during adiabatic process**
25-L22	**work done during isothermal and adiabatic processes**
26-L23	**slopes of isothermal and adiabatic processes**
27-L24	**problems in all topics.**
28-L25	**Unit IV. THERMODYNAMICS II**
29-L26	**Reversible and irreversible processes – second law of thermodynamics**
30-L27	**Carnot's engine – refrigerator – Carnot's theorem**
31-L28	**Thermodynamic scale of temperature**
32-L29	**Clapeyron latent heat equation**
33-L30	**entropy – second law of thermodynamics**
34- P3	**Department Seminar**
35-L31	**change in entropy in a Carnot's cycle**
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**change in entropy in an irreversible process**
38- IT-II	**Internal Test-II**
39-L34	**third law of thermodynamics**
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**temperature- entropy diagram**
42- L37	**entropy of a perfect gas**
43- L38	**problems in all topics.**
44- P4	**College level meeting/ function**
45-L39	**Unit V. THERMODYNAMICS III**
46-L40	**Maxwell's thermodynamic relations – Helmholtz function – Gibb's function**
47-L41	**enthalpy – Maxwell's relations from the above functions equilibrium between liquid and its vapour**
48-L42	**first order phase transition – second order phase transition**

49-L43	**TdS equations**
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**deduction of Clapeyron latent heat equation**
52- L46	**relation between specific heat capacities for a perfect and Vander Waals gas derivation of Clausius latent heat equation**
53-IT-III	**Internal Test-III**
54-L47	**problems in all topics.**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 22.04.2016

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Thermal physics
Course Code	JMPH22
Class	I year (2016-2019)
Semester	Even
Staff Name	Mrs.R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

Thermal Physics

Unit I. KINETIC THEORY OF GASES: Concept of heat and temperature –ideal and perfect gas – kinetic theory of gases – Expression for a pressure of a gas – interpretation of temperature – Gas laws – Gas equation – Avogadro's hypothesis – Graham's law of diffusion of gases – Maxwell's law of equi-partition of energy – atomicity of gases – Maxwell's law of distribution of velocity – experimental verification – mean free path – problems in all topics

Unit II. TRANSPORT PHEONOMENA : Transport of momentum - Transport of energy gases at high pressure- Tr of st ansport of matter – behavior of sure – Vander Waals equation ate – critical constants – experimental determination – Porous plug experiment – J-K effect – relation between temperatures - problems in all topics.

Unit III. THERMODYNAMICS I : Thermodynamic system – thermal equilibrium and concept of temperature – heat and work as path function – comparison – first law of thermodynamics – applications – isothermal process – adiabatic process – isochoric process – isobaric process – gas equation during adiabatic process – work done during isothermal and adiabatic processes – slopes of isothermal and adiabatic processes - problems in all topics.

Unit IV. THERMODYNAMICS II: Reversible and irreversible processes – second law of thermodynamics – Carnot's engine – refrigerator – Carnot's theorem – Thermodynamic scale of temperature - Clapeyron latent heat equation – entropy – second law of thermodynamics – change in entropy in a Carnot's cycle – change in entropy in an irreversible process – third law of thermodynamics – temperature-– entropy diagram entropy of a perfect gas - problems in all topics.

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Book for study:

1. Heat and Thermodynamics – Brijlal and Subramanium – S.Chand and company Ltd.

Book for reference:

1.Physics - Robert Resnick, David Halliday, Jearl Walker Wiley and Sons Inc., Sixth Edition

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 01.12.2016
1-L1	**Unit I. KINETIC THEORY OF GASES**
2-L2	**Concept of heat and temperature**
3- L3	**ideal and perfect gas – kinetic theory of gases**
4-L4	**Expression for a pressure of a gas – interpretation of temperature**
5-L5	**Gas laws – Gas equation**
6-L6	**Avogadro's hypothesis – Graham's law of diffusion of gases**
7-L7	**Maxwell's law of equi-partition of energy – atomicity of gases**
8- P1	**Maxwell's law of distribution of velocity – experimental verification**

9- L8	**mean free path -problems in all topics**
10- L9	**Unit II. TRANSPORT PHEONOMENA**
11-L10	**Transport of momentum - Transport of energy gases at high pressure**
12-L11	**Vander Waals equation ate – critical constants**
13-L12	**experimental determination – Porous plug experiment**
14-L13	**J-K effect – relation between temperatures**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**problems in all topics.**
17-IT-1	**Internal Test-I**
18-L16	**Unit III. THERMODYNAMICS I**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**Thermodynamic system – thermal equilibrium and concept of temperature**
21- L19	**heat and work as path function**
22- P2	**College level meeting/Cell function**
23-L20	**comparison – first law of thermodynamics – applications – isothermal process**
24-L21	**adiabatic process – isochoric process – isobaric process – gas equation during adiabatic process**
25-L22	**work done during isothermal and adiabatic processes**
26-L23	**slopes of isothermal and adiabatic processes**
27-L24	**problems in all topics.**
28-L25	**Unit IV. THERMODYNAMICS II**
29-L26	**Reversible and irreversible processes – second law of thermodynamics**
30-L27	**Carnot's engine – refrigerator – Carnot's theorem**
31-L28	**Thermodynamic scale of temperature**
32-L29	**Clapeyron latent heat equation**
33-L30	**entropy – second law of thermodynamics**
34- P3	**Department Seminar**
35-L31	**change in entropy in a Carnot's cycle**
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**change in entropy in an irreversible process**
38- IT-II	**Internal Test-II**
39-L34	**third law of thermodynamics**
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**temperature- entropy diagram**
42- L37	**entropy of a perfect gas**
43- L38	**problems in all topics.**
44- P4	**College level meeting/ function**
45-L39	**Unit V. THERMODYNAMICS III**
46-L40	**Maxwell's thermodynamic relations – Helmholtz function – Gibb's function**
47-L41	**enthalpy – Maxwell's relations from the above functions equilibrium between liquid and its vapour**
48-L42	**first order phase transition – second order phase transition**

49-L43	**TdS equations**
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**deduction of Clapeyron latent heat equation**
52- L46	**relation between specific heat capacities for a perfect and Vander Waals gas derivation of Clausius latent heat equation**
53-IT-III	**Internal Test-III**
54-L47	**problems in all topics.**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 21.04.2017

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Thermal physics
Course Code	SMPH22
Class	I year (2017-2020)
Semester	Even
Staff Name	Mr.A.Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

Thermal Physics

Unit I. KINETIC THEORY OF GASES: Concept of heat and temperature –ideal and perfect gas – kinetic theory of gases – Expression for a pressure of a gas – interpretation of temperature – Gas laws – Gas equation – Avogadro's hypothesis – Graham's law of diffusion of gases – Maxwell's law of equi-partition of energy – atomicity of gases – Maxwell's law of distribution of velocity – experimental verification – mean free path – problems in all topics

Unit II. TRANSPORT PHEONOMENA : Transport of momentum - Transport of energy gases at high pressure- Tr of st ansport of matter – behavior of sure – Vander Waals equation ate – critical constants – experimental determination – Porous plug experiment – J-K effect – relation between temperatures - problems in all topics.

Unit III. THERMODYNAMICS I : Thermodynamic system – thermal equilibrium and concept of temperature – heat and work as path function – comparison – first law of thermodynamics – applications – isothermal process – adiabatic process – isochoric process – isobaric process – gas equation during adiabatic process – work done during isothermal and adiabatic processes – slopes of isothermal and adiabatic processes - problems in all topics.

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Book for study:

1. Heat and Thermodynamics – Brijlal and Subramanium – S.Chand and company Ltd.

Book for reference:

1.Physics - Robert Resnick, David Halliday, Jearl Walker Wiley and Sons Inc., Sixth Edition

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 07.12.2017
1-L1	**Unit I. KINETIC THEORY OF GASES**
2-L2	**Concept of heat and temperature**
3- L3	**ideal and perfect gas – kinetic theory of gases**
4-L4	**Expression for a pressure of a gas – interpretation of temperature**
5-L5	**Gas laws – Gas equation**
6-L6	**Avogadro's hypothesis – Graham's law of diffusion of gases**
7-L7	**Maxwell's law of equi-partition of energy – atomicity of gases**
8- P1	**Maxwell's law of distribution of velocity – experimental verification**

9- L8	**mean free path -problems in all topics**
10- L9	**Unit II. TRANSPORT PHEONOMENA**
11-L10	**Transport of momentum - Transport of energy gases at high pressure**
12-L11	**Vander Waals equation ate – critical constants**
13-L12	**experimental determination – Porous plug experiment**
14-L13	**J-K effect – relation between temperatures**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**problems in all topics.**
17-IT-1	**Internal Test-I**
18-L16	**Unit III. THERMODYNAMICS I**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**Thermodynamic system – thermal equilibrium and concept of temperature**
21- L19	**heat and work as path function**
22- P2	**College level meeting/Cell function**
23-L20	**comparison – first law of thermodynamics – applications – isothermal process**
24-L21	**adiabatic process – isochoric process – isobaric process – gas equation during adiabatic process**
25-L22	**work done during isothermal and adiabatic processes**
26-L23	**slopes of isothermal and adiabatic processes**
27-L24	**problems in all topics.**
28-L25	**Unit IV. THERMODYNAMICS II**
29-L26	**Reversible and irreversible processes – second law of thermodynamics**
30-L27	**Carnot's engine – refrigerator – Carnot's theorem**
31-L28	**Thermodynamic scale of temperature**
32-L29	**Clapeyron latent heat equation**
33-L30	**entropy – second law of thermodynamics**
34- P3	**Department Seminar**
35-L31	**change in entropy in a Carnot's cycle**
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**change in entropy in an irreversible process**
38- IT-II	**Internal Test-II**
39-L34	**third law of thermodynamics**
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**temperature- entropy diagram**
42- L37	**entropy of a perfect gas**
43- L38	**problems in all topics.**
44- P4	**College level meeting/ function**
45-L39	**Unit V. THERMODYNAMICS III**
46-L40	**Maxwell's thermodynamic relations – Helmholtz function – Gibb's function**
47-L41	**enthalpy – Maxwell's relations from the above functions equilibrium between liquid and its vapour**
48-L42	**first order phase transition – second order phase transition**

49-L43	**TdS equations**
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**deduction of Clapeyron latent heat equation**
52- L46	**relation between specific heat capacities for a perfect and Vander Waals gas derivation of Clausius latent heat equation**
53-IT-III	**Internal Test-III**
54-L47	**problems in all topics.**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2018

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

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# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Thermal physics
Course Code	SMPH22
Class	I year (2018-2021)
Semester	Even
Staff Name	Mr.A.Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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Syllabus

Thermal Physics

Unit I. KINETIC THEORY OF GASES: Concept of heat and temperature –ideal and perfect gas – kinetic theory of gases – Expression for a pressure of a gas – interpretation of temperature – Gas laws – Gas equation – Avogadro's hypothesis – Graham's law of diffusion of gases – Maxwell's law of equi-partition of energy – atomicity of gases – Maxwell's law of distribution of velocity – experimental verification – mean free path – problems in all topics

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Book for study:

1. Heat and Thermodynamics – Brijlal and Subramanium – S.Chand and company Ltd.

Book for reference:

1.Physics - Robert Resnick, David Halliday, Jearl Walker Wiley and Sons Inc., Sixth Edition

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 03.12.2018
1-L1	**Unit I. KINETIC THEORY OF GASES**
2-L2	**Concept of heat and temperature**
3- L3	**ideal and perfect gas – kinetic theory of gases**
4-L4	**Expression for a pressure of a gas – interpretation of temperature**
5-L5	**Gas laws – Gas equation**
6-L6	**Avogadro's hypothesis – Graham's law of diffusion of gases**
7-L7	**Maxwell's law of equi-partition of energy – atomicity of gases**
8- P1	**Maxwell's law of distribution of velocity – experimental verification**

9- L8	**mean free path -problems in all topics**
10- L9	**Unit II. TRANSPORT PHEONOMENA**
11-L10	**Transport of momentum - Transport of energy gases at high pressure**
12-L11	**Vander Waals equation ate – critical constants**
13-L12	**experimental determination – Porous plug experiment**
14-L13	**J-K effect – relation between temperatures**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**problems in all topics.**
17-IT-1	**Internal Test-I**
18-L16	**Unit III. THERMODYNAMICS I**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**Thermodynamic system – thermal equilibrium and concept of temperature**
21- L19	**heat and work as path function**
22- P2	**College level meeting/Cell function**
23-L20	**comparison – first law of thermodynamics – applications – isothermal process**
24-L21	**adiabatic process – isochoric process – isobaric process – gas equation during adiabatic process**
25-L22	**work done during isothermal and adiabatic processes**
26-L23	**slopes of isothermal and adiabatic processes**
27-L24	**problems in all topics.**
28-L25	**Unit IV. THERMODYNAMICS II**
29-L26	**Reversible and irreversible processes – second law of thermodynamics**
30-L27	**Carnot's engine – refrigerator – Carnot's theorem**
31-L28	**Thermodynamic scale of temperature**
32-L29	**Clapeyron latent heat equation**
33-L30	**entropy – second law of thermodynamics**
34- P3	**Department Seminar**
35-L31	**change in entropy in a Carnot's cycle**
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**change in entropy in an irreversible process**
38- IT-II	**Internal Test-II**
39-L34	**third law of thermodynamics**
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**temperature- entropy diagram**
42- L37	**entropy of a perfect gas**
43- L38	**problems in all topics.**
44- P4	**College level meeting/ function**
45-L39	**Unit V. THERMODYNAMICS III**
46-L40	**Maxwell's thermodynamic relations – Helmholtz function – Gibb's function**
47-L41	**enthalpy – Maxwell's relations from the above functions equilibrium between liquid and its vapour**
48-L42	**first order phase transition – second order phase transition**

49-L43	**TdS equations**
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**deduction of Clapeyron latent heat equation**
52- L46	**relation between specific heat capacities for a perfect and Vander Waals gas derivation of Clausius latent heat equation**
53-IT-III	**Internal Test-III**
54-L47	**problems in all topics.**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2019

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Thermal physics
Course Code	SMPH22
Class	I year (2019-2022)
Semester	Even
Staff Name	Mrs.R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

-
-
-
-

Syllabus

Thermal Physics

Unit I. KINETIC THEORY OF GASES: Concept of heat and temperature –ideal and perfect gas – kinetic theory of gases – Expression for a pressure of a gas – interpretation of temperature – Gas laws – Gas equation – Avogadro's hypothesis – Graham's law of diffusion of gases – Maxwell's law of equi-partition of energy – atomicity of gases – Maxwell's law of distribution of velocity – experimental verification – mean free path – problems in all topics

Unit II. TRANSPORT PHEONOMENA : Transport of momentum - Transport of energy gases at high pressure- Tr of st ansport of matter – behavior of sure – Vander Waals equation ate – critical constants – experimental determination – Porous plug experiment – J-K effect – relation between temperatures - problems in all topics.

Unit III. THERMODYNAMICS I : Thermodynamic system – thermal equilibrium and concept of temperature – heat and work as path function – comparison – first law of thermodynamics – applications – isothermal process – adiabatic process – isochoric process – isobaric process – gas equation during adiabatic process – work done during isothermal and adiabatic processes – slopes of isothermal and adiabatic processes - problems in all topics.

Unit IV. THERMODYNAMICS II: Reversible and irreversible processes – second law of thermodynamics – Carnot's engine – refrigerator – Carnot's theorem – Thermodynamic scale of temperature - Clapeyron latent heat equation – entropy – second law of thermodynamics – change in entropy in a Carnot's cycle – change in entropy in an irreversible process – third law of thermodynamics – temperature-– entropy diagram entropy of a perfect gas - problems in all topics.

Unit V. THERMODYNAMICS III: Maxwell's thermodynamic relations – Helmholtz function – Gibb's function – enthalpy – Maxwell's relations from the above functions – equilibrium between liquid and its vapour – first order phase transition – second order phase transition – TdS equations – deduction of Clapeyron latent heat equation – relation between specific heat capacities for a perfect and Vander Waals gas – derivation of Clausius latent heat equation - problems in all topics.

Book for study:

1. Heat and Thermodynamics – Brijlal and Subramanium – S.Chand and company Ltd.

Book for reference:

1.Physics - Robert Resnick, David Halliday, Jearl Walker Wiley and Sons Inc., Sixth Edition

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 02.12.2019
1-L1	**Unit I. KINETIC THEORY OF GASES**
2-L2	**Concept of heat and temperature**
3- L3	**ideal and perfect gas – kinetic theory of gases**
4-L4	**Expression for a pressure of a gas – interpretation of temperature**
5-L5	**Gas laws – Gas equation**
6-L6	**Avogadro's hypothesis – Graham's law of diffusion of gases**
7-L7	**Maxwell's law of equi-partition of energy – atomicity of gases**
8- P1	**Maxwell's law of distribution of velocity – experimental verification**

9- L8	**mean free path -problems in all topics**
10- L9	**Unit II. TRANSPORT PHEONOMENA**
11-L10	**Transport of momentum - Transport of energy gases at high pressure**
12-L11	**Vander Waals equation ate – critical constants**
13-L12	**experimental determination – Porous plug experiment**
14-L13	**J-K effect – relation between temperatures**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**problems in all topics.**
17-IT-1	**Internal Test-I**
18-L16	**Unit III. THERMODYNAMICS I**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**Thermodynamic system – thermal equilibrium and concept of temperature**
21- L19	**heat and work as path function**
22- P2	**College level meeting/Cell function**
23-L20	**comparison – first law of thermodynamics – applications – isothermal process**
24-L21	**adiabatic process – isochoric process – isobaric process – gas equation during adiabatic process**
25-L22	**work done during isothermal and adiabatic processes**
26-L23	**slopes of isothermal and adiabatic processes**
27-L24	**problems in all topics.**
28-L25	**Unit IV. THERMODYNAMICS II**
29-L26	**Reversible and irreversible processes – second law of thermodynamics**
30-L27	**Carnot's engine – refrigerator – Carnot's theorem**
31-L28	**Thermodynamic scale of temperature**
32-L29	**Clapeyron latent heat equation**
33-L30	**entropy – second law of thermodynamics**
34- P3	**Department Seminar**
35-L31	**change in entropy in a Carnot's cycle**
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**change in entropy in an irreversible process**
38- IT-II	**Internal Test-II**
39-L34	**third law of thermodynamics**
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**temperature- entropy diagram**
42- L37	**entropy of a perfect gas**
43- L38	**problems in all topics.**
44- P4	**College level meeting/ function**
45-L39	**Unit V. THERMODYNAMICS III**
46-L40	**Maxwell's thermodynamic relations – Helmholtz function – Gibb's function**
47-L41	**enthalpy – Maxwell's relations from the above functions equilibrium between liquid and its vapour**
48-L42	**first order phase transition – second order phase transition**

49-L43	**TdS equations**
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**deduction of Clapeyron latent heat equation**
52- L46	**relation between specific heat capacities for a perfect and Vander Waals gas derivation of Clausius latent heat equation**
53-IT-III	**Internal Test-III**
54-L47	**problems in all topics.**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 27.04.2020

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Allied Physics I
Course Code	JAPH11
Class	I year (2016-2019)
Semester	Odd
Staff Name	D r. D. Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- For To understand the property of Elasticity and its applications.
- For to know about the property of viscosity.
- For to study the property of sound and thermodynamics.
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Syllabus

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 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,

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2016
1-L1	**Unit I : Elasticity and bending moment**
2-L2	**Hooke's law – Elastic moduli**
3- L3	**Relation between elastic constants**
4-L4	**Work done in stretching a wire**
5-L5	**Expression for bending moment - uniform bending**
6-L6	**Experiment to determine Young's modulus using pin and microscope- Twisting couple of a wire**
7-L7	**Expression for couple per unit twist – Work done in twisting**
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	**Experimental determination of rigidity modulus of a wire using Torsion pendulum with theory**
10- L9	**Unit II: Surface tension and Viscosity**
11-L10	**Surface tension – Definition – Examples**
12-L11	**Molecular interpretation**
13-L12	**Application to spherical and cylindrical drops and bubbles**
14-L13	**Viscosity: Coefficient of viscosity – Rate of flow of liquid in a capillary tube (Poisueuille's formula)**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**Analogy between liquid flow and current flow**
17-IT-1	**Internal Test-I**
18-L16	**Stokes' formula for highly viscous liquids (Dimension method) – Experimental determination of viscosity of highly viscous liquid (stokes' method)**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**Unit III: Sound**
21- L19	**Simple harmonic motion – Free, damped ,forced vibrations and resonance**
22- P2	**College level meeting/Cell function**
23-L20	**Composition of two SHMs along a straight line and in perpendicular direction**
24-L21	**Melde's string experiment**
25-L22	**Determination of frequency of tuning fork** **Unit IV : Thermal physics**

26-L23	**Mean free path- Expression for mean free path**
27-L24	**Transport phenomena – Expression for viscosity and thermal conductivity**
28-L25	**Conduction in solids – coefficient of thermal conductivity**
29-L26	**Lee's disc method to determine thermal conductivity of a bad conductor**
30-L27	**Wiedmann – Franz's law – Convection : Newton's**
31-L28	**Unit V: Optics**
32-L29	**Interference: Condition for interference**
33-L30	**Air wedge**
34- P3	**Department Seminar**
35-L31	**determination of thickness of a thin wire by air wedge**
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**Diffraction: Fresnel diffraction**
38- IT-II	**Internal Test-II**
39-L34	**Fraunhofer diffraction**
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**Plane diffraction grating**
42- L37	**theory and experiment to determine wavelength (normal incidence)**
43- L38	**Polarization: Double refraction**
44- P4	**College level meeting/ function**
45-L39	**half wave and quarter wave plate**
46-L40	**Production and detection of plane, elliptically and circularly polarized light.**
47-L41	**Expression for excess of pressure inside a synclastic and anticlastic surface**
48-L42	**Expression for viscosity and thermal conductivity**
49-L43	**uniform bending**
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**Expression for bending moment**
52- L46	**Problem solving**
53-IT-III	**Internal Test-III**
54-L47	**Problem solving**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.11.2016

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	Studied the various properties of physics especially

	elasticity,viscosity,sound and thermodynamics .test were conducted.
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	Also related practicals were demonstrated
EL2	
EL3	
EL4	
Integrated Activity	
IA1	Students did project using this concepts.
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Communication Electronics
Course Code	JMPH5C
Class	III year (2018-2019)
Semester	Odd
Staff Name	Dr.D.Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- Students to study the different concepts of modulation and their various types.
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Syllabus

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)

Page 20 of 54

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

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2018
1-L1	**UNIT I: AMPLITUDE MODULATION AND TRANSMISSION**
2-L2	**amplitude Modulation – AM envelop – AM frequency spectrum and bandwidth**
3- L3	**Phasor representation of AM with carrier**
4-L4	**coefficient of modulation or percentage modulation or modulation index**
5-L5	**– degrees of modulation – AM power distribution -**
6-L6	**AM Current relation and efficiency - modulation by complex information signal**
7-L7	**doubleside band suppressed carrier AM**
8- P1	**single side band suppressed carrier AM**
9- L8	**Vestigal side band amplitude modulation**
10- L9	**AM modulator circuits – emitter modulations or low power AM**
11-L10	**collector modulator or medium and high power AM modulator**
12-L11	**AM transmitters – Broadcast AM transmitters**
13-L12	**Low level of AM transmitter – High level AM transmitter**
14-L13	**Welcoming of First year and Inauguration of MathematicsAssociation**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**UNIT II: AMPLITUDE MODULATION -RECEPTION**
17-IT-1	**Internal Test-I**
18-L16	**Comparison of AM system – Quadrature amplitude modulation**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**principles of AM detection – AM receivers – receiver parameters**
21- L19	**Tuned radio frequency (TRF) receiver or straight receiver**
22- P2	**College level meeting/Cell function**
23-L20	**principles of superhetrodyne**
24-L21	**double frequency conversion AM receiver**
25-L22	**UNIT III:ANGLE MODULATION – TRANSMISSION**
26-L23	**Frequency modulation – Phase modulation**
27-L24	**Phase deviation and modulation index**
28-L25	**Multitone modulation**
29-L26	**Transmission band width of FM**
30-L27	**conversion of PM to FM or frequency modulator**
31-L28	**conversion of FM to PM / phase modulators**
32-L29	**commercial broadcast FM**
33-L30	**average power of an AM/FM wave**
34- P3	**Department Seminar**
35-L31	**generation of FM – direct method of FM generation**
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**reactance tube modulator**
38- IT-II	**Internal Test-II**
39-L34	**indirect method of FM wave generation – FM transmitters**

40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**Comparison of AM and FM.**
42- L37	**UNIT IV:FM RECEPTION FM**
43- L38	**detectors – Balanced slope detector**
44- P4	**College level meeting/ function**
45-L39	**Foster seely discriminator – ratio detector**
46-L40	**FM super heterodyne receiver – FM noise suppression**
47-L41	**threshold extension by FMFB technique**
48-L42	**UNIT – V: DIGITAL MODULATION TECHNIQUES**
49-L43	**BFSK – Binary phase shift keying**
50-L44	**Quadrature PSK – Differential PSK**
	Internal Test III begins
51 L45	**correlative coding – Duobinary encoding**
52- L46	**Performance comparison of digital modulation schemes - - M ary FSK**
53-IT-III	**Internal Test-III**
54-L47	**correlative coding – Duobinary encoding**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.11.2018

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	Students got more knowledge in modulation and demodulation techniques.
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	Students construct circuits usin the concepts.
EL3	
EL4	

Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Allied Physics I
Course Code	GAPH11
Class	I year (2015-2018)
Semester	Odd
Staff Name	M r. D. Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- Students to understand the property of Elasticity, Viscosity, sound.
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-
-

Syllabus

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 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,

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2015
1-L1	**Unit I : Elasticity and bending moment**
2-L2	**Hooke's law – Elastic moduli**
3- L3	**Relation between elastic constants**
4-L4	**Work done in stretching a wire**
5-L5	**Expression for bending moment - uniform bending**
6-L6	**Experiment to determine Young's modulus using pin and microscope-Twisting couple of a wire**
7-L7	**Expression for couple per unit twist – Work done in twisting**
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	**Experimental determination of rigidity modulus of a wire using Torsion pendulum with theory**
10- L9	**Unit II: Surface tension and Viscosity**
11-L10	**Surface tension – Definition – Examples**
12-L11	**Molecular interpretation**
13-L12	**Application to spherical and cylindrical drops and bubbles**
14-L13	**Viscosity: Coefficient of viscosity – Rate of flow of liquid in a capillary tube (Poisueuille's formula)**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**Analogy between liquid flow and current flow**
17-IT-1	**Internal Test-I**
18-L16	**Stokes' formula for highly viscous liquids (Dimension method) – Experimental determination of viscosity of highly viscous liquid (stokes' method)**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**Unit III: Sound**
21- L19	**Simple harmonic motion – Free, damped ,forced vibrations and resonance**
22- P2	**College level meeting/Cell function**
23-L20	**Composition of two SHMs along a straight line and in perpendicular direction**
24-L21	**Melde's string experiment**
25-L22	**Determination of frequency of tuning fork** **Unit IV : Thermal physics**

26-L23	**Mean free path- Expression for mean free path**
27-L24	**Transport phenomena – Expression for viscosity and thermal conductivity**
28-L25	**Conduction in solids – coefficient of thermal conductivity**
29-L26	**Lee's disc method to determine thermal conductivity of a bad conductor**
30-L27	**Wiedmann – Franz's law – Convection : Newton's**
31-L28	**Unit V: Optics**
32-L29	**Interference: Condition for interference**
33-L30	**Air wedge**
34- P3	**Department Seminar**
35-L31	**determination of thickness of a thin wire by air wedge**
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**Diffraction: Fresnel diffraction**
38- IT-II	**Internal Test-II**
39-L34	**Fraunhofer diffraction**
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**Plane diffraction grating**
42- L37	**theory and experiment to determine wavelength (normal incidence)**
43- L38	**Polarization: Double refraction**
44- P4	**College level meeting/ function**
45-L39	**half wave and quarter wave plate**
46-L40	**Production and detection of plane, elliptically and circularly polarized light.**
47-L41	**Expression for excess of pressure inside a synclastic and anticlastic surface**
48-L42	**Expression for viscosity and thermal conductivity**
49-L43	**uniform bending**
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**Expression for bending moment**
52- L46	**Problem solving**
53-IT-III	**Internal Test-III**
54-L47	**Problem solving**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 29.10.2015

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	Students got more knowledge in various properties of matters

CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	The related practical were demonstrated
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Communication Electronics
Course Code	SEPH5C
Class	III year (2019-2020)
Semester	Odd
Staff Name	Dr.D.Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- Students to understand the various modulation techniques.
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Syllabus

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)

Page 20 of 54

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

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 17.06.2019
1-L1	UNIT I: AMPLITUDE MODULATION AND TRANSMISSION
2-L2	amplitude Modulation – AM envelop – AM frequency spectrum and bandwidth
3- L3	Phasor representation of AM with carrier
4-L4	coefficient of modulation or percentage modulation or modulation index
5-L5	– degrees of modulation – AM power distribution -
6-L6	AM Current relation and efficiency - modulation by complex information signal
7-L7	doubleside band suppressed carrier AM
8- P1	single side band suppressed carrier AM
9- L8	Vestigal side band amplitude modulation
10- L9	AM modulator circuits – emitter modulations or low power AM
11-L10	collector modulator or medium and high power AM modulator
12-L11	AM transmitters – Broadcast AM transmitters
13-L12	Low level of AM transmitter – High level AM transmitter
14-L13	Welcoming of First year and Inauguration of MathematicsAssociation
15-L14	____ - Allotting portion for Internal Test-I
	Internal Test I begins
16-L15	UNIT II: AMPLITUDE MODULATION -RECEPTION
17-IT-1	Internal Test-I
18-L16	Comparison of AM system – Quadrature amplitude modulation
19-L17	____ -Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	principles of AM detection – AM receivers – receiver parameters
21- L19	Tuned radio frequency (TRF) receiver or straight receiver
22- P2	College level meeting/Cell function
23-L20	principles of superhetrodyne
24-L21	double frequency conversion AM receiver
25-L22	UNIT III:ANGLE MODULATION – TRANSMISSION
26-L23	Frequency modulation – Phase modulation
27-L24	Phase deviation and modulation index
28-L25	Multitone modulation
29-L26	Transmission band width of FM
30-L27	conversion of PM to FM or frequency modulator
31-L28	conversion of FM to PM / phase modulators
32-L29	commercial broadcast FM
33-L30	average power of an AM/FM wave
34- P3	Department Seminar
35-L31	generation of FM – direct method of FM generation
36-L32	____ - Allotting portion for Internal Test-II
	Internal Test II begins
37- L33	reactance tube modulator
38- IT-II	Internal Test-II
39-L34	indirect method of FM wave generation – FM transmitters

40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**Comparison of AM and FM.**
42- L37	**UNIT IV:FM RECEPTION FM**
43- L38	**detectors – Balanced slope detector**
44- P4	**College level meeting/ function**
45-L39	**Foster seely discriminator – ratio detector**
46-L40	**FM super heterodyne receiver – FM noise suppression**
47-L41	**threshold extension by FMFB technique**
48-L42	**UNIT – V: DIGITAL MODULATION TECHNIQUES**
49-L43	**BFSK – Binary phase shift keying**
50-L44	**Quadrature PSK – Differential PSK**
	Internal Test III begins
51 L45	**correlative coding – Duobinary encoding**
52- L46	**Performance comparison of digital modulation schemes - - M ary FSK**
53-IT-III	**Internal Test-III**
54-L47	**correlative coding – Duobinary encoding**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on30.10.2019

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	Students understood the modulation applications.
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	Students did project related this modulation.
EL3	
EL4	
Integrated Activity	

IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Allied Physics I
Course Code	GAPH11
Class	I year (2014-2017)
Semester	Odd
Staff Name	M r. D. Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- Students to understand the various properties of matters.
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-
-

Syllabus

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 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,

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2014
1-L1	**Unit I : Elasticity and bending moment**
2-L2	**Hooke's law – Elastic moduli**
3- L3	**Relation between elastic constants**
4-L4	**Work done in stretching a wire**
5-L5	**Expression for bending moment - uniform bending**
6-L6	**Experiment to determine Young's modulus using pin and microscope- Twisting couple of a wire**
7-L7	**Expression for couple per unit twist – Work done in twisting**
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	**Experimental determination of rigidity modulus of a wire using Torsion pendulum with theory**
10- L9	**Unit II: Surface tension and Viscosity**
11-L10	**Surface tension – Definition – Examples**
12-L11	**Molecular interpretation**
13-L12	**Application to spherical and cylindrical drops and bubbles**
14-L13	**Viscosity: Coefficient of viscosity – Rate of flow of liquid in a capillary tube (Poisueuille's formula)**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**Analogy between liquid flow and current flow**
17-IT-1	**Internal Test-I**
18-L16	**Stokes' formula for highly viscous liquids (Dimension method) – Experimental determination of viscosity of highly viscous liquid (stokes' method)**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**Unit III: Sound**
21- L19	**Simple harmonic motion – Free, damped ,forced vibrations and resonance**
22- P2	**College level meeting/Cell function**
23-L20	**Composition of two SHMs along a straight line and in perpendicular direction**
24-L21	**Melde's string experiment**
25-L22	**Determination of frequency of tuning fork** **Unit IV : Thermal physics**

26-L23	**Mean free path- Expression for mean free path**
27-L24	**Transport phenomena – Expression for viscosity and thermal conductivity**
28-L25	**Conduction in solids – coefficient of thermal conductivity**
29-L26	**Lee's disc method to determine thermal conductivity of a bad conductor**
30-L27	**Wiedmann – Franz's law – Convection : Newton's**
31-L28	**Unit V: Optics**
32-L29	**Interference: Condition for interference**
33-L30	**Air wedge**
34- P3	**Department Seminar**
35-L31	**determination of thickness of a thin wire by air wedge**
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**Diffraction: Fresnel diffraction**
38- IT-II	**Internal Test-II**
39-L34	**Fraunhofer diffraction**
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**Plane diffraction grating**
42- L37	**theory and experiment to determine wavelength (normal incidence)**
43- L38	**Polarization: Double refraction**
44- P4	**College level meeting/ function**
45-L39	**half wave and quarter wave plate**
46-L40	**Production and detection of plane, elliptically and circularly polarized light.**
47-L41	**Expression for excess of pressure inside a synclastic and anticlastic surface**
48-L42	**Expression for viscosity and thermal conductivity**
49-L43	**uniform bending**
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**Expression for bending moment**
52- L46	**Problem solving**
53-IT-III	**Internal Test-III**
54-L47	**Problem solving**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2014

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	Students got more knowledge in various properties of matters in

	physics.
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	Related experiments were demonstrated.
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Energy Physics
Course Code	GNPH3B
Class	II year (2014-2015)
Semester	Odd
Staff Name	Dr.D.Arul Asir Abraham
Credits	4
L. Hours /P. Hours	2 / WK
Total 30Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 20 Hrs (5 units; 5×4=20; 4Hrs /unit)	

Course Objectives

- Students to understand the various energy and its applications.
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-

Syllabus

ENERGY PHYSICS
(Major Elective Paper)
Unit I
Conventional Energy Sources: World's reserve of commercial energy sources and their availability - various forms of energy - renewable and conventional energy systems - comparison
- coal, oil and natural gas - availability - statistical details - applications - merits and demerits.
Nuclear energy – merits and demerits
Unit II
Non-Conventional Energy Sources: Renewable energy sources - solar energy - nature of solar radiation - components - solar heaters - crop dryers - space cooling - solar ponds, solar cookers - water desalination - photovoltaic generation basics - merits and demerits of solar energy.
Unit III
Biomass energy: Biomass energy - classification - photosynthesis - biomass conversion process - gobar gas plants - wood gasification - ethanol from wood - advantages and

disadvantages of biomass as energy source
Unit IV
Geothermal energy - wind energy - ocean thermal energy conversion (OTEC) - energy from waves and tides (Basic ideas, nature, applications, merits and demerits of these).
Unit V
Impacts of Conventional Energy: Energy crisis and possible solutions - energy options for the developing countries - energy storage and hydrogen as a fuel(basics) - impact due to conventional energy sources – Thermal, Hydel , Nuclear - global warming- ecological damage -
Nuclear pollution (leaks,accidents, nuclear waste disposal).

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2014
1-L1	Unit I:Conventional Energy Sources: World's reserve of commercial energy sources and their availability
2-L2	various forms of energy
3- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
4-L3	renewable and conventional energy systems - comparison- coal, oil and natural gas
5-L4	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
6-IT-I	**Internal Test-I**
7-L5	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
8-L6	availability - statistical details - applications - merits and demerits
9-L7	Nuclear energy – merits and demerits Unit II Non-Conventional Energy Sources: Renewable energy sources - solar energy - nature of solar radiation - components
10-P2	**College level meeting/Cell function**
11-L8	solar heaters - crop dryers - space cooling - solar ponds, solar cookers - water desalination - photovoltaic generation basics - merits and demerits of solar energy.
12-L9	Unit III Biomass energy: Biomass energy - classification - photosynthesis - biomass conversion process - gobar gas plants - wood gasification - ethanol from wood
13-P3	**Department Seminar**
14-L10	advantages and disadvantages of biomass as energy source
15-L11	Unit IV Geothermal energy - wind energy - ocean thermal energy conversion (OTEC) – energy from waves and tides (Basic ideas, nature, applications, merits and demerits ofthese).
16-L12	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
17-IT-1	**Internal Test-II**

18-L13	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
19-L14	Unit V Impacts of Conventional Energy: Energy crisis and possible solutions - energy options for the developing countries - energy storage and hydrogen as a fuel(basics) - impact due to conventional energy source
20- P2	**College level meeting/ function**
21-L15	Thermal, Hydel , Nuclear - global warming- ecological damage
22-L16	Nuclear pollution (leaks,accidents, nuclear waste disposal).
23- L17	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
24- IT-III	**Internal Test-III**
25-L18	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
26-MT	**Model Test**
27-MT	**Model Test**
28-MT	**Model Test**
29-L19	**Model test paper distribution and previous year university question paper discussion**
30-L20	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2014

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	Students got knowledge in energy sources.
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	Energy related project were done
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Energy Physics
Course Code	SMPH6B
Class	III year (2019– 2020)
Semester	Even
Staff Name	Dr.D.Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- Students to understand about the energy sources
-
-
-

Syllabus

ENERGY PHYSICS
(Major Elective Paper)

Unit I

Conventional Energy Sources: World's reserve of commercial energy sources and their availability - various forms of energy - renewable and conventional energy systems - comparison
- coal, oil and natural gas - availability - statistical details - applications - merits and demerits. Nuclear energy – merits and demerits

Unit II

Non-Conventional Energy Sources: Renewable energy sources - solar energy - nature of solar radiation - components - solar heaters - crop dryers - space cooling - solar ponds, solar cookers - water desalination - photovoltaic generation basics - merits and demerits of solar energy.

Unit III
Biomass energy: Biomass energy - classification - photosynthesis - biomass conversion process - gobar gas plants - wood gasification - ethanol from wood - advantages and disadvantages of biomass as energy source

Unit IV
Geothermal energy - wind energy - ocean thermal energy conversion (OTEC) - energy from waves and tides (Basic ideas, nature, applications, merits and demerits of these).

Unit V
Impacts of Conventional Energy: Energy crisis and possible solutions - energy options for the developing countries - energy storage and hydrogen as a fuel(basics) - impact due to conventional energy sources – Thermal, Hydel , Nuclear - global warming- ecological damage -
Nuclear pollution (leaks, accidents, nuclear waste disposal).

Text Books:
1. Solar Energy by G.D. Rai, Ed. V, 1995.
2. Solar energy by S.P. Sukhatme, Tata McGraw-Hill Publishing Company, Ed. II, 1997.
Reference Books:
1 Non Conventional Energy Sources, G.D. Rai, 4th Edition, 1997.
2 Energy Technology by S. Rao and Dr. B.B. Parulekar 2nd Edition, 1997.
3 Power Plant technology by A.K. Wahil 1993
4 Renewable Energy: Power for a sustainable Future by Godfery Boyle, Alden Oess Ltd., Oxford, 1996.
5 Energy models for 2000 and beyond by Jyoti Parikh, Tata McGraw Hill Publishing Company, New Delhi, 1997.

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 02.12.2019
1-L1	World's reserve of commercial energy sources and their availability
2-L2	various forms of energy
3- L3	renewable and conventional energy systems
4-L4	Class Test
5-L5	Comparison - coal, oil and natural gas
6-L6	availability - statistical details
7-L7	applications
8- P1	**Welcoming of First year and Inauguration of Mathematics Association**
9- L8	merits and demerits
10- L9	Class Test
11-L10	Nuclear energy
12-L11	merits and demerits

13-L12	Renewable energy sources
14-L13	nature of solar radiation
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	components - solar heaters
17-IT-1	**Internal Test-I**
18-L16	crop dryers - space cooling
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Class Test
21- L19	Solar cookers
22- P2	**College level meeting/Cell function**
23-L20	water desalination
24-L21	photovoltaic generation basics
25-L22	merits and demerits of solar energy
26-L23	Class Test
27-L24	Biomass energy
28-L25	classification – photosynthesis
29-L26	biomass conversion process
30-L27	Class Test
31-L28	gobar gas plants - wood gasification
32-L29	ethanol from wood
33-L30	advantages and disadvantages of biomass as energy source
34- P3	**Department Seminar**
35-L31	Class Test
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Geothermal energy
38- IT-II	**Internal Test-II**
39-L34	wind energy
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	ocean thermal energy conversion (OTEC)
42- L37	Class Test
43- L38	Energy from waves and tides
44- P4	**College level meeting/ function**
45-L39	Basic ideas, nature, applications, merits and demerits of these
46-L40	Class Test
47-L41	Energy crisis and possible solutions
48-L42	energy options for the developing countries
49-L43	energy storage and hydrogen as a fuel(basics)
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	impact due to conventional energy sources
52- L46	Thermal, Hydel , Nuclear - global warming- ecological damage
53-IT-III	**Internal Test-III**
54-L47	Nuclear pollution (leaks, accidents, nuclear waste disposal).
55-L48	**____ - Test Paper distribution and result analysis**

	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 27.04.2020

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	Students got more knowledge in Energy sources.
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	Related experiment were demonstrated lab.
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Energy Physics
Course Code	JMPH6B
Class	III year (2018 – 2019)
Semester	Even
Staff Name	Dr.D.Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- Students to understand the various energy sources and its applications.
-
-
-

Syllabus

ENERGY PHYSICS
(Major Elective Paper)

Unit I

Conventional Energy Sources: World's reserve of commercial energy sources and their availability - various forms of energy - renewable and conventional energy systems - comparison
- coal, oil and natural gas - availability - statistical details - applications - merits and demerits.
Nuclear energy – merits and demerits
Unit II
Non-Conventional Energy Sources: Renewable energy sources - solar energy - nature of solar radiation - components - solar heaters - crop dryers - space cooling - solar ponds, solar cookers - water desalination - photovoltaic generation basics - merits and demerits of solar energy.

Unit III
Biomass energy: Biomass energy - classification - photosynthesis - biomass conversion process - gobar gas plants - wood gasification - ethanol from wood - advantages and disadvantages of biomass as energy source

Unit IV
Geothermal energy - wind energy - ocean thermal energy conversion (OTEC) - energy from waves and tides (Basic ideas, nature, applications, merits and demerits of these).

Unit V
Impacts of Conventional Energy: Energy crisis and possible solutions - energy options for the developing countries - energy storage and hydrogen as a fuel(basics) - impact due to conventional energy sources – Thermal, Hydel , Nuclear - global warming- ecological damage -
Nuclear pollution (leaks, accidents, nuclear waste disposal).

Text Books:
1. Solar Energy by G.D. Rai, Ed. V, 1995.
2. Solar energy by S.P. Sukhatme, Tata McGraw-Hill Publishing Company, Ed. II, 1997.
Reference Books:
1 Non Conventional Energy Sources, G.D. Rai, 4th Edition, 1997.
2 Energy Technology by S. Rao and Dr. B.B. Parulekar 2nd Edition, 1997.
3 Power Plant technology by A.K. Wahil 1993
4 Renewable Energy: Power for a sustainable Future by Godfery Boyle, Alden Oess Ltd., Oxford, 1996.
5 Energy models for 2000 and beyond by Jyoti Parikh, Tata McGraw Hill Publishing Company, New Delhi, 1997.

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 03.12.2018
1-L1	World's reserve of commercial energy sources and their availability
2-L2	various forms of energy
3- L3	renewable and conventional energy systems
4-L4	Class Test
5-L5	Comparison - coal, oil and natural gas
6-L6	availability - statistical details
7-L7	applications
8- P1	**Welcoming of First year and Inauguration of Mathematics Association**
9- L8	merits and demerits
10- L9	Class Test
11-L10	Nuclear energy
12-L11	merits and demerits

13-L12	Renewable energy sources
14-L13	nature of solar radiation
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	components - solar heaters
17-IT-1	**Internal Test-I**
18-L16	crop dryers - space cooling
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Class Test
21- L19	Solar cookers
22- P2	**College level meeting/Cell function**
23-L20	water desalination
24-L21	photovoltaic generation basics
25-L22	merits and demerits of solar energy
26-L23	Class Test
27-L24	Biomass energy
28-L25	classification – photosynthesis
29-L26	biomass conversion process
30-L27	Class Test
31-L28	gobar gas plants - wood gasification
32-L29	ethanol from wood
33-L30	advantages and disadvantages of biomass as energy source
34- P3	**Department Seminar**
35-L31	Class Test
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Geothermal energy
38- IT-II	**Internal Test-II**
39-L34	wind energy
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	ocean thermal energy conversion (OTEC)
42- L37	Class Test
43- L38	Energy from waves and tides
44- P4	**College level meeting/ function**
45-L39	Basic ideas, nature, applications, merits and demerits of these
46-L40	Class Test
47-L41	Energy crisis and possible solutions
48-L42	energy options for the developing countries
49-L43	energy storage and hydrogen as a fuel(basics)
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	impact due to conventional energy sources
52- L46	Thermal, Hydel , Nuclear - global warming- ecological damage
53-IT-III	**Internal Test-III**
54-L47	Nuclear pollution (leaks, accidents, nuclear waste disposal).
55-L48	**____ - Test Paper distribution and result analysis**

	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2019

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	Students studied the energy and its applications
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	Related energy project was done by students.
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Maintenance Of Electrical Appliances
Course Code	SSPH3A
Class	II year (2019-2020)
Semester	Odd
Staff Name	Dr.D.Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- Student to understand the concepts of electrical appliances
-
-
-

Syllabus

MAINTAINANCE OF ELECTRICAL EQUIPMENT (Skilled Based Subject)

Unit-I ,

Network Analysis: Direct Current and Alternating Current, power , Ohms law,kircoff law resistances ,capacitances, combination in series, parallel - problems

Unit-II

Two Port Networks: Resistance, impedence and reactances, Impedance Parameters, Admittance Parameters, Hybrid Parameters, Inverse Hybrid Parameters,

Unit-III

Elecrical bulb, choke, starter, tube light wiring, cfl functioning, LED lighting , staircase switch, domestic wiring, fuse, ELCB,(Earth leak circuit breaker), circuit breaker(MCB),

Unit-IV

Transformers, Electric iron, fan, mixie , grinder, refrigerator, circuit diagram and working Two Port Networks: Resistance, impedence and reactances, Impedance Parameters, Admittance Parameters, Hybrid Parameters, Inverse Hybrid Parameters,

Unit-III

Elecrical bulb, choke, starter, tube light wiring, cfl functioning, LED lighting , staircase switch, domestic wiring, fuse, ELCB,(Earth leak circuit breaker), circuit breaker(MCB),

Unit-IV

Transformers, Electric iron, fan, mixie , grinder, refrigerator, circuit diagram and working

Unit-V

Soldering and Desoldering Techniques : Grove board, bread board, printed circuit board, wave soldering

Reference Books.:

1. Circuits and Networks by A. Sudhakar and Shyam Mohan 2. Instrumentation Repair and Maintenance by R.G. Gupta 3. Basic Electronics and Linear Circuits by Bhargava & Kulshreshtha (TTTI) 4. Integrated Electronics by Millman and Halkias 5. Instrumentation Cooper 6. Internet

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 17.06.2019
1-L1	Network Analysis: Direct Current and Alternating Current,
2-L2	power , Ohms law,
3- L3	Kircoff law
4-L4	resistances,
5-L5	Capacitances
6-L6	combination in series,
7-L7	Parallel
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**

9- L8	- problems
10- L9	Problems for solving
11-L10	Revision for unit-I
12-L11	Unit-II introduction
13-L12	Two Port Networks:
14-L13	: Resistance
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Revision
17-IT-1	**Internal Test-I**
18-L16	, impedence and
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	reactances,
21- L19	Impedance Parameters,
22- P2	**College level meeting/Cell function**
23-L20	Admittance Parameters,
24-L21	Hybrid Parameters,
25-L22	Inverse Hybrid Parameters,
26-L23	Solving for problems
27-L24	Revision
28-L25	Class test
29-L26	Unit-III Introduction
30-L27	choke, starter,
31-L28	tube light wiring, cfl functioning, LED lighting , staircase switch, domestic wiring,
32-L29	fuse,
33-L30	ELCB,(Earth leak circuit breaker),
34- P3	**Department Seminar**
35-L31	circuit breaker(MCB),
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Revision
38- IT-II	**Internal Test-II**
39-L34	Unil-IV Introduction
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Transformers, Electric iron, fan, mixie , iagram
42- L37	grinder, refrigerator, circuit diagram and working
43- L38	Soldering and Desoldering Techniques :
44- P4	**College level meeting/ function**
45-L39	: Grove board, bread board,
46-L40	printed circuit board,

47-L41	wave soldering
48-L42	Problems
49-L43	Solving for problems
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Revision
52- L46	Class test
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working 30.10.2019

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	Students got knowledge in the electrical appliances
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	Some servicing done by Students
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Maintanance of electronic appliances
Course Code	SSPH4A
Class	II year (2019-2020)
Semester	Even
Staff Name	Dr.D.Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- Students to understand the concept of various electrical appliances
-
-
-

Syllabus

MAINTANANCE OF 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 shutteraperture-flash photography-filters-battery-tele and wide angle lens

Digital formats-data transfer to computer-ISO speed-resolution(11L)

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on02.12.2019
1-L1	**UNIT-I: ELECTRONIC COMPONENTS** Study of electronic components
2-L2	star and delta connection of resistors
3- L3	wattage rating-potential divider arrangement
4-L4	capacitors - type -characteristics -–working voltage
5-L5	resistors - types - characteristics – colour coding
6-L6	soldering and desoldering techniques
7-L7	Groove board,bread board
8- P1	**Welcoming of First year and Inauguration of Mathematics Association**
9- L8	Practical uses of Multimeter (analog and digital)
10- L9	measurement of voltage, frequency and phase
11-L10	waveforms and Lissajoue's figures
12-L11	CRO - Block Diagram
13-L12	Digital Storage Oscilloscopes
14-L13	LCD display for instruments
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins

16-L15	A/F and R/F oscillators
17-IT-1	**Internal Test-I**
18-L16	printed circuit board
19-L17	____ **-Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Classification of transducers
21- L19	active and passive transducers, resistive (Potentiometer-Theory, temperature compensation &applications
22- P2	**College level meeting/Cell function**
23-L20	Capacitive (variable air gap type),
24-L21	Inductive (LVDT) &piezoelectric transducers.
25-L22	Measurement of temperature (RTD, semiconductor IC sensors)
26-L23	Light transducers
27-L24	Basic concepts of radio transmitter and receiver
28-L25	TV antennas
29-L26	Dipole antenna - Folded dipole
30-L27	Yagi antenna
31-L28	Dish antenna
32-L29	Mobile communication system
33-L30	MODEM.
34- P3	**Department Seminar**
35-L31	Telephone systems
36-L32	____ **- Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	cellular Telephone systems
38- IT-II	**Internal Test-II**
39-L34	mobile phone-principle of operation
40-L35	____ **-Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	integrated services
42- L37	digital networks(ISDN)
43- L38	Yagi antenna design
44- P4	**College level meeting/ function**
45-L39	resonance antennas and their characteristics
46-L40	basic requirements/characteristics of Transducers
47-L41	DTH system
48-L42	(photo resistors & photovoltaic cells).
49-L43	Class test
50-L44	____ **- Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**UNIT-V: Photography** Introduction to cameras-parts of camera and accessories
52- L46	lens shutteraperture
53-IT-III	**Internal Test-III**

54-L47	flash photography-filters-battery
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	tele and wide angle lens Digital formats-data transfer to computer-ISO speed-resolution
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on27.04.2020

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	
CO2	
CO3	Students got more knowledge in electrical appliances and servicing
CO4	
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	Related equipment faults was identified by student
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Maintenance Of Electrical Equipment
Course Code	JSPH3A
Class	II year (2017-2018)
Semester	Odd
Staff Name	Dr.D.Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- Students to understand the concepts of various electrical equipments
-
-
-

Syllabus

MAINTAINANCE OF ELECTRICAL EQUIPMENT (Skilled Based Subject)

Unit-I ,

Network Analysis: Direct Current and Alternating Current, power , Ohms law,kircoff law resistances ,capacitances, combination in series, parallel - problems

Unit-II

Two Port Networks: Resistance, impedence and reactances, Impedance Parameters, Admittance Parameters, Hybrid Parameters, Inverse Hybrid Parameters,

Unit-III

Elecrical bulb, choke, starter, tube light wiring, cfl functioning, LED lighting , staircase switch, domestic wiring, fuse, ELCB,(Earth leak circuit breaker), circuit breaker(MCB),

Unit-IV

Transformers, Electric iron, fan, mixie , grinder, refrigerator, circuit diagram and working Two Port Networks: Resistance, impedence and reactances, Impedance Parameters, Admittance Parameters, Hybrid Parameters, Inverse Hybrid Parameters,

Unit-III

Elecrical bulb, choke, starter, tube light wiring, cfl functioning, LED lighting , staircase switch, domestic wiring, fuse, ELCB,(Earth leak circuit breaker), circuit breaker(MCB),

Unit-IV

Transformers, Electric iron, fan, mixie , grinder, refrigerator, circuit diagram and working

Unit-V

Soldering and Desoldering Techniques : Grove board, bread board, printed circuit board, wave soldering

Reference Books.:

1. Circuits and Networks by A. Sudhakar and Shyam Mohan 2. Instrumentation Repair and Maintenance by R.G. Gupta 3. Basic Electronics and Linear Circuits by Bhargava & Kulshreshtha (TTTI) 4. Integrated Electronics by Millman and Halkias 5. Instrumentation Cooper 6. Internet

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 16.06.2017
1-L1	Network Analysis: Direct Current and Alternating Current,
2-L2	power , Ohms law,
3- L3	Kircoff law
4-L4	resistances,
5-L5	Capacitances
6-L6	combination in series,

7-L7	Parallel
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	- problems
10- L9	Problems for solving
11-L10	Revision for unit-I
12-L11	Unit-II introduction
13-L12	Two Port Networks:
14-L13	: Resistance
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Revision
17-IT-1	**Internal Test-I**
18-L16	, impedence and
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	reactances,
21- L19	Impedance Parameters,
22- P2	**College level meeting/Cell function**
23-L20	Admittance Parameters,
24-L21	Hybrid Parameters,
25-L22	Inverse Hybrid Parameters,
26-L23	Solving for problems
27-L24	Revision
28-L25	Class test
29-L26	Unit-III Introduction
30-L27	choke, starter,
31-L28	tube light wiring, cfl functioning, LED lighting , staircase switch, domestic wiring,
32-L29	fuse,
33-L30	ELCB,(Earth leak circuit breaker),
34- P3	**Department Seminar**
35-L31	circuit breaker(MCB),
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Revision
38- IT-II	**Internal Test-II**
39-L34	Unil-IV Introduction
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Transformers, Electric iron, fan, mixie , iagram
42- L37	grinder, refrigerator, circuit diagram and working
43- L38	Soldering and Desoldering Techniques :
44- P4	**College level meeting/ function**
45-L39	: Grove board, bread board,

46-L40	printed circuit board,
47-L41	wave soldering
48-L42	Problems
49-L43	Solving for problems
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Revision
52- L46	Class test
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working 06.11.2017

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	Students got more knowledge i electrical equipments.
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	Some equipment servicing were done by Students
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Mechanics And Relativity
Course Code	GMPH21
Class	I year (2015-2018)
Semester	EVEN
Staff Name	Dr.D.Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- Students to understand the Mechanics concepts and relativity in physics
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Syllabus

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, Stokes and Greens theorem

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. Torque - Rotational Kinetic energy - parallel axis and perpendicular axis theorem - Newton’s second law for rotation - 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.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 2.12.2015
1-L1	**MECHANICS AND RELATIVITY UNIT-I:Introduction**
2-L2	**VECTORS** Vector analysis gradient of a scalar point function
3- L3	components of a vector
4-L4	gradient of a scalar point function
5-L5	angular momentum as a vector-product of two vectors
6-L6	work as a scalar product of two vectors - line, surface and volume integrals
7-L7	Gauss divergence, Stokes and Greens theorem
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	Laws of conservation of energy, linear momentum and angular momentum
10- L9	linear momentum and angular momentum
11-L10	work energy theorem
12-L11	work done by gravitational force - work done by spring force
13-L12	proof of Kepler's second and third laws
14-L13	Two body problem and reduced mass - central field motion - motion of planets in elliptical orbits
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	conservative and non conservative forces - potential energy curve - centre of mass
17-IT-1	**Internal Test-I**
18-L16	work done by gravitational force - work done by spring force - potential energy
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	work energy theorem
21- L19	Translational and rotational motion
22- P2	**College level meeting/Cell function**
23-L20	moment of inertia and radius of gyration
24-L21	Angular momentum and angular impulse

25-L22	moment of inertia of a thin circular ring, solid sphere
26-L23	Torque- Rotational Kinetic energy
27-L24	Kinetic energy of rolling
28-L25	Gyrostat
29-L26	moment of inertia of a solid cylinder
30-L27	parallel axis and perpendicular axis theorem
31-L28	Newton's second law for rotation - work, rotational
32-L29	Kinetic energy and expression for power during rotation
33-L30	Acceleration of a uniform body, rolling down an inclined plane.
34- P3	**Department Seminar**
35-L31	Precessional motion
36-L32	____ - **Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Pressure and thrust - Thrust on a plane surface immersed in a liquid
38- IT-II	**Internal Test-II**
39-L34	centre of pressure
40-L35	____ **-Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	centre of pressure on a rectangular lamina, a triangular lamina
42- L37	Laws of floation - determination of meta centric height of a ship
43- L38	steady and streamline flow - equation of continuity - energy of a fluid
44- P4	**College level meeting/ function**
45-L39	Bernoulli's theorem – proof - pitot's tube and venturimeter
46-L40	Introduction - Reference frames-inertial frames
47-L41	the ether hypothesis - Michelson morley experiment
48-L42	Postulates of special theory of relativity - Lorentz transformation equations
49-L43	Lorentz Fitzgerald contraction - time dilation - Relativistic addition of velocities
50-L44	____ - **Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	velocity addition theorem - simultaneity - Relativistic mass – Relativistic momentum - mass energy equivalence
52- L46	Relation between total energy, rest mass energy and momentum
53-IT-III	**Internal Test-III**
54-L47	Accelerated frames and Gravity - general theory of relativity (basics) - gravity waves.
55-L48	____ - **Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 22.04.2016

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	
CO2	
CO3	
CO4	Students got knowledge in mechanics and relativity
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Mechanics And Relativity
Course Code	GMPH21
Class	I year (2014-2017)
Semester	EVEN
Staff Name	Dr.D.Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- Students to understand the concepts of mechanics and relativity
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-
-

Syllabus

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, Stokes and Greens theorem

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. Torque - Rotational Kinetic energy - parallel axis and perpendicular axis theorem - Newton's second law for rotation - 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.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 3.12.2014
1-L1	**MECHANICS AND RELATIVITY UNIT-I:Introduction**
2-L2	**VECTORS** Vector analysis gradient of a scalar point function
3- L3	components of a vector
4-L4	gradient of a scalar point function
5-L5	angular momentum as a vector-product of two vectors
6-L6	work as a scalar product of two vectors - line, surface and volume integrals
7-L7	Gauss divergence, Stokes and Greens theorem
8- P1	**Welcoming of First year and Inauguration of MathematicsAssociation**
9- L8	Laws of conservation of energy, linear momentum and angular momentum
10- L9	linear momentum and angular momentum
11-L10	work energy theorem
12-L11	work done by gravitational force - work done by spring force
13-L12	proof of Kepler's second and third laws
14-L13	Two body problem and reduced mass - central field motion - motion of planets in elliptical orbits
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	conservative and non conservative forces - potential energy curve - centre of mass
17-IT-1	**Internal Test-I**
18-L16	work done by gravitational force - work done by spring force - potential energy
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	work energy theorem
21- L19	Translational and rotational motion
22- P2	**College level meeting/Cell function**
23-L20	moment of inertia and radius of gyration
24-L21	Angular momentum and angular impulse

25-L22	moment of inertia of a thin circular ring, solid sphere
26-L23	Torque- Rotational Kinetic energy
27-L24	Kinetic energy of rolling
28-L25	Gyrostat
29-L26	moment of inertia of a solid cylinder
30-L27	parallel axis and perpendicular axis theorem
31-L28	Newton's second law for rotation - work, rotational
32-L29	Kinetic energy and expression for power during rotation
33-L30	Acceleration of a uniform body, rolling down an inclined plane.
34- P3	**Department Seminar**
35-L31	Precessional motion
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Pressure and thrust - Thrust on a plane surface immersed in a liquid
38- IT-II	**Internal Test-II**
39-L34	centre of pressure
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	centre of pressure on a rectangular lamina, a triangular lamina
42- L37	Laws of floation - determination of meta centric height of a ship
43- L38	steady and streamline flow - equation of continuity - energy of a fluid
44- P4	**College level meeting/ function**
45-L39	Bernoulli's theorem – proof - pitot's tube and venturimeter
46-L40	Introduction - Reference frames-inertial frames
47-L41	the ether hypothesis - Michelson morley experiment
48-L42	Postulates of special theory of relativity - Lorentz transformation equations
49-L43	Lorentz Fitzgerald contraction - time dilation - Relativistic addition of velocities
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	velocity addition theorem - simultaneity - Relativistic mass – Relativistic momentum - mass energy equivalence
52- L46	Relation between total energy, rest mass energy and momentum
53-IT-III	**Internal Test-III**
54-L47	Accelerated frames and Gravity - general theory of relativity (basics) - gravity waves.
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2015

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	Mechanics theoremes were proved
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	Students applied the concepts in various fields
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Properties Of Matter
Course Code	SMPH12
Class	I year (2017-2018)
Semester	Odd
Staff Name	Dr.D.Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To understand the various properties of matters
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Syllabus

Paper I Properties of Matter and Oscillations

Unit I. ELASTICITY: - Modulus of elasticity- Poisson's ratio- Relation between elastic constants and Poisson's ratio- Twisting couple on a cylinder -Energy stored in a twisted wire- - Torsional pendulum (with and without weights)- Bending of beams- Bending moment- Cantilever loading- -Non-uniform and uniform bending of a beam

Bending of beams- Bending moment- Cantilever loading- -Non-uniform and uniform bending of a beam

UnitII.Viscosity and low pressure : - Newton's law- Poiseuilles flow- Stoke's fall-Rotation viscometer- Ostwald viscometer- Meyer's formula for viscosity of gas-Rankine's method- Effect of temperature and pressure on viscosity- Vacuum pump-Rotary oil pump-Mercury diffusion pump- Knudsen Gauge.

Unit III. SURFACE TENSION: - Molecular interpretation- surface energy- Pressure difference across a curved surface- Excess pressure in liquid drops and air bubbles- Molecular forces- Shape of liquid meniscus in capillary tube-Angle of contact- Capillary rise and energy consideration- Jaeger's method.

OSCILLATIONS Unit IV. Simple Harmonic Motion: Simple Harmonic Oscillator, Motion of simple and compound pendulum , loaded spring, Energy in simple harmonic motion. Superposition principle: (i) collinear SHM of same frequency, Standing wave on a stretched string (both ends fixed).. (ii) SHM of same frequency but perpendicular to each other and (iii) Lissajous figures .

Unit V. Damped Harmonic Motion: Equation of motion, Dead beat motion, Critically damped system, Lightly damped system: relaxation time, logarithmic decrement, quality factor. Forced Oscillations: Equation of motion, complete solution, Steady state solution, Resonance, Sharpness of resonance, Quality factor. Wave Motion: One dimensional plane wave; Classical wave equation;;

Books for study 1. Properties of Matter - Brijlal & Subramaniam. 2. Properties of Matter - D.S. Mathur 3. Properties of Matter - Murugesan 4. Waves & Oscillations - Brijlal & Subramaniam 5. Satya Prakash and Akash Saluja- oscillations and waves- pragati prakashan (2002) Books for Reference

1. Physics, Robert Resnick, David Halliday, Jearl Walker Wiley and Sons Inc., Sixth Edition. 2. Waves and Oscillations, Berkeley Physics Course, Vol. 3. F. S. Crawford, Tata McGraw Hill 3. H.R Gulati- fundamental of general properties of matter- R.Chand and co- fifth edition (1977) 4. N.k Bajaj- The physics of waves and oscillations- Tata McGraw-Hill (1988)

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 16.06.2017
1-L1	**Unit I. ELASTICITY**
2-L2	**Modulus of elasticity- Poisson's ratio**
3- L3	**Relation between elastic constants and Poisson's ratio- Twisting couple on a cylinder**
4-L4	**Energy stored in a twisted wire- - Torsional pendulum (with and without weights)**
5-L5	**Torsional pendulum (with and without weights)- Bending of beams- Bending moment- Cantilever loading-**
6-L6	**Bending of beams- Bending moment- Cantilever loading- -Non-uniform and uniform bending of a beam**

7-L7	**UnitII.Viscosity and low pressure**
8- P1	**Welcoming of First year and Inauguration of physics Association**
9- L8	**Newton's law- Poiseuilles flow- Stoke's fall**
10- L9	**Rotation viscometer- Ostwald viscometer- Meyer's formula for viscosity of gas-Rankine's method- Effect of temperature and pressure on viscosity**
11-L10	**Vacuum pump- Rotary oil pump-Mercury diffusion pump- Knudsen Gauge.**
12-L11	**Unit III. SURFACE TENSION**
13-L12	**- Molecular interpretation- surface energy- Pressure difference across a curved surface**
14-L13	**Excess pressure in liquid drops and air bubbles-Molecular forces- Shape of liquid meniscus in capillary tube**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**Angle of contact- Capillary rise and energy consideration- Jaeger's method.**
17-IT-1	**Internal Test-I**
18-L16	**Unit IV- OSCILLATIONS Simple Harmonic Motion**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**, Motion of simple and compound pendulum , loaded spring,.:**
21- L19	**. Superposition principle: (i) collinear SHM of same frequency but perpendicular to each other.**
22- P2	**College level meeting/Cell function**
23-L20	**, Energy in simple harmonic motion. Superposition principle**
24-L21	**Lissajous figures**
25-L22	**Simple Harmonic Oscillator**
26-L23	**(i) collinear SHM of same frequency**
27-L24	**Unit V. Damped Harmonic Motion**
28-L25	**Equation of motion**
29-L26	**Dead beat motion**
30-L27	**Critically damped system,**
31-L28	**relaxation time, logarithmic decrement**
32-L29	Problem solving
33-L30	**relaxation time, logarithmic decrement**
34- P3	**Department Seminar**
35-L31	**logarithmic decrement,**
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**quality factor. Forced Oscillations**
38- IT-II	**Internal Test-II**
39-L34	Problem solving
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**Equation of motion, complete solution**
42- L37	**Dead beat motion**
43- L38	**, Energy in simple harmonic motion. Superposition principle**

44- P4	**College level meeting/ function**
45-L39	**Energy in simple harmonic motion. Superposition principle**
46-L40	**Superposition principle**
47-L41	**Sharpness of resonance**
48-L42	**Quality factor. Wave Motion**
49-L43	**Wave Motion: One dimensional plane wave**
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**Classical wave equation**
52- L46	Problem solving
53-IT-III	**Internal Test-III**
54-L47	**Energy in simple harmonic motion**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 06.11.2017

Course Outcomes

Learning Outcomes	**COs** of the course “<course name>”
CO1	
CO2	
CO3	
CO4	Students got more knowledge in properties of matters
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	Some experiments were demonstrated
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature　　　　　　　　　　　　　　　　　　　　Staff Signature

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St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Properties Of Matter
Course Code	SMPH12
Class	I year (2018-2019)
Semester	Odd
Staff Name	Dr.D.Arul Asir Abraham
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Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- Students to understand the properties of matters and oscillations
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-
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Syllabus

Paper I Properties of Matter and Oscillations

Unit I. ELASTICITY: - Modulus of elasticity- Poisson's ratio- Relation between elastic constants and Poisson's ratio- Twisting couple on a cylinder -Energy stored in a twisted wire- - Torsional pendulum (with and without weights)- Bending of beams- Bending moment- Cantilever loading- -Non-uniform and uniform bending of a beam

Bending of beams- Bending moment- Cantilever loading- -Non-uniform and uniform bending of a beam

UnitII.Viscosity and low pressure : - Newton's law- Poiseuilles flow- Stoke's fall- Rotation viscometer- Ostwald viscometer- Meyer's formula for viscosity of gas- Rankine's method- Effect of temperature and pressure on viscosity- Vacuum pump- Rotary oil pump-Mercury diffusion pump- Knudsen Gauge.

Unit III. SURFACE TENSION: - Molecular interpretation- surface energy- Pressure difference across a curved surface- Excess pressure in liquid drops and air bubbles- Molecular forces- Shape of liquid meniscus in capillary tube-Angle of contact- Capillary rise and energy consideration- Jaeger's method.

OSCILLATIONS Unit IV. Simple Harmonic Motion: Simple Harmonic Oscillator, Motion of simple and compound pendulum , loaded spring, Energy in simple harmonic motion. Superposition principle: (i) collinear SHM of same frequency, Standing wave on a stretched string (both ends fixed).. (ii) SHM of same frequency but perpendicular to each other and (iii) Lissajous figures .

Unit V. Damped Harmonic Motion: Equation of motion, Dead beat motion, Critically damped system, Lightly damped system: relaxation time, logarithmic decrement, quality factor. Forced Oscillations: Equation of motion, complete solution, Steady state solution, Resonance, Sharpness of resonance, Quality factor. Wave Motion: One dimensional plane wave; Classical wave equation;;

Books for study 1. Properties of Matter - Brijlal & Subramaniam. 2. Properties of Matter - D.S. Mathur 3. Properties of Matter - Murugesan 4. Waves & Oscillations - Brijlal & Subramaniam 5. Satya Prakash and Akash Saluja- oscillations and waves- pragati prakashan (2002) Books for Reference

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Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2018
1-L1	**Unit I. ELASTICITY**
2-L2	**Modulus of elasticity- Poisson's ratio**
3- L3	**Relation between elastic constants and Poisson's ratio- Twisting couple on a cylinder**
4-L4	**Energy stored in a twisted wire- - Torsional pendulum (with and without weights)**
5-L5	**Torsional pendulum (with and without weights)- Bending of beams- Bending moment- Cantilever loading-**
6-L6	**Bending of beams- Bending moment- Cantilever loading- -Non-uniform and uniform bending of a beam**

7-L7	**UnitII.Viscosity and low pressure**
8- P1	**Welcoming of First year and Inauguration of physics Association**
9- L8	**Newton’s law- Poiseuilles flow- Stoke’s fall**
10- L9	**Rotation viscometer- Ostwald viscometer- Meyer’s formula for viscosity of gas-Rankine’s method- Effect of temperature and pressure on viscosity**
11-L10	**Vacuum pump- Rotary oil pump-Mercury diffusion pump- Knudsen Gauge.**
12-L11	**Unit III. SURFACE TENSION**
13-L12	**- Molecular interpretation- surface energy- Pressure difference across a curved surface**
14-L13	**Excess pressure in liquid drops and air bubbles-Molecular forces- Shape of liquid meniscus in capillary tube**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**Angle of contact- Capillary rise and energy consideration- Jaeger’s method.**
17-IT-1	**Internal Test-I**
18-L16	**Unit IV- OSCILLATIONS Simple Harmonic Motion**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**, Motion of simple and compound pendulum , loaded spring,.:**
21- L19	**. Superposition principle: (i) collinear SHM of same frequency but perpendicular to each other.**
22- P2	**College level meeting/Cell function**
23-L20	**, Energy in simple harmonic motion. Superposition principle**
24-L21	**Lissajous figures**
25-L22	**Simple Harmonic Oscillator**
26-L23	**(i) collinear SHM of same frequency**
27-L24	**Unit V. Damped Harmonic Motion**
28-L25	**Equation of motion**
29-L26	**Dead beat motion**
30-L27	**Critically damped system,**
31-L28	**relaxation time, logarithmic decrement**
32-L29	Problem solving
33-L30	**relaxation time, logarithmic decrement**
34- P3	**Department Seminar**
35-L31	**logarithmic decrement,**
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**quality factor. Forced Oscillations**
38- IT-II	**Internal Test-II**
39-L34	Problem solving
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**Equation of motion, complete solution**
42- L37	**Dead beat motion**
43- L38	**, Energy in simple harmonic motion. Superposition principle**

44- P4	**College level meeting/ function**
45-L39	**Energy in simple harmonic motion. Superposition principle**
46-L40	**Superposition principle**
47-L41	**Sharpness of resonance**
48-L42	**Quality factor. Wave Motion**
49-L43	**Wave Motion: One dimensional plane wave**
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**Classical wave equation**
52- L46	Problem solving
53-IT-III	**Internal Test-III**
54-L47	**Energy in simple harmonic motion**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.11.2018

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	
CO2	
CO3	
CO4	Students got more knowledge in properties of matters and its applications
CO5	
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	Some experiments were demonstrated
EL4	
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Thermal physics
Course Code	SMPH22
Class	I year (2017-2020)
Semester	Even
Staff Name	Dr.D.Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- Students to understand the properties of thermal physics and thermodynamics
-
-
-

Syllabus

Thermal Physics

Unit I. KINETIC THEORY OF GASES: Concept of heat and temperature –ideal and perfect gas – kinetic theory of gases – Expression for a pressure of a gas – interpretation of temperature – Gas laws – Gas equation – Avogadro's hypothesis – Graham's law of diffusion of gases – Maxwell's law of equi-partition of energy – atomicity of gases – Maxwell's law of distribution of velocity – experimental verification – mean free path – problems in all topics

Unit II. TRANSPORT PHEONOMENA : Transport of momentum - Transport of energy gases at high pressure- Tr of st ansport of matter – behavior of sure – Vander Waals equation ate – critical constants – experimental determination – Porous plug experiment – J-K effect – relation between temperatures - problems in all topics.

Unit III. THERMODYNAMICS I : Thermodynamic system – thermal equilibrium and concept of temperature – heat and work as path function – comparison – first law of thermodynamics – applications – isothermal process – adiabatic process – isochoric process – isobaric process – gas equation during adiabatic process – work done during isothermal and adiabatic processes – slopes of isothermal and adiabatic processes - problems in all topics.

Unit IV. THERMODYNAMICS II: Reversible and irreversible processes – second law of thermodynamics – Carnot's engine – refrigerator – Carnot's theorem – Thermodynamic scale of temperature - Clapeyron latent heat equation – entropy – second law of thermodynamics – change in entropy in a Carnot's cycle – change in entropy in an irreversible process – third law of thermodynamics – temperature-– entropy diagram entropy of a perfect gas - problems in all topics.

Unit V. THERMODYNAMICS III: Maxwell's thermodynamic relations – Helmholtz function – Gibb's function – enthalpy – Maxwell's relations from the above functions – equilibrium between liquid and its vapour – first order phase transition – second order phase transition – TdS equations – deduction of Clapeyron latent heat equation – relation between specific heat capacities for a perfect and Vander Waals gas – derivation of Clausius latent heat equation - problems in all topics.

Book for study:

1. Heat and Thermodynamics – Brijlal and Subramanium – S.Chand and company Ltd.

Book for reference:

1.Physics - Robert Resnick, David Halliday, Jearl Walker Wiley and Sons Inc., Sixth Edition

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 07.12.2017
1-L1	**Unit I. KINETIC THEORY OF GASES**
2-L2	**Concept of heat and temperature**
3- L3	**ideal and perfect gas – kinetic theory of gases**
4-L4	**Expression for a pressure of a gas – interpretation of temperature**
5-L5	**Gas laws – Gas equation**
6-L6	**Avogadro's hypothesis – Graham's law of diffusion of gases**
7-L7	**Maxwell's law of equi-partition of energy – atomicity of gases**
8- P1	**Maxwell's law of distribution of velocity – experimental verification**

9- L8	**mean free path -problems in all topics**
10- L9	**Unit II. TRANSPORT PHEONOMENA**
11-L10	**Transport of momentum - Transport of energy gases at high pressure**
12-L11	**Vander Waals equation ate – critical constants**
13-L12	**experimental determination – Porous plug experiment**
14-L13	**J-K effect – relation between temperatures**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**problems in all topics.**
17-IT-1	**Internal Test-I**
18-L16	**Unit III. THERMODYNAMICS I**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**Thermodynamic system – thermal equilibrium and concept of temperature**
21- L19	**heat and work as path function**
22- P2	**College level meeting/Cell function**
23-L20	**comparison – first law of thermodynamics – applications – isothermal process**
24-L21	**adiabatic process – isochoric process – isobaric process – gas equation during adiabatic process**
25-L22	**work done during isothermal and adiabatic processes**
26-L23	**slopes of isothermal and adiabatic processes**
27-L24	**problems in all topics.**
28-L25	**Unit IV. THERMODYNAMICS II**
29-L26	**Reversible and irreversible processes – second law of thermodynamics**
30-L27	**Carnot's engine – refrigerator – Carnot's theorem**
31-L28	**Thermodynamic scale of temperature**
32-L29	**Clapeyron latent heat equation**
33-L30	**entropy – second law of thermodynamics**
34- P3	**Department Seminar**
35-L31	**change in entropy in a Carnot's cycle**
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**change in entropy in an irreversible process**
38- IT-II	**Internal Test-II**
39-L34	**third law of thermodynamics**
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**temperature- entropy diagram**
42- L37	**entropy of a perfect gas**
43- L38	**problems in all topics.**
44- P4	**College level meeting/ function**
45-L39	**Unit V. THERMODYNAMICS III**
46-L40	**Maxwell's thermodynamic relations – Helmholtz function – Gibb's function**
47-L41	**enthalpy – Maxwell's relations from the above functions equilibrium between liquid and its vapour**
48-L42	**first order phase transition – second order phase transition**

49-L43	**TdS equations**
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**deduction of Clapeyron latent heat equation**
52- L46	**relation between specific heat capacities for a perfect and Vander Waals gas derivation of Clausius latent heat equation**
53-IT-III	**Internal Test-III**
54-L47	**problems in all topics.**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2018

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	
CO2	
CO3	
CO4	
CO5	Students studied the thermal proprties
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	Some experiments were demonstrated
EL3	
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Thermal physics
Course Code	SMPH22
Class	I year (2018-2021)
Semester	Even
Staff Name	Dr.D.Arul Asir Abraham
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To study the properties of kinetic theory of gases and thermodynamics
-
-
-

Syllabus

Thermal Physics

Unit I. KINETIC THEORY OF GASES: Concept of heat and temperature –ideal and perfect gas – kinetic theory of gases – Expression for a pressure of a gas – interpretation of temperature – Gas laws – Gas equation – Avogadro's hypothesis – Graham's law of diffusion of gases – Maxwell's law of equi-partition of energy – atomicity of gases – Maxwell's law of distribution of velocity – experimental verification – mean free path – problems in all topics

Unit II. TRANSPORT PHEONOMENA : Transport of momentum - Transport of energy gases at high pressure- Tr of st ansport of matter – behavior of sure – Vander Waals equation ate – critical constants – experimental determination – Porous plug experiment – J-K effect – relation between temperatures - problems in all topics.

Unit III. THERMODYNAMICS I : Thermodynamic system – thermal equilibrium and concept of temperature – heat and work as path function – comparison – first law of thermodynamics – applications – isothermal process – adiabatic process – isochoric process – isobaric process – gas equation during adiabatic process – work done during isothermal and adiabatic processes – slopes of isothermal and adiabatic processes - problems in all topics.

Unit IV. THERMODYNAMICS II: Reversible and irreversible processes – second law of thermodynamics – Carnot's engine – refrigerator – Carnot's theorem – Thermodynamic scale of temperature - Clapeyron latent heat equation – entropy – second law of thermodynamics – change in entropy in a Carnot's cycle – change in entropy in an irreversible process – third law of thermodynamics – temperature-– entropy diagram entropy of a perfect gas - problems in all topics.

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Book for study:

1. Heat and Thermodynamics – Brijlal and Subramanium – S.Chand and company Ltd.

Book for reference:

1.Physics - Robert Resnick, David Halliday, Jearl Walker Wiley and Sons Inc., Sixth Edition

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 03.12.2018
1-L1	**Unit I. KINETIC THEORY OF GASES**
2-L2	**Concept of heat and temperature**
3- L3	**ideal and perfect gas – kinetic theory of gases**
4-L4	**Expression for a pressure of a gas – interpretation of temperature**
5-L5	**Gas laws – Gas equation**
6-L6	**Avogadro's hypothesis – Graham's law of diffusion of gases**
7-L7	**Maxwell's law of equi-partition of energy – atomicity of gases**
8- P1	**Maxwell's law of distribution of velocity – experimental verification**

9- L8	**mean free path -problems in all topics**
10- L9	**Unit II. TRANSPORT PHEONOMENA**
11-L10	**Transport of momentum - Transport of energy gases at high pressure**
12-L11	**Vander Waals equation ate – critical constants**
13-L12	**experimental determination – Porous plug experiment**
14-L13	**J-K effect – relation between temperatures**
15-L14	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	**problems in all topics.**
17-IT-1	**Internal Test-I**
18-L16	**Unit III. THERMODYNAMICS I**
19-L17	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	**Thermodynamic system – thermal equilibrium and concept of temperature**
21- L19	**heat and work as path function**
22- P2	**College level meeting/Cell function**
23-L20	**comparison – first law of thermodynamics – applications – isothermal process**
24-L21	**adiabatic process – isochoric process – isobaric process – gas equation during adiabatic process**
25-L22	**work done during isothermal and adiabatic processes**
26-L23	**slopes of isothermal and adiabatic processes**
27-L24	**problems in all topics.**
28-L25	**Unit IV. THERMODYNAMICS II**
29-L26	**Reversible and irreversible processes – second law of thermodynamics**
30-L27	**Carnot's engine – refrigerator – Carnot's theorem**
31-L28	**Thermodynamic scale of temperature**
32-L29	**Clapeyron latent heat equation**
33-L30	**entropy – second law of thermodynamics**
34- P3	**Department Seminar**
35-L31	**change in entropy in a Carnot's cycle**
36-L32	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**change in entropy in an irreversible process**
38- IT-II	**Internal Test-II**
39-L34	**third law of thermodynamics**
40-L35	**____ -Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	**temperature- entropy diagram**
42- L37	**entropy of a perfect gas**
43- L38	**problems in all topics.**
44- P4	**College level meeting/ function**
45-L39	**Unit V. THERMODYNAMICS III**
46-L40	**Maxwell's thermodynamic relations – Helmholtz function – Gibb's function**
47-L41	**enthalpy – Maxwell's relations from the above functions equilibrium between liquid and its vapour**
48-L42	**first order phase transition – second order phase transition**

49-L43	**TdS equations**
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	**deduction of Clapeyron latent heat equation**
52- L46	**relation between specific heat capacities for a perfect and Vander Waals gas derivation of Clausius latent heat equation**
53-IT-III	**Internal Test-III**
54-L47	**problems in all topics.**
55-L48	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2019

Course Outcomes

Learning Outcomes	**COs** of the course "<course name>"
CO1	
CO2	
CO3	
CO4	
CO5	Students studied and got more knowledge in Thermodynamics
CO6	
CO7	
CO8	
CO9	
Experimental Learning	
EL1	
EL2	
EL3	Related experiments were demonstrated
EL4	
Integrated Activity	
IA1	
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Basic Electronics
Course Code	GMPH52
Class	III year (2014 – 2015)
Semester	Odd
Staff Name	Dr. M. Daniel Sweetlin
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- Student knows about semiconductor
- Student learns about the principles of electronics components
- Student develops skills in circuit analysis
- Student applies the knowledge to design of electronic devices

Syllabus

BASIC ELECTRONICS

Unit I
Linear Circuits and Semiconductors: Voltage source – Constant Voltage source – Constantcurrent source – Conversion of voltage source into current source – Maximum power transfertheorem- Thevenin‘s theorem – Norton‘s theorem - Semiconductor – bonds in semiconductors –Commonly used semiconductors – effect of temperature in semiconductors – intrinsic andextrinsic semiconductors – P and N type semiconductors.

Unit II Diodes and Transistors: PN junction diode – diode characteristics – Zener diode – Zener asvoltage regulator - transistor – transistor action – three modes of connection – common emittercharacteristics – transistor biasing methods – stability factor –CE amplifier.

Unit III

Oscillators and Modulation: Feedback – principles – gain – advantage –sinusoidal oscillators –tank circuit – Colpitts's Oscillator – Hartley Oscillator – Wien's Oscillator – modulation – AM –modulation index – analysis – modulator – FM – Demodulation

Unit IV

FET and Electronic Instruments: FET – working – importance – Difference between FET andtransistor – FET as amplifier – output characteristic – important terms – expression for draincurrent – advantages – FET parameters – UJT – equivalent circuit – Characteristic – advantages– applications – Multimeter – applications – merits and demerits – CRO and its applications.

Unit V

Operational amplifier: Op amp – Schematic symbol – output voltage – AC analysis – band width– slew rate – frequency response – op amp with negative feedback – applications – invertingamplifier – input and output – impedance of inverting amplifier – Non inverting amplifier –voltage follower – summing amplifier – adder – subtracter – integrator – differentiator – comparator

Book for Study:

Principles of Electronics - .K.Mehta and Rohit Mehta, S.Chand and Company ltd. New edition

Electronic principles – Malvino Ed 6

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2014
1-L1	Voltage source – Constant Voltage source
2-L2	Constant current source – Conversion of voltage source into current source
3- L3	Maximum power transfer theorem – Thevenin 's theorem
4-L4	Problems solved
5-L5	Norton 's theorem - Semiconductor
6-L6	Problems solved
7-L7	bonds in semiconductors – Commonly used semiconductors
8- P1	**Welcoming of First year and Inauguration of PhysicsAssociation**
9- L8	effect of temperature in semiconductors
10- L9	intrinsic and extrinsic semiconductors
11-L10	P and N type semiconductors
12-L11	PN junction diode – diode characteristics
13-L12	Zener diode – Zener as voltage regulator
14-L13	transistor – transistor action
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	three modes of connection – common emitter
17-IT-1	**Internal Test-I**
18-L16	characteristics – transistor biasing methods
19-L17	**__Test Paper distribution and result analysis**

	Entering Internal Test-I Marks into University portal
20-L18	stability factor –CE amplifier
21- L19	Feedback – principles
22- P2	**College level meeting/Cell function**
23-L20	gain – advantage –sinusoidal oscillators
24-L21	tank circuit – Colpitt's Oscillator
25-L22	Hartley Oscillator
26-L23	Wien's Oscillator
27-L24	modulation – AM – modulation index
28-L25	analysis – modulator – FM – Demodulation
29-L26	FET – working – importance
30-L27	Difference between FET and transistor – FET as amplifier
31-L28	FET as amplifier – output characteristic – important terms
32-L29	expression for draincurrent – advantages
33-L30	FET parameters – UJT
34- P3	**Department Seminar**
35-L31	UJT equivalent circuit – Characteristic – advantages – applications
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Multimeter – applications – merits and demerits
38- IT-II	**Internal Test-II**
39-L34	CRO and its applications
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Op amp – Schematic symbol
42- L37	output voltage – AC analysis
43- L38	band width – slew rate
44- P4	**College level meeting/ function**
45-L39	frequency response – op amp with negative feedback
46-L40	applications – inverting amplifier
47-L41	input and output – impedance of inverting amplifier
48-L42	Non inverting amplifier
49-L43	Application of op amps
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	voltage follower – summing amplifier
52- L46	adder – subtracter
53-IT-III	**Internal Test-III**
54-L47	integrator – differentiator – comparator
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**

59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2014

Course Outcomes

Learning Outcomes	**COs** of the course Basic Electronics
	At the completion the student should be able to
CO1	Explain the properties of semiconductor
CO2	Draw electrical circuits
CO3	Design and working principles of diodes, transistors etc.
CO4	Analyse and simplify simple electrical networks
CO5	Identifies electronic components
CO6	Study the waveform using CRO
CO7	Develop simple amplifier
CO8	Develop oscillator circuit
Experimental Learning	
EL1	Measures voltage and current using multimeter
EL2	Measures frequency using CRO
EL3	Handles bread board
EL4	Identifies defects in electronic components
Integrated Activity	
IA1	
IA2	

Blended Learning : Using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : Use library books, E- books, motivate student to prepare for higher study.

For slow learner : Special care taken, motivate the advanced learner to support the slow learner to study to attend the remedial classes.

Extension activity : Motivate students to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Basic Electronics
Course Code	GMPH52
Class	III year (2015 – 2016)
Semester	Odd
Staff Name	Dr. M. Daniel Sweetlin
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- Student knows about semiconductor
- Student learns about the principles of electronics components
- Student develops skills in circuit analysis
- Student applies the knowledge to design of electronic devices

Syllabus

BASIC ELECTRONICS

Unit I
Linear Circuits and Semiconductors: Voltage source – Constant Voltage source – Constantcurrent source – Conversion of voltage source into current source – Maximum power transfertheorem- Thevenin's theorem – Norton's theorem - Semiconductor – bonds in semiconductors –Commonly used semiconductors – effect of temperature in semiconductors – intrinsic andextrinsic semiconductors – P and N type semiconductors.

Unit II Diodes and Transistors: PN junction diode – diode characteristics – Zener diode – Zener asvoltage regulator - transistor – transistor action – three modes of connection – common emittercharacteristics – transistor biasing methods – stability factor –CE amplifier.

Unit III

Oscillators and Modulation: Feedback – principles – gain – advantage –sinusoidal oscillators –tank circuit – Colpitts's Oscillator – Hartley Oscillator – Wien's Oscillator – modulation – AM –modulation index – analysis – modulator – FM – Demodulation

Unit IV

FET and Electronic Instruments: FET – working – importance – Difference between FET andtransistor – FET as amplifier – output characteristic – important terms – expression for draincurrent – advantages – FET parameters – UJT – equivalent circuit – Characteristic – advantages– applications – Multimeter – applications – merits and demerits – CRO and its applications.

Unit V

Operational amplifier: Op amp – Schematic symbol – output voltage – AC analysis – band width– slew rate – frequency response – op amp with negative feedback – applications – invertingamplifier – input and output – impedance of inverting amplifier – Non inverting amplifier –voltage follower – summing amplifier – adder – subtracter – integrator – differentiator – comparator

Book for Study:

Principles of Electronics - .K.Mehta and Rohit Mehta, S.Chand and Company ltd. New edition

Electronic principles – Malvino Ed 6

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2014
1-L1	Voltage source – Constant Voltage source
2-L2	Constant current source – Conversion of voltage source into current source
3- L3	Maximum power transfer theorem – Thevenin 's theorem
4-L4	Problems solved
5-L5	Norton 's theorem - Semiconductor
6-L6	Problems solved
7-L7	bonds in semiconductors – Commonly used semiconductors
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	effect of temperature in semiconductors
10- L9	intrinsic and extrinsic semiconductors
11-L10	P and N type semiconductors
12-L11	PN junction diode – diode characteristics
13-L12	Zener diode – Zener as voltage regulator
14-L13	transistor – transistor action
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	three modes of connection – common emitter
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18-L16	characteristics – transistor biasing methods
19-L17	**__Test Paper distribution and result analysis**

	Entering Internal Test-I Marks into University portal
20-L18	stability factor –CE amplifier
21- L19	Feedback – principles
22- P2	**College level meeting/Cell function**
23-L20	gain – advantage –sinusoidal oscillators
24-L21	tank circuit – Colpitt‘s Oscillator
25-L22	Hartley Oscillator
26-L23	Wien‘s Oscillator
27-L24	modulation – AM – modulation index
28-L25	analysis – modulator – FM – Demodulation
29-L26	FET – working – importance
30-L27	Difference between FET and transistor – FET as amplifier
31-L28	FET as amplifier – output characteristic – important terms
32-L29	expression for draincurrent – advantages
33-L30	FET parameters – UJT
34- P3	**Department Seminar**
35-L31	UJT equivalent circuit – Characteristic – advantages – applications
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Multimeter – applications – merits and demerits
38- IT-II	**Internal Test-II**
39-L34	CRO and its applications
40-L35	**Test Paper distribution and result analysis**
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41-L36	Op amp – Schematic symbol
42- L37	output voltage – AC analysis
43- L38	band width – slew rate
44- P4	**College level meeting/ function**
45-L39	frequency response – op amp with negative feedback
46-L40	applications – inverting amplifier
47-L41	input and output – impedance of inverting amplifier
48-L42	Non inverting amplifier
49-L43	Application of op amps
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	voltage follower – summing amplifier
52- L46	adder – subtracter
53-IT-III	**Internal Test-III**
54-L47	integrator – differentiator – comparator
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**

59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2014

Course Outcomes

Learning Outcomes	**COs** of the course Basic Electronics
	At the completion the student should be able to
CO1	Explain the properties of semiconductor
CO2	Draw electrical circuits
CO3	Design and working principles of diodes, transistors etc.
CO4	Analyse and simplify simple electrical networks
CO5	Identifies electronic components
CO6	Study the waveform using CRO
CO7	Develop simple amplifier
CO8	Develop oscillator circuit
Experimental Learning	
EL1	Measures voltage and current using multimeter
EL2	Measures frequency using CRO
EL3	Handles bread board
EL4	Identifies defects in electronic components
Integrated Activity	
IA1	
IA2	

Blended Learning : Using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : Use library books, E- books, motivate student to prepare for higher study.

For slow learner : Special care taken, motivate the advanced learner to support the slow learner to study to attend the remedial classes.

Extension activity : Motivate students to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Basic Electronics
Course Code	GMPH52
Class	III year (2016 – 2017)
Semester	Odd
Staff Name	Dr. M. Daniel Sweetlin
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- Student knows about semiconductor
- Student learns about the principles of electronics components
- Student develops skills in circuit analysis
- Student applies the knowledge to design of electronic devices

Syllabus

BASIC ELECTRONICS

Unit I
Linear Circuits and Semiconductors: Voltage source – Constant Voltage source – Constantcurrent source – Conversion of voltage source into current source – Maximum power transfertheorem- Thevenin's theorem – Norton's theorem - Semiconductor – bonds in semiconductors –Commonly used semiconductors – effect of temperature in semiconductors – intrinsic andextrinsic semiconductors – P and N type semiconductors.

Unit II Diodes and Transistors: PN junction diode – diode characteristics – Zener diode – Zener asvoltage regulator - transistor – transistor action – three modes of connection – common emittercharacteristics – transistor biasing methods – stability factor –CE amplifier.

Unit III

Oscillators and Modulation: Feedback – principles – gain – advantage –sinusoidal oscillators –tank circuit – Colpitts's Oscillator – Hartley Oscillator – Wien's Oscillator – modulation – AM –modulation index – analysis – modulator – FM – Demodulation

Unit IV

FET and Electronic Instruments: FET – working – importance – Difference between FET andtransistor – FET as amplifier – output characteristic – important terms – expression for draincurrent – advantages – FET parameters – UJT – equivalent circuit – Characteristic – advantages– applications – Multimeter – applications – merits and demerits – CRO and its applications.

Unit V

Operational amplifier: Op amp – Schematic symbol – output voltage – AC analysis – band width– slew rate – frequency response – op amp with negative feedback – applications – invertingamplifier – input and output – impedance of inverting amplifier – Non inverting amplifier –voltage follower – summing amplifier – adder – subtracter – integrator – differentiator – comparator

Book for Study:

Principles of Electronics - .K.Mehta and Rohit Mehta, S.Chand and Company ltd. New edition

Electronic principles – Malvino Ed 6

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 16.06.2016
1-L1	Voltage source – Constant Voltage source
2-L2	Constant current source – Conversion of voltage source into current source
3- L3	Maximum power transfer theorem – Thevenin 's theorem
4-L4	Problems solved
5-L5	Norton 's theorem - Semiconductor
6-L6	Problems solved
7-L7	bonds in semiconductors – Commonly used semiconductors
8- P1	**Welcoming of First year and Inauguration of PhysicsAssociation**
9- L8	effect of temperature in semiconductors
10- L9	intrinsic and extrinsic semiconductors
11-L10	P and N type semiconductors
12-L11	PN junction diode – diode characteristics
13-L12	Zener diode – Zener as voltage regulator
14-L13	transistor – transistor action
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	three modes of connection – common emitter
17-IT-1	**Internal Test-I**
18-L16	characteristics – transistor biasing methods
19-L17	**__Test Paper distribution and result analysis**

	Entering Internal Test-I Marks into University portal
20-L18	stability factor –CE amplifier
21- L19	Feedback – principles
22- P2	**College level meeting/Cell function**
23-L20	gain – advantage –sinusoidal oscillators
24-L21	tank circuit – Colpitt‘s Oscillator
25-L22	Hartley Oscillator
26-L23	Wien‘s Oscillator
27-L24	modulation – AM – modulation index
28-L25	analysis – modulator – FM – Demodulation
29-L26	FET – working – importance
30-L27	Difference between FET and transistor – FET as amplifier
31-L28	FET as amplifier – output characteristic – important terms
32-L29	expression for draincurrent – advantages
33-L30	FET parameters – UJT
34- P3	**Department Seminar**
35-L31	UJT equivalent circuit – Characteristic – advantages – applications
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Multimeter – applications – merits and demerits
38- IT-II	**Internal Test-II**
39-L34	CRO and its applications
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Op amp – Schematic symbol
42- L37	output voltage – AC analysis
43- L38	band width – slew rate
44- P4	**College level meeting/ function**
45-L39	frequency response – op amp with negative feedback
46-L40	applications – inverting amplifier
47-L41	input and output – impedance of inverting amplifier
48-L42	Non inverting amplifier
49-L43	Application of op amps
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	voltage follower – summing amplifier
52- L46	adder – subtracter
53-IT-III	**Internal Test-III**
54-L47	integrator – differentiator – comparator
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**

59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.11.2016

Course Outcomes

Learning Outcomes	**COs** of the course Basic Electronics
	At the completion the student should be able to
CO1	Explain the properties of semiconductor
CO2	Draw electrical circuits
CO3	Design and working principles of diodes, transistors etc.
CO4	Analyse and simplify simple electrical networks
CO5	Identifies electronic components
CO6	Study the waveform using CRO
CO7	Develop simple amplifier
CO8	Develop oscillator circuit
Experimental Learning	
EL1	Measures voltage and current using multimeter
EL2	Measures frequency using CRO
EL3	Handles bread board
EL4	Identifies defects in electronic components
Integrated Activity	
IA1	
IA2	

Blended Learning : Using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

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Extension activity : Motivate students to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Basic Electronics
Course Code	GMPH52
Class	III year (2017 – 2018)
Semester	Odd
Staff Name	Dr. M. Daniel Sweetlin
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- Student knows about semiconductor
- Student learns about the principles of electronics components
- Student develops skills in circuit analysis
- Student applies the knowledge to design of electronic devices

Syllabus

BASIC ELECTRONICS

Unit I
Linear Circuits and Semiconductors: Voltage source – Constant Voltage source – Constantcurrent source – Conversion of voltage source into current source – Maximum power transfertheorem- Thevenin‘s theorem – Norton‘s theorem - Semiconductor – bonds in semiconductors –Commonly used semiconductors – effect of temperature in semiconductors – intrinsic andextrinsic semiconductors – P and N type semiconductors.

Unit II Diodes and Transistors: PN junction diode – diode characteristics – Zener diode – Zener asvoltage regulator - transistor – transistor action – three modes of connection – common emittercharacteristics – transistor biasing methods – stability factor –CE amplifier.

Unit III

Oscillators and Modulation: Feedback – principles – gain – advantage –sinusoidal oscillators –tank circuit – Colpitts's Oscillator – Hartley Oscillator – Wien's Oscillator – modulation – AM –modulation index – analysis – modulator – FM – Demodulation

Unit IV

FET and Electronic Instruments: FET – working – importance – Difference between FET andtransistor – FET as amplifier – output characteristic – important terms – expression for draincurrent – advantages – FET parameters – UJT – equivalent circuit – Characteristic – advantages– applications – Multimeter – applications – merits and demerits – CRO and its applications.

Unit V

Operational amplifier: Op amp – Schematic symbol – output voltage – AC analysis – band width– slew rate – frequency response – op amp with negative feedback – applications – invertingamplifier – input and output – impedance of inverting amplifier – Non inverting amplifier –voltage follower – summing amplifier – adder – subtracter – integrator – differentiator – comparator

Book for Study:

Principles of Electronics - .K.Mehta and Rohit Mehta, S.Chand and Company ltd. New edition

Electronic principles – Malvino Ed 6

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 16.06.2017
1-L1	Voltage source – Constant Voltage source
2-L2	Constant current source – Conversion of voltage source into current source
3- L3	Maximum power transfer theorem – Thevenin 's theorem
4-L4	Problems solved
5-L5	Norton 's theorem - Semiconductor
6-L6	Problems solved
7-L7	bonds in semiconductors – Commonly used semiconductors
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	effect of temperature in semiconductors
10- L9	intrinsic and extrinsic semiconductors
11-L10	P and N type semiconductors
12-L11	PN junction diode – diode characteristics
13-L12	Zener diode – Zener as voltage regulator
14-L13	transistor – transistor action
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	three modes of connection – common emitter
17-IT-1	**Internal Test-I**
18-L16	characteristics – transistor biasing methods
19-L17	**__Test Paper distribution and result analysis**

	Entering Internal Test-I Marks into University portal
20-L18	stability factor –CE amplifier
21- L19	Feedback – principles
22- P2	**College level meeting/Cell function**
23-L20	gain – advantage –sinusoidal oscillators
24-L21	tank circuit – Colpitt's Oscillator
25-L22	Hartley Oscillator
26-L23	Wien's Oscillator
27-L24	modulation – AM – modulation index
28-L25	analysis – modulator – FM – Demodulation
29-L26	FET – working – importance
30-L27	Difference between FET and transistor – FET as amplifier
31-L28	FET as amplifier – output characteristic – important terms
32-L29	expression for draincurrent – advantages
33-L30	FET parameters – UJT
34- P3	**Department Seminar**
35-L31	UJT equivalent circuit – Characteristic – advantages – applications
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Multimeter – applications – merits and demerits
38- IT-II	**Internal Test-II**
39-L34	CRO and its applications
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Op amp – Schematic symbol
42- L37	output voltage – AC analysis
43- L38	band width – slew rate
44- P4	**College level meeting/ function**
45-L39	frequency response – op amp with negative feedback
46-L40	applications – inverting amplifier
47-L41	input and output – impedance of inverting amplifier
48-L42	Non inverting amplifier
49-L43	Application of op amps
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	voltage follower – summing amplifier
52- L46	adder – subtracter
53-IT-III	**Internal Test-III**
54-L47	integrator – differentiator – comparator
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**

59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 06.11.2017

Course Outcomes

Learning Outcomes	**COs** of the course Basic Electronics
	At the completion the student should be able to
CO1	Explain the properties of semiconductor
CO2	Draw electrical circuits
CO3	Design and working principles of diodes, transistors etc.
CO4	Analyse and simplify simple electrical networks
CO5	Identifies electronic components
CO6	Study the waveform using CRO
CO7	Develop simple amplifier
CO8	Develop oscillator circuit
Experimental Learning	
EL1	Measures voltage and current using multimeter
EL2	Measures frequency using CRO
EL3	Handles bread board
EL4	Identifies defects in electronic components
Integrated Activity	
IA1	
IA2	

Blended Learning : Using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : Use library books, E- books, motivate student to prepare for higher study.

For slow learner : Special care taken, motivate the advanced learner to support the slow learner to study to attend the remedial classes.

Extension activity : Motivate students to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Basic Electronics
Course Code	GMPH52
Class	III year (2018 – 2019)
Semester	Odd
Staff Name	Dr. M. Daniel Sweetlin
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- Student knows about semiconductor
- Student learns about the principles of electronics components
- Student develops skills in circuit analysis
- Student applies the knowledge to design of electronic devices

Syllabus

BASIC ELECTRONICS

Unit I
Linear Circuits and Semiconductors: Voltage source – Constant Voltage source – Constantcurrent source – Conversion of voltage source into current source – Maximum power transfertheorem- Thevenin‘s theorem – Norton‘s theorem - Semiconductor – bonds in semiconductors –Commonly used semiconductors – effect of temperature in semiconductors – intrinsic andextrinsic semiconductors – P and N type semiconductors.

Unit II Diodes and Transistors: PN junction diode – diode characteristics – Zener diode – Zener asvoltage regulator - transistor – transistor action – three modes of connection – common emittercharacteristics – transistor biasing methods – stability factor –CE amplifier.

Unit III

Oscillators and Modulation: Feedback – principles – gain – advantage –sinusoidal oscillators –tank circuit – Colpitts's Oscillator – Hartley Oscillator – Wien's Oscillator – modulation – AM –modulation index – analysis – modulator – FM – Demodulation

Unit IV

FET and Electronic Instruments: FET – working – importance – Difference between FET andtransistor – FET as amplifier – output characteristic – important terms – expression for draincurrent – advantages – FET parameters – UJT – equivalent circuit – Characteristic – advantages– applications – Multimeter – applications – merits and demerits – CRO and its applications.

Unit V

Operational amplifier: Op amp – Schematic symbol – output voltage – AC analysis – band width– slew rate – frequency response – op amp with negative feedback – applications – invertingamplifier – input and output – impedance of inverting amplifier – Non inverting amplifier –voltage follower – summing amplifier – adder – subtracter – integrator – differentiator – comparator

Book for Study:

Principles of Electronics - .K.Mehta and Rohit Mehta, S.Chand and Company ltd. New edition

Electronic principles – Malvino Ed 6

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2018
1-L1	Voltage source – Constant Voltage source
2-L2	Constant current source – Conversion of voltage source into current source
3- L3	Maximum power transfer theorem – Thevenin 's theorem
4-L4	Problems solved
5-L5	Norton 's theorem - Semiconductor
6-L6	Problems solved
7-L7	bonds in semiconductors – Commonly used semiconductors
8- P1	**Welcoming of First year and Inauguration of PhysicsAssociation**
9- L8	effect of temperature in semiconductors
10- L9	intrinsic and extrinsic semiconductors
11-L10	P and N type semiconductors
12-L11	PN junction diode – diode characteristics
13-L12	Zener diode – Zener as voltage regulator
14-L13	transistor – transistor action
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	three modes of connection – common emitter
17-IT-1	**Internal Test-I**
18-L16	characteristics – transistor biasing methods
19-L17	**__Test Paper distribution and result analysis**

	Entering Internal Test-I Marks into University portal
20-L18	stability factor –CE amplifier
21- L19	Feedback – principles
22- P2	**College level meeting/Cell function**
23-L20	gain – advantage –sinusoidal oscillators
24-L21	tank circuit – Colpitt‘s Oscillator
25-L22	Hartley Oscillator
26-L23	Wien‘s Oscillator
27-L24	modulation – AM – modulation index
28-L25	analysis – modulator – FM – Demodulation
29-L26	FET – working – importance
30-L27	Difference between FET and transistor – FET as amplifier
31-L28	FET as amplifier – output characteristic – important terms
32-L29	expression for draincurrent – advantages
33-L30	FET parameters – UJT
34- P3	**Department Seminar**
35-L31	UJT equivalent circuit – Characteristic – advantages – applications
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Multimeter – applications – merits and demerits
38- IT-II	**Internal Test-II**
39-L34	CRO and its applications
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Op amp – Schematic symbol
42- L37	output voltage – AC analysis
43- L38	band width – slew rate
44- P4	**College level meeting/ function**
45-L39	frequency response – op amp with negative feedback
46-L40	applications – inverting amplifier
47-L41	input and output – impedance of inverting amplifier
48-L42	Non inverting amplifier
49-L43	Application of op amps
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	voltage follower – summing amplifier
52- L46	adder – subtracter
53-IT-III	**Internal Test-III**
54-L47	integrator – differentiator – comparator
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**

59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.11.2018

Course Outcomes

Learning Outcomes	**COs** of the course Basic Electronics
	At the completion the student should be able to
CO1	Explain the properties of semiconductor
CO2	Draw electrical circuits
CO3	Design and working principles of diodes, transistors etc.
CO4	Analyse and simplify simple electrical networks
CO5	Identifies electronic components
CO6	Study the waveform using CRO
CO7	Develop simple amplifier
CO8	Develop oscillator circuit
Experimental Learning	
EL1	Measures voltage and current using multimeter
EL2	Measures frequency using CRO
EL3	Handles bread board
EL4	Identifies defects in electronic components
Integrated Activity	
IA1	
IA2	

Blended Learning : Using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : Use library books, E- books, motivate student to prepare for higher study.

For slow learner : Special care taken, motivate the advanced learner to support the slow learner to study to attend the remedial classes.

Extension activity : Motivate students to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Basic Electronics
Course Code	GMPH52
Class	III year (2019 – 2020)
Semester	Odd
Staff Name	Dr. M. Daniel Sweetlin
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- Student knows about semiconductor
- Student learns about the principles of electronics components
- Student develops skills in circuit analysis
- Student applies the knowledge to design of electronic devices

Syllabus

BASIC ELECTRONICS

Unit I
Linear Circuits and Semiconductors: Voltage source – Constant Voltage source – Constantcurrent source – Conversion of voltage source into current source – Maximum power transfertheorem- Thevenin‘s theorem – Norton‘s theorem - Semiconductor – bonds in semiconductors –Commonly used semiconductors – effect of temperature in semiconductors – intrinsic andextrinsic semiconductors – P and N type semiconductors.

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Unit III

Oscillators and Modulation: Feedback – principles – gain – advantage –sinusoidal oscillators –tank circuit – Colpitts's Oscillator – Hartley Oscillator – Wien's Oscillator – modulation – AM –modulation index – analysis – modulator – FM – Demodulation

Unit IV
FET and Electronic Instruments: FET – working – importance – Difference between FET andtransistor – FET as amplifier – output characteristic – important terms – expression for draincurrent – advantages – FET parameters – UJT – equivalent circuit – Characteristic – advantages– applications – Multimeter – applications – merits and demerits – CRO and its applications.

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Operational amplifier: Op amp – Schematic symbol – output voltage – AC analysis – band width– slew rate – frequency response – op amp with negative feedback – applications – invertingamplifier – input and output – impedance of inverting amplifier – Non inverting amplifier –voltage follower – summing amplifier – adder – subtracter – integrator – differentiator – comparator

Book for Study:
Principles of Electronics - .K.Mehta and Rohit Mehta, S.Chand and Company ltd. New edition
Electronic principles – Malvino Ed 6

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 17.06.2019
1-L1	Voltage source – Constant Voltage source
2-L2	Constant current source – Conversion of voltage source into current source
3- L3	Maximum power transfer theorem – Thevenin 's theorem
4-L4	Problems solved
5-L5	Norton 's theorem - Semiconductor
6-L6	Problems solved
7-L7	bonds in semiconductors – Commonly used semiconductors
8- P1	**Welcoming of First year and Inauguration of PhysicsAssociation**
9- L8	effect of temperature in semiconductors
10- L9	intrinsic and extrinsic semiconductors
11-L10	P and N type semiconductors
12-L11	PN junction diode – diode characteristics
13-L12	Zener diode – Zener as voltage regulator
14-L13	transistor – transistor action
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	three modes of connection – common emitter
17-IT-1	**Internal Test-I**
18-L16	characteristics – transistor biasing methods
19-L17	**__Test Paper distribution and result analysis**

	Entering Internal Test-I Marks into University portal
20-L18	stability factor –CE amplifier
21- L19	Feedback – principles
22- P2	**College level meeting/Cell function**
23-L20	gain – advantage –sinusoidal oscillators
24-L21	tank circuit – Colpitt‘s Oscillator
25-L22	Hartley Oscillator
26-L23	Wien‘s Oscillator
27-L24	modulation – AM – modulation index
28-L25	analysis – modulator – FM – Demodulation
29-L26	FET – working – importance
30-L27	Difference between FET and transistor – FET as amplifier
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32-L29	expression for draincurrent – advantages
33-L30	FET parameters – UJT
34- P3	**Department Seminar**
35-L31	UJT equivalent circuit – Characteristic – advantages – applications
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	Multimeter – applications – merits and demerits
38- IT-II	**Internal Test-II**
39-L34	CRO and its applications
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
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42- L37	output voltage – AC analysis
43- L38	band width – slew rate
44- P4	**College level meeting/ function**
45-L39	frequency response – op amp with negative feedback
46-L40	applications – inverting amplifier
47-L41	input and output – impedance of inverting amplifier
48-L42	Non inverting amplifier
49-L43	Application of op amps
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	voltage follower – summing amplifier
52- L46	adder – subtracter
53-IT-III	**Internal Test-III**
54-L47	integrator – differentiator – comparator
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**

59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.10.2019

Course Outcomes

Learning Outcomes	**COs** of the course Basic Electronics
	At the completion the student should be able to
CO1	Explain the properties of semiconductor
CO2	Draw electrical circuits
CO3	Design and working principles of diodes, transistors etc.
CO4	Analyse and simplify simple electrical networks
CO5	Identifies electronic components
CO6	Study the waveform using CRO
CO7	Develop simple amplifier
CO8	Develop oscillator circuit
Experimental Learning	
EL1	Measures voltage and current using multimeter
EL2	Measures frequency using CRO
EL3	Handles bread board
EL4	Identifies defects in electronic components
Integrated Activity	
IA1	
IA2	

Blended Learning : Using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

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Extension activity : Motivate students to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Digital Electronics
Course Code	GMPH63
Class	III year (2012-2015)
Semester	Even
Staff Name	Dr. M. Daniel Sweetlin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- Student understands the principles of digital systems.
- Student learns about different number systems
- Applies Boolean algebra for digital system design
- Simplifies circuits using Boolean algebra
- Simplifies circuits using K Map
- Designs simple digital circuits

Syllabus

SEMESTER-VI

PAPER XII

DIGITAL ELECTRONICS

Preamble: This course provides an understanding of Boolean algebra and digitalcircuits. The paper needs a basic knowledge in solid state electronics and thelearners 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 interconversions-binary arithmetic-binary addition-subtraction-1's and 2'scomplements- 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 logicsystems-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 ANDMULTIVIBRATORS

Half and full adders- Half and full subtractors-RS Flip-flop-clocked RSFlip-flop, JK Flip-flop, JK master slave Flip-flop, D Flip-flop, T Flip-flop555 timer-Astable multivibrator, monostable multivibrator-Frequencydivider(11L+7T)

UNIT IV: KARNAUGH MAP AND COMBINATIONAL CIRCUIT APPLICATIONS

Karnaugh map - 2,3and 4 variables –simplification-SOP and POS form ofBoolean 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- Parallelin- Serial out- Parallel in- Parallel out-Asynchronous and Synchronous counters-Ring counter- Binary counter- Up- Down counter- Mod-5 counter- Mod-10counter (decade counter)-A/D and D/A converters(9L+6T)

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Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 03.12.2014
1-L1	Analog verses Digital
2-L2	Binary system for digital.
3- L3	Decimal, binary numbersystems and interconversions
4-L4	Octal, binary and hexadecimal number systemsand interconversions

5-L5	binary arithmetic-binary addition and subtraction
6-L6	1s complement subtraction
7-L7	2s complement subtraction
8- P1	**Welcoming of First year and Inauguration of PhysicsAssociation**
9- L8	BCD codes 8421 code
10- L9	Excess-3code, Gray code.
11-L10	ASCII code
12-L11	Boolean algebra
13-L12	De Morgan’s theorem
14-L13	Positive logic and negative logic system
15-L14	Basic logic gates, OR, AND, NOT
16-L15	NAND and NOR as universal building blocks.
17- L16	Half and full adders
18- L17	Half and full subtractors
19- L18	RS Flip-flop-clocked RS Flipflop
20- L19	D Flip-flop, T Flip-flop
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins
22- L21	JK Flip-flop, JK master slave Flip-flop
23- IT-1	**Internal Test-I**
24- L22	Astable multivibrator
25- L23	monostable multivibrator
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	555 time
28- L26	Frequency divider
29- L27	Karnaugh map Simplification
30- P2	**College level meeting/Cell function**
31-L28	2,3 Variables K map
32-L29	4 Variables K map
33-L30	Don’t Care Conditions
34- L31	SOP form of Boolean Function
35- L32	POS Form of Boolean Function
36- L33	Multiplexer
37- L34	Demultiplexer
38-L35	Encoder
39- L36	Decoder
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41- L38	Parity checker
42-P3	**Department Seminar**
43- L39	Registers – shift registerst
44- L40	Serial in Serial Out

45- L41	Serial in Parallel out
46- L42	Parallel in Serial out
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins
48- L44	Parallel in- Parallel out
49-IT-II	**Internal Test-II**
50-L45	Counters
51- L46	**Test Paper distribution and result analysis**
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52- L47	Synchronouscounter
53- L48	Asynchronous Counters
54- L49	Mod-5 counter
55- L50	Mod-10 Counter
56- L51	decade counter
57- L52	Ring counter
58- L53	Up- Down counter
59-P4	**College level meeting/ function**
60- L54	D/A Converter
61- L55	A/D Converter
62- L56	AssignmentProblems
63- L57	Revision
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins
65- L59	Problems
66- L60	Problems
67-IT-III	**Internal Test-III**
68- L61	Revision
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70- L63	**Test Paper distribution and result analysis**
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	Model Test begins
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72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.4.2015

Course Outcomes

Learning Outcomes	COs of the course Digital Electronics
CO1	The students are able to Convert a decimal number into other number systems
CO2	Explain the difference between analogue and digital system
CO3	Explains the advantage of digital system
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CO5	Designs simple digital circuits
CO6	Designs counters
CO7	Designs multivibrators
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Experimental Learning	
EL1	Constructs multivibrator
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HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Digital Electronics
Course Code	GMPH63
Class	III year (2015-2016)
Semester	Even
Staff Name	Dr. M. Daniel Sweetlin
Credits	5
L. Hours /P. Hours	5 / WK
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- Simplifies circuits using K Map
- Designs simple digital circuits

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SEMESTER-VI

PAPER XII

DIGITAL ELECTRONICS

Preamble: This course provides an understanding of Boolean algebra and digitalcircuits. The paper needs a basic knowledge in solid state electronics and thelearners are expected to gain knowledge to design electronic circuits

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Karnaugh map - 2,3and 4 variables –simplification-SOP and POS form ofBoolean functions - Don't care conditions-Multiplexer, Demultiplexer, Encoder,Decoder, parity generator and checker. (10L+6T)

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Types of registers- Serial in –Serial out-Serial in-Parallel out- Parallelin- Serial out- Parallel in- Parallel out-Asynchronous and Synchronous counters-Ring counter- Binary counter- Up- Down counter- Mod-5 counter- Mod-10counter (decade counter)-A/D and D/A converters(9L+6T)

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4.Fundamentals of Digital Electronics and Microprocessors - Anokhsingh

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Hour allotment	Class Schedule
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3- L3	Decimal, binary number systems and interconversions
4-L4	Octal, binary and hexadecimal number systems and interconversions

5-L5	binary arithmetic-binary addition and subtraction
6-L6	1s complement subtraction
7-L7	2s complement subtraction
8- P1	**Welcoming of First year and Inauguration of PhysicsAssociation**
9- L8	BCD codes 8421 code
10- L9	Excess-3code, Gray code.
11-L10	ASCII code
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13-L12	De Morgan’s theorem
14-L13	Positive logic and negative logic system
15-L14	Basic logic gates, OR, AND, NOT
16-L15	NAND and NOR as universal building blocks.
17- L16	Half and full adders
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19- L18	RS Flip-flop-clocked RS Flip flop
20- L19	D Flip-flop, T Flip-flop
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins
22- L21	JK Flip-flop, JK master slave Flip-flop
23- IT-1	**Internal Test-I**
24- L22	Astable multivibrator
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	Entering Internal Test-I Marks into University portal
27- L25	555 time
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29- L27	Karnaugh map Simplification
30- P2	**College level meeting/Cell function**
31-L28	2,3 Variables K map
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39- L36	Decoder
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75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 22.4.2016

Course Outcomes

Learning Outcomes	COs of the course Digital Electronics
CO1	The students are able to Convert a decimal number into other number systems
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CO3	Explains the advantage of digital system
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HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Digital Electronics
Course Code	GMPH63
Class	III year (2016-2017)
Semester	Even
Staff Name	Dr. M. Daniel Sweetlin
Credits	5
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- Simplifies circuits using K Map
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Syllabus

SEMESTER-VI
PAPER XII
DIGITAL ELECTRONICS

Preamble: This course provides an understanding of Boolean algebra and digitalcircuits. The paper needs a basic knowledge in solid state electronics and thelearners are expected to gain knowledge to design electronic circuits

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Karnaugh map - 2,3and 4 variables –simplification-SOP and POS form ofBoolean functions - Don't care conditions-Multiplexer, Demultiplexer, Encoder,Decoder, parity generator and checker. (10L+6T)

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Types of registers- Serial in –Serial out-Serial in-Parallel out- Parallelin- Serial out- Parallel in- Parallel out-Asynchronous and Synchronous counters-Ring counter- Binary counter- Up- Down counter- Mod-5 counter- Mod-10counter (decade counter)-A/D and D/A converters(9L+6T)

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24- L22	Astable multivibrator
25- L23	monostable multivibrator
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55- L50	Mod-10 Counter
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CO1	The students are able to Convert a decimal number into other number systems
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Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
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Course Code	GMPH63
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Semester	Even
Staff Name	Dr. M. Daniel Sweetlin
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SEMESTER-VI

PAPER XII

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34- L31	SOP form of Boolean Function
35- L32	POS Form of Boolean Function
36- L33	Multiplexer
37- L34	Demultiplexer
38-L35	Encoder
39- L36	Decoder
40- L37	Parity Generator
41- L38	Parity checker
42-P3	**Department Seminar**
43- L39	Registers – shift registerst
44- L40	Serial in Serial Out

45- L41	Serial in Parallel out
46- L42	Parallel in Serial out
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins
48- L44	Parallel in- Parallel out
49-IT-II	**Internal Test-II**
50-L45	Counters
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Synchronous counter
53- L48	Asynchronous Counters
54- L49	Mod-5 counter
55- L50	Mod-10 Counter
56- L51	decade counter
57- L52	Ring counter
58- L53	Up- Down counter
59-P4	**College level meeting/ function**
60- L54	D/A Converter
61- L55	A/D Converter
62- L56	AssignmentProblems
63- L57	Revision
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins
65- L59	Problems
66- L60	Problems
67-IT-III	**Internal Test-III**
68- L61	Revision
69- L62	RevisionTest
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
71-MT	**Model Test**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.4.2018

Course Outcomes

Learning Outcomes	COs of the course Digital Electronics
CO1	The students are able to Convert a decimal number into other number systems
CO2	Explain the difference between analogue and digital system
CO3	Explains the advantage of digital system
CO4	Simplifies the Boolean algebraic equations
CO5	Designs simple digital circuits
CO6	Designs counters
CO7	Designs multivibrators
CO8	Design a circuit using only NAND or NOR gates
Experimental Learning	
EL1	Constructs multivibrator
EL2	Measures the frequency of the vibrators
EL3	Constructs gate circuits and verify its operation
EL4	Constructs flip flops
Integrated Activity	
IA1	
IA2	

Blended Learning : Using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : Use library books, E- books, motivate student to prepare for higher study.

For slow learner : Special care taken, motivate the advanced learner to support the slow learner to study and to attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Digital Electronics
Course Code	GMPH63
Class	III year (2018-2019)
Semester	Even
Staff Name	Dr. M. Daniel Sweetlin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- Student understands the principles of digital systems.
- Student learns about different number systems
- Applies Boolean algebra for digital system design
- Simplifies circuits using Boolean algebra
- Simplifies circuits using K Map
- Designs simple digital circuits

Syllabus

SEMESTER-VI

PAPER XII

DIGITAL ELECTRONICS

Preamble: This course provides an understanding of Boolean algebra and digitalcircuits. The paper needs a basic knowledge in solid state electronics and thelearners 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 interconversions-binary arithmetic-binary addition-subtraction-1's and 2'scomplements- 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 logicsystems-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 ANDMULTIVIBRATORS

Half and full adders- Half and full subtractors-RS Flip-flop-clocked RSFlip-flop, JK Flip-flop, JK master slave Flip-flop, D Flip-flop, T Flip-flop555 timer- Astable multivibrator, monostable multivibrator-Frequencydivider(11L+7T)

UNIT IV: KARNAUGH MAP AND COMBINATIONAL CIRCUIT APPLICATIONS

Karnaugh map - 2,3and 4 variables –simplification-SOP and POS form ofBoolean 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- Parallelin- Serial out- Parallel in- Parallel out-Asynchronous and Synchronous counters-Ring counter- Binary counter- Up- Down counter- Mod-5 counter- Mod-10counter (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

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 03.12.2018
1-L1	Analog verses Digital
2-L2	Binary system for digital.
3- L3	Decimal, binary number systems and interconversions
4-L4	Octal, binary and hexadecimal number systems and interconversions

5-L5	binary arithmetic-binary addition and subtraction
6-L6	1s complement subtraction
7-L7	2s complement subtraction
8- P1	**Welcoming of First year and Inauguration of PhysicsAssociation**
9- L8	BCD codes 8421 code
10- L9	Excess-3code, Gray code.
11-L10	ASCII code
12-L11	Boolean algebra
13-L12	De Morgan’s theorem
14-L13	Positive logic and negative logic system
15-L14	Basic logic gates, OR, AND, NOT
16-L15	NAND and NOR as universal building blocks.
17- L16	Half and full adders
18- L17	Half and full subtractors
19- L18	RS Flip-flop-clocked RS Flip flop
20- L19	D Flip-flop, T Flip-flop
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins
22- L21	JK Flip-flop, JK master slave Flip-flop
23- IT-1	**Internal Test-I**
24- L22	Astable multivibrator
25- L23	monostable multivibrator
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	555 time
28- L26	Frequency divider
29- L27	Karnaugh map Simplification
30- P2	**College level meeting/Cell function**
31-L28	2,3 Variables K map
32-L29	4 Variables K map
33-L30	Don’t Care Conditions
34- L31	SOP form of Boolean Function
35- L32	POS Form of Boolean Function
36- L33	Multiplexer
37- L34	Demultiplexer
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39- L36	Decoder
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61- L55	A/D Converter
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66- L60	Problems
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69- L62	RevisionTest
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72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.4.2019

Course Outcomes

Learning Outcomes	COs of the course Digital Electronics
CO1	The students are able to Convert a decimal number into other number systems
CO2	Explain the difference between analogue and digital system
CO3	Explains the advantage of digital system
CO4	Simplifies the Boolean algebraic equations
CO5	Designs simple digital circuits
CO6	Designs counters
CO7	Designs multivibrators
CO8	Design a circuit using only NAND or NOR gates
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EL2	Measures the frequency of the vibrators
EL3	Constructs gate circuits and verify its operation
EL4	Constructs flip flops
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IA2	

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HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Digital Electronics
Course Code	GMPH63
Class	III year (2017-2020)
Semester	Even
Staff Name	Dr. M. Daniel Sweetlin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

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- Simplifies circuits using K Map
- Designs simple digital circuits

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SEMESTER-VI

PAPER XII

DIGITAL ELECTRONICS

Preamble: This course provides an understanding of Boolean algebra and digitalcircuits. The paper needs a basic knowledge in solid state electronics and thelearners are expected to gain knowledge to design electronic circuits

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Half and full adders- Half and full subtractors-RS Flip-flop-clocked RSFlip-flop, JK Flip-flop, JK master slave Flip-flop, D Flip-flop, T Flip-flop555 timer-Astable multivibrator, monostable multivibrator-Frequencydivider(11L+7T)

UNIT IV: KARNAUGH MAP AND COMBINATIONAL CIRCUIT APPLICATIONS

Karnaugh map - 2,3and 4 variables –simplification-SOP and POS form ofBoolean functions - Don't care conditions-Multiplexer, Demultiplexer, Encoder,Decoder, parity generator and checker. (10L+6T)

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Types of registers- Serial in –Serial out-Serial in-Parallel out- Parallelin- Serial out- Parallel in- Parallel out-Asynchronous and Synchronous counters-Ring counter- Binary counter- Up- Down counter- Mod-5 counter- Mod-10counter (decade counter)-A/D and D/A converters(9L+6T)

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3.Metha V.K.Mehtha.R.Principles of electronics,S.Chand &Co.
4.Fundamentals of Digital Electronics and Microprocessors - Anokh singh

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 02.12.2019
1-L1	Analog verses Digital
2-L2	Binary system for digital.
3- L3	Decimal, binary number systems and interconversions
4-L4	Octal, binary and hexadecimal number systems and interconversions

5-L5	binary arithmetic-binary addition and subtraction
6-L6	1s complement subtraction
7-L7	2s complement subtraction
8- P1	**Welcoming of First year and Inauguration of PhysicsAssociation**
9- L8	BCD codes 8421 code
10- L9	Excess-3code, Gray code.
11-L10	ASCII code
12-L11	Boolean algebra
13-L12	De Morgan’s theorem
14-L13	Positive logic and negative logic system
15-L14	Basic logic gates, OR, AND, NOT
16-L15	NAND and NOR as universal building blocks.
17- L16	Half and full adders
18- L17	Half and full subtractors
19- L18	RS Flip-flop-clocked RS Flip flop
20- L19	D Flip-flop, T Flip-flop
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins
22- L21	JK Flip-flop, JK master slave Flip-flop
23- IT-1	**Internal Test-I**
24- L22	Astable multivibrator
25- L23	monostable multivibrator
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	555 time
28- L26	Frequency divider
29- L27	Karnaugh map Simplification
30- P2	**College level meeting/Cell function**
31-L28	2,3 Variables K map
32-L29	4 Variables K map
33-L30	Don’t Care Conditions
34- L31	SOP form of Boolean Function
35- L32	POS Form of Boolean Function
36- L33	Multiplexer
37- L34	Demultiplexer
38-L35	Encoder
39- L36	Decoder
40- L37	Parity Generator
41- L38	Parity checker
42-P3	**Department Seminar**
43- L39	Registers – shift registerst
44- L40	Serial in Serial Out

45- L41	Serial in Parallel out
46- L42	Parallel in Serial out
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins
48- L44	Parallel in- Parallel out
49-IT-II	**Internal Test-II**
50-L45	Counters
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Synchronous counter
53- L48	Asynchronous Counters
54- L49	Mod-5 counter
55- L50	Mod-10 Counter
56- L51	decade counter
57- L52	Ring counter
58- L53	Up- Down counter
59-P4	**College level meeting/ function**
60- L54	D/A Converter
61- L55	A/D Converter
62- L56	AssignmentProblems
63- L57	Revision
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins
65- L59	Problems
66- L60	Problems
67-IT-III	**Internal Test-III**
68- L61	Revision
69- L62	RevisionTest
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
71-MT	**Model Test**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 27.4.2020

Course Outcomes

Learning Outcomes	COs of the course Digital Electronics
CO1	The students are able to Convert a decimal number into other number systems
CO2	Explain the difference between analogue and digital system
CO3	Explains the advantage of digital system
CO4	Simplifies the Boolean algebraic equations
CO5	Designs simple digital circuits
CO6	Designs counters
CO7	Designs multivibrators
CO8	Design a circuit using only NAND or NOR gates
Experimental Learning	
EL1	Constructs multivibrator
EL2	Measures the frequency of the vibrators
EL3	Constructs gate circuits and verify its operation
EL4	Constructs flip flops
Integrated Activity	
IA1	
IA2	

Blended Learning : Using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : Use library books, E- books, motivate student to prepare for higher study.

For slow learner : Special care taken, motivate the advanced learner to support the slow learner to study and to attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2017-2018)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Electricity and Magnetism
Course Code	GMPH31
Class	II year (2017-2018)
Semester	Odd
Staff Name	Mrs. R. Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To learn electricity and magnetism
- To understand electric Current
- How to apply Transient Current
- To understand Alternating Current

Syllabus

ELECTRICITY AND MAGNETISM
Unit I
Electrostatics: Coulomb's law – electric field – electric dipole – electric flux – Electrostatics: Coulomb's law – electric field – electric dipole – electric flux – electric potential – relation connecting electric potential and electric field – potential at a point due to a point charge – potential due to an electric dipole – capacity – capacitance of a spherical and cylindrical
Capacitor – energy of a charged capacitor – Loss of energy due to sharing of charges.
Unit II
Chemical Effects of Electric Current: Faraday's Laws of Electrolysis – electrical Conductivity of an electrolyte – specific conductivity – Kohlrausch bridge – Thermoelectricity –

Seebeck effect – Peltier effect – Thomson effect – total e.m.f – thermodynamics of thermocouple
– thermoelectric power diagram – its uses – applications.

Unit III

Transient Current: Growth and decay of current in a circuit containing resistance and inductance – Growth and decay of charge in a circuit containing resistance and capacitance – Determination of high resistance by leakage – Growth and decay of charge in a LCR circuit – condition for the discharge to be oscillatory – Frequency of Oscillation.

672

Unit IV

Alternating Current: j operator – properties – use of j operator in the study of A.C Circuit With R only – inductance only – capacitance only – LCR series and parallel circuits – power in an AC circuit – Wattless current – choke coil – construction and working of AC generator, 1 phase and 3 phase AC generator – distribution of 3 phase AC – star connection – delta Connection.

Unit V

Magnetic Properties of Materials: Magnetic induction – Magnetism – Relation between B, H and M – Magnetic susceptibility – Magnetic permeability – Relation between them – Electron theory of dia, para and ferromagnetism – Determination of susceptibility – Curie balance method – Moving coil Ballistic galvanometer – construction – theory – correction for damping in B.G – Measurement of Charge sensitiveness – absolute capacity of a condenser.

Books for Study and reference:

1.Electricity and Magnetism - D.N. Vasudeva
2.Electricity and Magnetism - Brijlal and Subramanian
3.Electricity and Magnetism - R. Murugeshan
4.Electricity and Magnetism - K.K. Tewari
5.Halliday Rhesnick walker Ed 6 Wiley

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 16.06.2017
1-L1	Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux
2-L2	Coulomb‘s law – electric field – electric dipole – electric flux – electric potential relation connecting electric potential and electric field
3- L3	potential at a point due to a point charge – potential due to an electric dipole
4-L4	potential due to an electric dipole – capacity
5-L5	capacitance of a spherical and cylindrical
6-L6	capacitor – energy of a charged capacitor – Loss of energy due to sharing of charges
7-L7	Unit II Chemical Effects of Electric Current: Faraday‘s Laws of Electrolysis
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Electrical conductivity of an electrolyte
10- L9	specific conductivity – Kohlrausch bridge – Thermoelectricity –
11-L10	See beck effect – Peltier effect – Thomson effect
12-L11	thermoelectric power diagram – its uses – applications
13-L12	Unit III Transient Current: Growth and decay of current in a circuit

14-L13	Growth and decay of charge in a circuit containing resistance and capacitance
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 31.07.2017
16-L15	Determination of high resistance by leakage
17-IT-1	Growth and decay of charge in a LCR circuit **Internal Test-I**
18-L16	condition for the discharge to be oscillatory – Frequency of Oscillation.
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Alternating Current: j operator – properties
21- L19	properties – use of j operator in the study of A.C Circuit
22- P2	**College level meeting/Cell function**
23-L20	inductance only – capacitance only – LCR series and parallel circuits – power in an AC circuit
24-L21	Wattless current – choke coil
25-L22	construction and working of AC generator, 1
26-L23	phase and 3 phase AC generator
27-L24	distribution of 3 phase AC
28-L25	star connection – delta connection.
29-L26	Magnetic Properties of Materials
30-L27	Magnetic induction – Magnetism
31-L28	Relation between B, H and M – Magnetic susceptibility
32-L29	Magnetic permeability
33-L30	Relation between them Electron theory of dia, para and ferromagnetism
34- P3	**Department Seminar**
35-L31	Determination of susceptibility
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 30.08.2017
37- L33	Curie balance method
38- IT-II	**Internal Test-II**
39-L34	Moving coil Ballistic galvanometer
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Moving coil Ballistic galvanometer – construction
42- L37	theory – correction for
43- L38	correction for damping in B.G
44- P4	**College level meeting/ function**
45-L39	Measurement of Charge sensitiveness
46-L40	absolute capacity of a condenser
47-L41	Solving Problems
48-L42	Curie balance method explanation
49-L43	.Determination of susceptibility
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 03.10.2016
51 L45	Practical explanation
52- L46	Measurement of Charge sensitiveness
53-IT-III	**Internal Test-III**
54-L47	Revision

55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins 19.10.2017
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 06.11.2017

Course Outcomes

Learning Outcomes	**COs** of the course "<Electricity and Magnetism>"
CO1	The use of Coulomb's law and Gauss' law for the electrostatic force
CO2	The relationship between electrostatic field and electrostatic potential
CO3	The use of the Lorentz force law for the magnetic force
CO4	The use of Ampere's law to calculate magnetic fields
CO5	The use of Faraday's law in induction problems
CO6	The basic laws that underlie the properties of electric circuit elements
Experimental Learning	
EL1	The abstraction from forces to fields using the examples of the electric and magnetic fields, with some applications
EL2	The connection between conservative forces and potential energy
EL3	How charges move through electric circuits
EL4	The close connection between electricity and magnetism, leading to the discovery of electromagnetic waves.
EL5	the integral form of Maxwell's Equations
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2018-2019)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Electricity and Magnetism
Course Code	GMPH31
Class	II year (2018-2019)
Semester	Odd
Staff Name	Mrs. R. Nithya Agnes
Credits	4
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672

Unit IV

Alternating Current: j operator – properties – use of j operator in the study of A.C Circuit With R only – inductance only – capacitance only – LCR series and parallel circuits – power in an AC circuit – Wattless current – choke coil – construction and working of AC generator, 1 phase and 3 phase AC generator – distribution of 3 phase AC – star connection – delta Connection.

Unit V

Magnetic Properties of Materials: Magnetic induction – Magnetism – Relation between B, H and M – Magnetic susceptibility – Magnetic permeability – Relation between them – Electron theory of dia, para and ferromagnetism – Determination of susceptibility – Curie balance method – Moving coil Ballistic galvanometer – construction – theory – correction for damping in B.G – Measurement of Charge sensitiveness – absolute capacity of a condenser.

Books for Study and reference:

1.Electricity and Magnetism - D.N. Vasudeva
2.Electricity and Magnetism - Brijlal and Subramanian
3.Electricity and Magnetism - R. Murugeshan
4.Electricity and Magnetism - K.K. Tewari
5.Halliday Rhesnick walker Ed 6 Wiley

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2018
1-L1	Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux
2-L2	Coulomb‘s law – electric field – electric dipole – electric flux – electric potential relation connecting electric potential and electric field
3- L3	potential at a point due to a point charge – potential due to an electric dipole
4-L4	potential due to an electric dipole – capacity
5-L5	capacitance of a spherical and cylindrical
6-L6	capacitor – energy of a charged capacitor – Loss of energy due to sharing of charges
7-L7	Unit II Chemical Effects of Electric Current: Faraday‘s Laws of Electrolysis
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Electrical conductivity of an electrolyte
10- L9	specific conductivity – Kohlrausch bridge – Thermoelectricity –
11-L10	See beck effect – Peltier effect – Thomson effect
12-L11	thermoelectric power diagram – its uses – applications
13-L12	Unit III Transient Current: Growth and decay of current in a circuit

14-L13	Growth and decay of charge in a circuit containing resistance and capacitance
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 30.07.2018
16-L15	Determination of high resistance by leakage
17-IT-1	Growth and decay of charge in a LCR circuit **Internal Test-I**
18-L16	condition for the discharge to be oscillatory – Frequency of Oscillation.
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Alternating Current: j operator – properties
21- L19	properties – use of j operator in the study of A.C Circuit
22- P2	**College level meeting/Cell function**
23-L20	inductance only – capacitance only – LCR series and parallel circuits – power in an AC circuit
24-L21	Wattless current – choke coil
25-L22	construction and working of AC generator, 1
26-L23	phase and 3 phase AC generator
27-L24	distribution of 3 phase AC
28-L25	star connection – delta connection.
29-L26	Magnetic Properties of Materials
30-L27	Magnetic induction – Magnetism
31-L28	Relation between B, H and M – Magnetic susceptibility
32-L29	Magnetic permeability
33-L30	Relation between them Electron theory of dia, para and ferromagnetism
34- P3	**Department Seminar**
35-L31	Determination of susceptibility
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 03.09.2018
37- L33	Curie balance method
38- IT-II	**Internal Test-II**
39-L34	Moving coil Ballistic galvanometer
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Moving coil Ballistic galvanometer – construction
42- L37	theory – correction for
43- L38	correction for damping in B.G
44- P4	**College level meeting/ function**
45-L39	Measurement of Charge sensitiveness
46-L40	absolute capacity of a condenser
47-L41	Solving Problems
48-L42	Curie balance method explanation
49-L43	.Determination of susceptibility
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 08.10.2018
51 L45	Practical explanation
52- L46	Measurement of Charge sensitiveness
53-IT-III	**Internal Test-III**
54-L47	Revision

55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins 22.10.2018
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.11.2018

Course Outcomes

Learning Outcomes	**COs** of the course "<Electricity and Magnetism>"
CO1	The use of Coulomb's law and Gauss' law for the electrostatic force
CO2	The relationship between electrostatic field and electrostatic potential
CO3	The use of the Lorentz force law for the magnetic force
CO4	The use of Ampere's law to calculate magnetic fields
CO5	The use of Faraday's law in induction problems
CO6	The basic laws that underlie the properties of electric circuit elements
Experimental Learning	
EL1	The abstraction from forces to fields using the examples of the electric and magnetic fields, with some applications
EL2	The connection between conservative forces and potential energy
EL3	How charges move through electric circuits -
EL4	The close connection between electricity and magnetism, leading to the discovery of electromagnetic waves.
EL5	the integral form of Maxwell's Equations
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2019-2020)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Electricity and Magnetism
Course Code	GMPH31
Class	II year (2019-2020)
Semester	Odd
Staff Name	Mrs. R. Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To learn electricity and magnetism
- To understand electric Current
- How to apply Transient Current
- To understand Alternating Current

Syllabus

ELECTRICITY AND MAGNETISM
Unit I
Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux – Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux – electric potential – relation connecting electric potential and electric field – potential at a point due to a point charge – potential due to an electric dipole – capacity – capacitance of a spherical and cylindrical
Capacitor – energy of a charged capacitor – Loss of energy due to sharing of charges.
Unit II
Chemical Effects of Electric Current: Faraday‘s Laws of Electrolysis – electrical Conductivity of an electrolyte – specific conductivity – Kohlrausch bridge – Thermoelectricity –

Seebeck effect – Peltier effect – Thomson effect – total e.m.f – thermodynamics of thermocouple
– thermoelectric power diagram – its uses – applications.

Unit III

Transient Current: Growth and decay of current in a circuit containing resistance and inductance – Growth and decay of charge in a circuit containing resistance and capacitance – Determination of high resistance by leakage – Growth and decay of charge in a LCR circuit – condition for the discharge to be oscillatory – Frequency of Oscillation.

672

Unit IV

Alternating Current: j operator – properties – use of j operator in the study of A.C Circuit With R only – inductance only – capacitance only – LCR series and parallel circuits – power in an AC circuit – Wattless current – choke coil – construction and working of AC generator, 1 phase and 3 phase AC generator – distribution of 3 phase AC – star connection – delta Connection.

Unit V

Magnetic Properties of Materials: Magnetic induction – Magnetism – Relation between B, H and M – Magnetic susceptibility – Magnetic permeability – Relation between them – Electron theory of dia, para and ferromagnetism – Determination of susceptibility – Curie balance method – Moving coil Ballistic galvanometer – construction – theory – correction for damping in B.G – Measurement of Charge sensitiveness – absolute capacity of a condenser.

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4.Electricity and Magnetism - K.K. Tewari
5.Halliday Rhesnick walker Ed 6 Wiley

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 17.06.2019
1-L1	Electrostatics: Coulomb‘s law – electric field – electric dipole – electric flux
2-L2	Coulomb‘s law – electric field – electric dipole – electric flux – electric potential relation connecting electric potential and electric field
3- L3	potential at a point due to a point charge – potential due to an electric dipole
4-L4	potential due to an electric dipole – capacity
5-L5	capacitance of a spherical and cylindrical
6-L6	capacitor – energy of a charged capacitor – Loss of energy due to sharing of charges
7-L7	Unit II Chemical Effects of Electric Current: Faraday‘s Laws of Electrolysis
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Electrical conductivity of an electrolyte
10- L9	specific conductivity – Kohlrausch bridge – Thermoelectricity –
11-L10	See beck effect – Peltier effect – Thomson effect
12-L11	thermoelectric power diagram – its uses – applications
13-L12	Unit III Transient Current: Growth and decay of current in a circuit

14-L13	Growth and decay of charge in a circuit containing resistance and capacitance
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 24.07.2019
16-L15	Determination of high resistance by leakage
17-IT-1	Growth and decay of charge in a LCR circuit **Internal Test-I**
18-L16	condition for the discharge to be oscillatory – Frequency of Oscillation.
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Alternating Current: j operator – properties
21- L19	properties – use of j operator in the study of A.C Circuit
22- P2	**College level meeting/Cell function**
23-L20	inductance only – capacitance only – LCR series and parallel circuits – power in an AC circuit
24-L21	Wattless current – choke coil
25-L22	construction and working of AC generator, 1
26-L23	phase and 3 phase AC generator
27-L24	distribution of 3 phase AC
28-L25	star connection – delta connection.
29-L26	Magnetic Properties of Materials
30-L27	Magnetic induction – Magnetism
31-L28	Relation between B, H and M – Magnetic susceptibility
32-L29	Magnetic permeability
33-L30	Relation between them Electron theory of dia, para and ferromagnetism
34- P3	**Department Seminar**
35-L31	Determination of susceptibility
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 28.08.2019
37- L33	Curie balance method
38- IT-II	**Internal Test-II**
39-L34	Moving coil Ballistic galvanometer
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Moving coil Ballistic galvanometer – construction
42- L37	theory – correction for
43- L38	correction for damping in B.G
44- P4	**College level meeting/ function**
45-L39	Measurement of Charge sensitiveness
46-L40	absolute capacity of a condenser
47-L41	Solving Problems
48-L42	Curie balance method explanation
49-L43	.Determination of susceptibility
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 27.09.2019
51 L45	Practical explanation
52- L46	Measurement of Charge sensitiveness
53-IT-III	**Internal Test-III**
54-L47	Revision

55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins 14.10.2019
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.11.2019

Course Outcomes

Learning Outcomes	**COs** of the course “<Electricity and Magnetism>”
CO1	The use of Coulomb's law and Gauss' law for the electrostatic force
CO2	The relationship between electrostatic field and electrostatic potential
CO3	The use of the Lorentz force law for the magnetic force
CO4	The use of Ampere's law to calculate magnetic fields
CO5	The use of Faraday's law in induction problems
CO6	The basic laws that underlie the properties of electric circuit elements
Experimental Learning	
EL1	The abstraction from forces to fields using the examples of the electric and magnetic fields, with some applications
EL2	The connection between conservative forces and potential energy
EL3	How charges move through electric circuits -
EL4	The close connection between electricity and magnetism, leading to the discovery of electromagnetic waves.
EL5	the integral form of Maxwell's Equations
Integrated Activity	
IA1	
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2018-2019)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Computer Programming in C ++
Course Code	**GMPH41**
Class	II Year (2018-2019)
Semester	Even
Staff Name	Dr. A.Arul Gnanam Dr.R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To Learn about C++ Programme
- 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
- To discuss about operators.
- To learn about programme goading.

Syllabus

COMPUTER PROGRAMMING IN C++

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 ofarrays-array of stringsFunctions-introduction-function with no argument and no return valuesfunction
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 membersfriend 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

Course Calendar

Hour allotment	**Class Schedule**
	EVEN Semester 03.12.2018
1-L1	**UNIT-I: WHAT IS C++** Introduction - tokens - keywords - identifiers and constants -
2-L2	declaration of variables
3- L3	basic data types - user defined data types-derived data types – symbolic constants
4-L4	operators in C++ -expressions and their type-hierarchy of arithmetic
5-L5	operators- scope resolution operator

6-L6	declaring, initializing and modifying variables-special assignment operators
7-L7	all control structures-structure of a simple C ++ program
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	**C++**Introduction
10- L9	one dimensional and two dimensional arrays-initialization of arrays-array of strings Functions
11-L10	introduction-function with no argument and no return values function with no argument but return value
12-L11	function with argument and no return values
13-L12	function with argument and return values- call by reference-return by reference
14-L13	function prototyping - inline functions - local, -global and static variables
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 18.01.2019
16-L15	function overloading - virtual functions-main function-math library functions.
17-IT-1	**Internal Test-I**
18-L16	Introduction - specifying a class
19-L17	defining member functions-C++ program with class
	Entering Internal Test-I Marks into University portal
20-L18	nesting of member functions
21- L19	private member functions - objects as function arguments
22- P2	arrays within a class-array of objects-static class members friend functions-constructors
23-L20	parameterized constructors-multiple constructors
24-L21	constructors with default arguments - copy constructor
25-L22	OPERATOR OVERLOADING, INHERITANCE AND POINTERS Introduction
26-L23	defining operator overloading
27-L24	overloading unary operators
28-L25	binary operators.
29-L26	Inheritance - single inheritance
30-L27	multiple inheritance
31-L28	hybrid inheritance
32-L29	hierarchial inheritance
33-L30	virtual base class-abstract class
34- P3	**Department Seminar**
35-L31	**Revision**
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 25.02.2019
37- L33	**hierarchical inheritance**
38- IT-II	**Internal Test-II**
39-L34	Pointers- definition
40-L35	declaration- arithmetic operations
	Entering Internal Test-II Marks into University portal
41-L36	**Working with Files: Introduction**
42- L37	MANAGING CONSOLE I/O OPERATIONS Introduction
43- L38	C++ stream
44- P4	C++ stream classes -
45-L39	unformatted I/O Operations

46-L40	formatted console I/O operations -
47-L41	**Revision**
48-L42	**Revision Class**
49-L43	**File Modes**
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 22.03.2019
51 L45	**File Pointers and their Manipulations**
52- L46	**Revision**
53-IT-III	**Internal Test-III**
54-L47	working with files
55-L48	classes for file steam operations - opening and closing a file - file pointers and their manipulations
	Entering Internal Test-III Marks into University portal
	Model Test begins 08.04.2019
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2019

Course Outcomes

Learning Outcomes	**COs** of the course “<Computer Programming in C ++>”
CO1	Get insight knowledge about the language.
CO2	Get trained in writing small programs.
CO3	Capable of executes any programs and identifying errors in them
CO4	Design and implement C programs for any given problem
CO5	Work with existing programs and modify it as per the requirements.
CO6	Identify the errors in a C program.
CO7	Identify the output of a C program without actually executing it
Experimental Learning	
EL1	Capable coding any problem.
EL2	Capable of identifying errors in a coding
EL3	Capable handling any project assigned by a company.
Integrated Activity	
IA1	Individual and Team Work: Function effectively on teams to accomplish a common goal
IA2	Communication: Communicate effectively with a range of audiences and prepare technical documents and make effective oral presentations

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

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Department of Physics

COURSE ACADEMIC PLAN (2019-2020)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Physics
Course Name	Computer Programming in C ++
Course Code	**GMPH41**
Class	II Year (2019-2020)
Semester	Even
Staff Name	Dr. A.Arul Gnanam Dr.R.Nithya Agnes
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

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- 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
- To discuss about operators.
- To learn about programme goading.

Syllabus

COMPUTER PROGRAMMING IN C++

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 ofarrays-array of stringsFunctions-introduction-function with no argument and no return valuesfunction
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 membersfriend 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

Course Calendar

Hour allotment	Class Schedule
	EVEN Semester 02.12.2019
1-L1	**UNIT-I: WHAT IS C++** Introduction - tokens - keywords - identifiers and constants -
2-L2	declaration of variables
3- L3	basic data types - user defined data types-derived data types – symbolic constants
4-L4	operators in C++ -expressions and their type-hierarchy of arithmetic
5-L5	operators- scope resolution operator
6-L6	declaring, initializing and modifying variables-special assignment operators
7-L7	all control structures-structure of a simple C ++ program

8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	**C++**Introduction
10- L9	one dimensional and two dimensional arrays-initialization of arrays-array of strings Functions
11-L10	introduction-function with no argument and no return values function with no argument but return value
12-L11	function with argument and no return values
13-L12	function with argument and return values- call by reference-return by reference
14-L13	function prototyping - inline functions - local, -global and static variables
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins 23.01.2020
16-L15	function overloading - virtual functions-main function-math library functions.
17-IT-1	**Internal Test-I**
18-L16	Introduction - specifying a class
19-L17	defining member functions-C++ program with class
	Entering Internal Test-I Marks into University portal
20-L18	nesting of member functions
21- L19	private member functions - objects as function arguments
22- P2	arrays within a class-array of objects-static class members friend functions-constructors
23-L20	parameterized constructors-multiple constructors
24-L21	constructors with default arguments - copy constructor
25-L22	OPERATOR OVERLOADING, INHERITANCE AND POINTERS Introduction
26-L23	defining operator overloading
27-L24	overloading unary operators
28-L25	binary operators.
29-L26	Inheritance - single inheritance
30-L27	multiple inheritance
31-L28	hybrid inheritance
32-L29	hierarchial inheritance
33-L30	virtual base class-abstract class
34- P3	**Department Seminar**
35-L31	**Revision**
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins 25.02.2020
37- L33	**hierarchical inheritance**
38- IT-II	**Internal Test-II**
39-L34	Pointers- definition
40-L35	declaration- arithmetic operations
	Entering Internal Test-II Marks into University portal
41-L36	**Working with Files: Introduction**
42- L37	MANAGING CONSOLE I/O OPERATIONS Introduction
43- L38	C++ stream
44- P4	C++ stream classes -
45-L39	unformatted I/O Operations
46-L40	formatted console I/O operations -
47-L41	**Revision**

48-L42	**Revision Class**
49-L43	**File Modes**
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins 22.03.2020
51 L45	**File Pointers and their Manipulations**
52- L46	**Revision**
53-IT-III	**Internal Test-III**
54-L47	working with files
55-L48	classes for file steam operations - opening and closing a file - file pointers and their manipulations
	Entering Internal Test-III Marks into University portal
	Model Test begins 08.04.2019
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2020

Course Outcomes

Learning Outcomes	**COs** of the course “<Computer Programming in C ++>”
CO1	Get insight knowledge about the language.
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CO3	Capable of executes any programs and identifying errors in them
CO4	Design and implement C programs for any given problem
CO5	Work with existing programs and modify it as per the requirements.
CO6	Identify the errors in a C program.
CO7	Identify the output of a C program without actually executing it
Experimental Learning	
EL1	Capable coding any problem.
EL2	Capable of identifying errors in a coding
EL3	Capable handling any project assigned by a company.
Integrated Activity	
IA1	Individual and Team Work: Function effectively on teams to accomplish a common goal
IA2	Communication: Communicate effectively with a range of audiences and prepare technical documents and make effective oral presentations

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

<table>
<tr><td>Programme Name</td><td>M.Sc. Physics</td></tr>
<tr><td>Course Name</td><td>Opto Electronics</td></tr>
<tr><td>Course Code</td><td>HPHE12</td></tr>
<tr><td>Class</td><td>I year (2014-2015)</td></tr>
<tr><td>Semester</td><td>Odd</td></tr>
<tr><td>Staff Name</td><td>Dr. J. Ruby Jemima</td></tr>
<tr><td>Credits</td><td>5</td></tr>
<tr><td>L. Hours /P. Hours</td><td>5 / WK</td></tr>
<tr><td colspan="2">Total 75 Hrs/Sem
Internal Test-3 Hrs
Model Test-3 Hrs
Dept. Meetings-2 Hrs
College Meetings-2 Hrs
Remaining 65Hrs (5 units; 5×13=65; 13Hrs /unit)</td></tr>
</table>

Course Objectives

- To expose the students to the ideas of the optoelectronics and lasers
- To study the fundamentals of Light wave
- To acquire the knowledge of Integrated wave guides
- To gain knowledge of about fiber optic communications
- This course gives detailed knowledge of about Optic fiber wave guides
- The applications of Laser and Holography are to be studied.

Syllabus

Unit-I

Light wave fundamentals: Electromagnetic waves- dispersion-pulse distortion-and information rate- polarization- reasonant cavities at plane boundary – critical angle reflections.

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 optic network

Unit-III

Optic fiber wave guides: Step index fiber – graded index fiber – attenuation in fibers – modes in step index fiber – modes in graded index fiber pulse distortion and information rate in optic fibers – construction of optical fibers.

Unit-IV

Lasers: Emission and absorption of radiation – Einstein relations – absorption of radiation – population inversion – threshold conditions – laser losses – line shape functions – population inversion and pumping threshold conditions – laser modes – Axial modes – Transverse modes – classes of laser – doped insulator laser – semiconductor laser – gas lasers – liquid gas lasers- single mode operation – frequency stabilation – mode locking – active mode – passive mode locking- Q- switching methods

Unit-V

Holography: Wavefront reconstruction - linearity of hologralphic process – image formation of holographic process – Gabour hologram – limitations –Recording the hologram – minimum reference angle –holography of three dimensions – practical problems in holography – types of holograms – Fresnel – Fraunhofer- transmission –reflection – rainbow multiplex- embossed and thick holograms – application of holography – holography interferometry – holography computer memories.

Books for study:

1. Fiber Optic communications, Joseph C.Palais, Prentice Hall Publications (unit1-3)
2. Opto electronics, J. Wilson and J.F.B Hawkes, Prentice Hall Publications(unit-4)
3. Introduction to Fourier optics, Joseph W.Goodman, McGraw Hill/ person Education (unit-5)

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2014
1-L1	Light wave fundamentals: Electromagnetic waves -dispersion
2-L2	Pulse distortion
3- L3	Information rate
4-L4	Polarisation-reasonant cavities at plane boundary
5-L5	Critical angle reflections
6-L6	Integrated wave guides:Dielectric slab guide
7-L7	Modes in the symmetric slab guide
8- P1	**Welcoming of First year and Inauguration of Mathematics Association**

9- L8	Modes in the asymmetric slab wave guide
10- L9	Coupling to the wave guide
11-L10	Integrated optic network
12-L11	Optic fiber wave guides: Step index fiber
13-L12	Graded index fiber
14-L13	Attenuation in fibers
15-L14	Modes in step index fiber
16-L15	Modes in graded index fiber pulse distortion and information rate in optic fibers
17- L16	Construction of optical fibers
18- L17	Lasers : Emission and absorption of radiation
19- L18	Einstein relations
20- L19	Absorption of radiation
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (30.07.2014)
22- L21	Population inversion
23- IT-1	**Internal Test-I**
24- L22	Threshold conditions
25- L23	Laser losses
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Line shape functions
28- L26	Population inversion and pumping threshold conditions
29- L27	Laser modes
30- P2	**College level meeting/Cell function**
31-L28	Axial modes
32-L29	Transverse modes
33-L30	Classes of laser
34- L31	Doped insulator laser
35- L32	Semiconductor laser
36- L33	Gas lasers
37- L34	Liquid gas lasers
38-L35	Single mode operation
39- L36	Frequency stabilization
40- L37	Mode locking
41- L38	Active mode
42-P3	**Department Seminar**
43- L39	Passive mode locking-Q-switching methods
44- L40	Holography : Wavefront reconstruction
45- L41	Linearity of holographic process
46- L42	Image formation of holographic process
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins (18.08.2014)
48- L44	Gabour hologram
49-IT-II	**Internal Test-II**
50-L45	Limitations
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Recording the hologram

53- L48	Minimum reference angle
54- L49	Holography of three dimentions
55- L50	Practical problems in holography
56- L51	Types of holograms
57- L52	Fresnel
58- L53	Fraunhofer
59-P4	**College level meeting/ function**
60- L54	Transmission
61- L55	Reflection
62- L56	Rainbow multiplex
63- L57	Embossed and thick holograms
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins (15.09.2014)
65- L59	Application of holography
66- L60	Holography interferometry
67-IT-III	**Internal Test-III**
68- L61	Holography computer memories
69- L62	Revision
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (24.10.2014)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2014

Course Outcomes

Learning Outcomes	**COs** of the course "**Opto Electronics** "
CO1	To studied about the Electromagnetic wave dispersion
CO2	To discuss the application of Holography
CO3	To describe the coupling of the wave guide
CO4	To construct the practical problems in Holography
CO5	To learn the Rainbow Multiplex
CO6	To studied about the Reflection and Transmission
CO7	To deduce the threshold conditions
CO8	To define the Einstein relations
CO9	To know about the Optic fiber wave guides
Experimental Learning	
EL1	Fiber optic characterisation was studied in lab

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Classical Mechanics and relativity
Course Code	HPHM11
Class	I year (2014-2015)
Semester	Odd
Staff Name	E .Christy Jerin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs / Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To study the mechanics of the particle. .
- To derive the Lagrange's equation.
- To generalise the advantages of Variational principle formulation.
- To derive the Virial theorem.
- To study about the Euler's angle.
- To expose the special theory of relativity.

Syllabus

UNIT I

FUNDAMENTAL PRINCIPLE and LAGRANGIAN FORMULATION:

Mechanics of the particle and a System of the Particles -Constraints. D'Alembert's principle. Lagrange's equation. Velocity dependence force Dissipation functions Application of Lagrange's formulation. Hamilton's principle Lagrange's equation from Hamilton's principle Advantages of Variational principle formulation

Unit II

Reduction of two body problems

Reduction of two body problems into one body and equivalent dimensional problems. Equation of motion of first integral Virial theorem Bertrand's theorem Kepler's problem Scattering in a central force field. Transformation of scattering problems to laboratory coordinates

UNIT III

Rigid body motion Independent coordinates of a rigid body.

Matrix transformation Euler's angle Coriolis force Angular momentum and kinetic energy Principle of least action Hamilton's equation from Variational principle. Small oscillations Normal coordinates Linear tri atomic molecule Forced vibrations

UNIT IV

Hamilton,s formulationCanonical transformation Generating function.

Poisson's brakets. Poisson braket formula tion for equations of motion. Hamilton's Jacobi theory. Harmonic oscillator Problems. Hamilton's characteristic function. Seperation of variables Action angle variables.

UNIT V

Mechanics of small oscillations:

The special theory of relativity. Lorentz transformation. Four dimensional formulation. Relativistic elastic scattering. The Lagrangian and Hamiltonian of a relativistic particle.

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2014
1-L1	Mechanics of the particle.
2-L2	System of the Particles ,Constraints.
3- L3	D'Alembert's principle.
4-L4	Lagrange's equation.
5-L5	Velocity dependence force
6-L6	Dissipation functions.
7-L7	Application of Lagrange's formulation.
8- P1	**Welcoming of First year and Inauguration of Mathematics Association**
9- L8	Hamilton's principle.
10- L9	Lagrange's equation from Hamilton's principle.
11-L10	Advantages of Variational principle formulation.
12-L11	Reduction of two body problems into one body and equivalent dimensional

	problems.
13-L12	Equation of motion of first integral.
14-L13	Virial theorem.
15-L14	Bertrand’s theorem.
16-L15	Kepler’s problem.
17- L16	Scattering in a central force field.
18- L17	Transformation of scattering problems to laboratory coordinates.
19- L18	Transformation of scattering problems to laboratory coordinates
20- L19	Kepler’s problem.
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (30.07.2014)
22- L21	Rigid body motion.
23- IT-1	**Internal Test-I**
24- L22	Independent coordinates of a rigid body.
25- L23	Matrix transformation
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Matrix transformation.
28- L26	Euler’s angle
29- L27	Euler’s angle
30- P2	**College level meeting/Cell function**
31-L28	Coriolis force
32-L29	Coriolis force
33-L30	Angular momentum and kinetic energy
34- L31	Angular momentum and kinetic energy.
35- L32	Principle of least action
36- L33	Hamilton’s equation from Variational principle.
37- L34	Small oscillations.
38-L35	Normal coordinates
39- L36	Linear tri atomic molecule
40- L37	Forced vibrations.
41- L38	Canonical transformation
42-P3	**Department Seminar**
43- L39	Generating function.
44- L40	Poisson’s brakets.
45- L41	Poisson braket formulation for equations of motion.
46- L42	Hamilton’s Jacobi theory.
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins (18.08.2014)
48- L44	Harmonic oscillator Problems.
49-IT-II	**Internal Test-II**
50-L45	Hamilton’s characteristic function.
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Seperation of variables.
53- L48	Action angle variables.
54- L49	The special theory of relativity.
55- L50	The special theory of relativity.

56- L51	Lorentz transformation.
57- L52	Lorentz transformation.
58- L53	Four dimensional formulation.
59-P4	**College level meeting/ function**
60- L54	Relativistic elastic scattering.
61- L55	Relativistic elastic scattering
62- L56	The Lagrangian and Hamiltonian of a relativistic particle
63- L57	The Lagrangian and Hamiltonian of a relativistic particle
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins (15.09.2014)
65- L59	Covariant formulation
66- L60	Covariant formulation
67-IT-III	**Internal Test-III**
68- L61	Action angle variables
69- L62	Seperation of variables
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (24.102014)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2014

Course Outcomes

Learning Outcomes	**COs** of the course **"Classical Mechanics and relativity"**
CO1	Explain the D'Alembert's principle.
CO2	Determine the scattering in a central force field.
CO3	Deduce Euler's equation.
CO4	Generalise the canonical transformation.
CO5	Determine the action angle variables.
CO6	Derive Euler angle.
CO7	Describe abut small oscillations.
CO8	Derive poisson bracket.
CO9	Describe Hamilton's Jacobi theory.

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Mathematical physics I
Course Code	HPHM12
Class	I year (2014-2015)
Semester	Odd
Staff Name	J. Ruby Jemima
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To acquire the knowledge about the vector analysis.
- To identify the eigen value /eigen vector of the matrix. .
- To study the differentiation and integration of matrices.
- To derive the polynomials.
- To calculate the laplace integral transform.
- To explain the convolution theorm.
- To calculate the Fourier integral transform.

Syllabus

UNIT I

Gauss

Gauss divergence theorem. Deduction from Gauss divergence theorem. Green's theorem. Green's theorem in a plane. Classification of vector fields

UNIT II

Eigen values,Eigen vectors

Eigen values,Eigen vectors . Charecteristic equation of matrix. Cayley Hamilton theorem. Some Important theorems of eigen value and eigen vectors Diagonalisation of matrices Differentiation and integration of matrices. Power of matrices. Exponential of a matrix Matrices in physics

UNIT III

Bessel 's function

Bessel differential equation Bessel 's function of I kind Generating function Recurrence relations Laguarre's differential equation. Laguerie polynomial. Generating function Recurrence relations

UNIT IV

Fourier's transform

Introduction Fourier's transform(FT) Properities of FT-FT of a derivative Fourier sin and cosine transforms of derivatives FT of function of function of two or three variables Finite FT Simple applications of FT

UNIT V

Laplace Transform

Laplace Transform(LT) Properties of LT LT of derivation of a function L T of periodic functions Properties of inverse LT LT of derivation of a function L T of periodic functions Properties of inverse LT Convolution theorem Evaluation of inverse LT by convolution theorem Application of LT

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2014
1-L1	Gauss divergence theorem.
2-L2	Deduction from Gauss divergence theorem.
3- L3	Green's theorem.
4-L4	Green's theorem in a plane.
5-L5	Classification of vector fields

6-L6	Eigen values,Eigen vectors.
7-L7	Charecteristic equation of matrix.
8- P1	**Welcoming of First year and Inauguration of Mathematics Association**
9- L8	Cayley Hamilton theorem.
10- L9	Some Important theorems of eigen value and eigen vectors
11-L10	Some important theorems of eigen value and eigen vectors.
	Diagonalisation of matrices
13-L12	Differentiation and integration of matrices.
14-L13	Power of matrices.
15-L14	Exponential of a matrix
16-L15	Matrices in physics
17- L16	Bessel differential equation
18- L17	Bessel ‘s function of I kind
19- L18	Generating function
20- L19	Recurrence relations
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (30.07.2014)
22- L21	Recurrence Relations.
23- IT-1	**Internal Test-I**
24- L22	Laguarre’s differential equation.
25- L23	
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Laguerie polynomial.
28- L26	Generating function
29- L27	Recurrence relations
30- P2	**College level meeting/Cell function**
31-L28	Recurrence relations
32-L29	Recurrence relations.
33-L30	Introduction
34- L31	Fourier’s transform(FT)
35- L32	Properities of FT-FT of a derivative
36- L33	Fourier sin and cosine transforms of derivatives
37- L34	FT of function of function of two or three variables
38-L35	Finite FT
39- L36	Simple applications of FT
40- L37	Laplace Transform(LT)
41- L38	Properties of LT
42-P3	**Department Seminar**
43- L39	LT of derivation of a function
44- L40	L T of periodic functions
45- L41	Properties of inverse LT
46- L42	Convolution theorem
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins (18.08.2014)
48- L44	Evaluation of inverse LT by convolution theorem
49-IT-II	**Internal Test-II**

50-L45	Application of Lt
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Laplace Transform(LT)
53- L48	Properties of LT
54- L49	LT of a function of a function
55- L50	LT of periodic functions
56- L51	Properties of inverse LT
57- L52	Convolution theorem
58- L53	Evaluation of inverse LT by convolution theorem
59-P4	**College level meeting/ function**
60- L54	Application of LT
61- L55	Eigen values: Eigen Vector
62- L56	Characteristic equation of matrix
63- L57	Cayley Hamilton theorem
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins (15.09.2014)
65- L59	Some important theorem
66- L60	Diagonalisation of matrices
67-IT-III	**Internal Test-III**
68- L61	Differentiation and integration of matrices
69- L62	Power of matrices
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (24.10.2014)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2014

Course Outcomes

Learning Outcomes	**COs** of the course **“Mathematical physics I”**
CO1	Explain the classification of vector field.
CO2	Determine the eigen value and eigen vector of the characteristic equation of matrix.
CO3	Design the recurrence relation.
CO4	Determine the fourier transform for a given function
CO5	Explain about the convolution theorem.
CO6	Explain the properities of fourier transform.
CO7	Application of matrix in physics.
CO8	Application of laplace transform.
CO9	Application of fourier transform.

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Electronic device
Course Code	HPHM13
Class	I year (2014-2015)
Semester	Odd
Staff Name	C.Stella Rani
Credits	4
L. Hours /P. Hours	5 / WK
Total 75 Hrs / Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To understand different types of electronic devices and preparation of IC
- To discuss logical families in the digital electronics and study the counters and registers
- To describe the application of operational amplifier in the different field
- To study the various electronics instrumentation through basics of science

Syllabus

Electronic devices

UNIT I

Transistors:

JFET, BJT, MOSFET& MESFET- Structure-working- Derivations of the equations for I-V characteristics under different conditions- High frequency limits.

UNIT II

Photonic devices:

Eradicative and non radiative transitions- Optical absorption- Bulk and thin film- Photoconductive devices(LDR)- diode photodectors- soloar cell-(open circuit voltage and short circuit current, fill factor)- LED (high frequency limit- effect of surface and indirect combination current, operation of LED)- diode lasers(conditions for population inversion in active region, line confinement factor)- Optical gain and threshold current for lasing- Fabry-Perrot cavity length for lasing and the separation.

UNIT III

Memory devices:

Static and dynamic random access memories SRAM and DRAM- CMOS and NMOS- non volatile- NMOS- magnetic- optical and ferroelectric memories- charge cupled(CCD).

UNIT IV

Other electronic devices:

Electro optic- magneto optic and Acousto- Optic effects- material properties related to get these effects- Important Ferro electric, Liquid Crystal and Polymeric materials of these devices- Piezoelectric- Electrostrictive and MagnetostrictiveEfeects- Important exhibiting these properties and their applications in sensors and activated devices. Acoustic Delay lines- Piezoelectric resonators and filters- High frequency piezoelectric devices- Surface acoustic wave devices.

UNIT V

Microwave devices:

Tunnel diode- transfer electron devices- avalanche transit time devices-impatt diodes- parametric devices.

BOOKS FOR STUDY

1. Semiconductor devices- Physics and technology, S.M. Sze, John Wiley& Sons,1985.
2. Introduction to semiconductors devices, M.S. Tyagi, John Wiley and Sons,1991.
3. Measurement, Instrumentation and Experiment design in physics and eengineering, M. Sayer and A. Mansingh, Prentice Hall, India,2000.
4. Optical Electronics, AjoyGhatak and K. Thygarajan, Cambridge Univ. Press, 1989.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2014
1-L1	JFET, BJT
2-L2	MOSFET& MESFET
3- L3	Structure-working
4-L4	Derivations of the equations for I-V characteristics under different conditions
5-L5	High frequency limits.
6-L6	Eradicative and non radiative transitions
7-L7	Optical absorption
8- P1	**Welcoming of First year and Inauguration of Mathematics Association**
9- L8	Bulk and thin film
10- L9	Photoconductive devices(LDR)
11-L10	diode photodectors
12-L11	soloar cell(open circuit voltage and short circuit current, fill factor)
13-L12	LED (high frequency limit effect of surface and indirect combination current operation of LED)
14-L13	diode lasers(conditions for population inversion in active region, line confinement factor)
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (30.07.2014)
16-L15	Optical gain and threshold current for lasing
17-IT-1	**Internal Test-I**
18-L16	Fabry- Perrot cavity length for lasing and the separation.
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Static and dynamic random access memories SRAM and DRAM
21- L19	CMOS and NMOS
22- P2	**College level meeting/Cell function**
23-L20	non volatile
24-L21	NMOS
25-L22	magnetic
26-L23	optical and ferroelectric memories
27-L24	chargecupled(CCD).
28-L25	Electro optic
29-L26	magneto optic and Acousto
30-L27	Optic effects
31-L28	material properties related to get these effects
32-L29	Important Ferro electric
33-L30	Liquid Crystal and Polymeric materials of these devices
34- P3	**Department Seminar**
35-L31	Piezoelectric
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (18.08.2014)
37- L33	Electrostrictive and MagnetostrictiveEfeects- Important exhibiting these properties and their applications in sensors and activated devices.

38- IT-II	**Internal Test-II**
39-L34	Acoustic Delay lines
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Piezoelectric resonators and filters
42- L37	High frequency piezoelectric devices
43- L38	Surface acoustic wave devices.
44- P4	**College level meeting/ function**
45-L39	Tunnel diode
46-L40	transfer electron devices
47-L41	avalanche transit time devices
48-L42	impatt diodes
49-L43	parametric devices.
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (15.09.2014)
51 L45	**Internal Test-III (24.10.2014)**
52- L46	**Internal Test-III**
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2014

Course Outcomes

Learning Outcomes	**COs** of the course **"Electronic device"**
CO1	JFET, BJT
CO2	MOSFET& MESFET
CO3	NMOS
CO4	soloar cell(open circuit voltage and short circuit current, fill factor)
CO5	LED (high frequency limit effect of surface and indirect combination current operation of LED)
CO6	optical and ferroelectric memories
CO7	chargecupled(CCD).
CO8	transfer electron devices
CO9	avalanche transit time devices

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Communication Electronics
Course Code	HPHE22
Class	I year (2014-2015)
Semester	Even
Staff Name	J . RUBY JEMIMA
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To Knows the basic concepts of Communication Electronics
- To Analyses the Synchronization of Communication Electronics
- To Describes the Propagation waves
- To knows the Optical Communication
- To Derive the Kepler's law
- To calculates some problems based on Communication Electronics

Syllabus

UNIT – I

Amplitude Modulation:

Modulation index for AM Frequency spectrum for AM Average power AM transmitter Single side band principles Frequency Modulation Frequency Spectrum FM transmitter Phase Modulation Pulse amplitude modulation Pulse code modulation Pulse Frequency modulation Pulse Time modulation

UNIT II

Synchronization :

Asynchronous Transmission Probability of bit Error in baseband transmission Matched Filter Optimum Terminal Filters Bit time recovery Digital carrier systems Carrier recovery circuits Differential phase shift keying[DPSK] Hard and soft decision decoders

UNIT III

Propagation of waves :

Ground waves Sky wave propagation The ionosphere Space wave troposphere scatter Propagation Extra terrestrial communication

UNIT IV

Optical communication:

Transmission in fiber Losses in fibers , Dispersion Light sources for optics Photo detectors Connectors and splices Fiber optic communication link

UNIT V

Kepler's Laws;

Keplers's I, II,III law Orbits, Geostationary orbits, power system Altitude control, satellite station keeping, Antenna look angels Limits of visibility, Transponders ,Uplink and down power budget calculation Digital carrier transmission

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 03.12.2014
1-L1	Communication electronics and its objectives
2-L2	Amplitude modulation and Modulation index of AM
3- L3	Frequency Spectrum of AM
4-L4	Average power and AM receiver
5-L5	AM transmitter and single side band principles
6-L6	Frequency Modulation and Frequency spectrum
7-L7	Average power and FM transmitter
8- P1	**Welcoming of First year and Inauguration of Mathematics Association**
9- L8	Phase modulation
10- L9	Pulse amplitude modulation

11-L10	Pulse code modulation
12-L11	Pulse frequency modulation
13-L12	Pulse time modulation
14-L13	Introduction to Synchronization
15-L14	Asynchronous Transmission
16-L15	Probability of bit Error in baseband transmission
17- L16	Matched filter
18- L17	Optimum Terminal Filters
19- L18	Bit time recovery
20- L19	Digital carrier systems
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (19.01.2015)
22- L21	Recall the 1st internal syllabus
23- IT-1	**Internal Test-I**
24- L22	Carrier recovery circuits
25- L23	Differential Phase shift keying
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Hard and soft Decision decoders
28- L26	Introduction to Propagation waves
29- L27	Ground waves
30- P2	**College level meeting/Cell function**
31-L28	Sky wave Propagation
32-L29	The ionosphere
33-L30	Space wave troposphere scatter propagation
34- L31	Extra terrestrial communication
35- L32	Recall the Propagation waves
36- L33	Introduction to Optical communication
37- L34	Transmission in Fibers
38-L35	Losses in fibers
39- L36	Description of light sources for fiber optics
40- L37	Photo Detectors
41- L38	Connectors and splices
42-P3	**Department Seminar**
43- L39	Extra Tresstrial communication
44- L40	Transission fibers
45- L41	Fiber optic communication link
46- L42	Carrier recovery units
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins (16.02.2015)
48- L44	Recall the 2nd Internal syllabus
49-IT-II	**Internal Test-II**
50-L45	Losses in Fibers
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Fiber optic communication
53- L48	Introduction to kepler’s laws
54- L49	Kepler’s 1st, 2nd and rd law

55- L50	Introduction to orbits and Geostationary orbits
56- L51	Power systems
57- L52	Altitude control
58- L53	Satellite station keeping
59-P4	**College level meeting/ function**
60- L54	Antenna look angles
61- L55	Limits of visibility
62- L56	Transponders
63- L57	Up link power budget calculation
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins (16.03.2015)
65- L59	Down link power budget calculation
66- L60	Recall 3rd Internal syllabus
67-IT-III	**Internal Test-III**
68- L61	Digital Carrier transmission
69- L62	Multiple Access methods
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (16.04.2015)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2018

Course Outcomes

Learning Outcomes	**COs** of the course **"Communication Electronics"**
CO1	Define Communication Electronics and its objectives
CO2	Derive the pulse modulation and Pulse time modulation
CO3	Know the Concept of synchronization
CO4	Define the propagation waves
CO5	Describe the Optical Communication
CO6	Discriminate the kepler's law
CO7	Calculates the Error in baseband transmission
CO8	Evaluate the Fiber optics communication link
CO9	Know the pulse time modulation

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# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

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St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Mathematical physics II
Course Code	HPHM21
Class	I year (2014-2015)
Semester	Even
Staff Name	E .Christy Jerin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To introduce the special type of matrices. .
- To derive Cayley – hamilton theorem.
- To derive Cauchy's theorem.
- To derive Taylor' s theorem.
- To study the Polynomials.
- To import the knowledge of fourier transform.
- To apply then laplace transform into the electrical circuits.

Syllabus

UNIT 1

Matrices:

Introduction – special types of matrices Transpose – Conjugate – transposed conjugate Symmetric and antisymmetric matrices Hermitian and skew Hermitian matrices Determinant – Adjoint Orthogonal and unitary matrices Orthogonal and unitary matrices Eigen values and eigen vectors of the matrix Characteristic equation of a matrix – Cayley Hamilton theorem

UNIT II

Complex variables:

Analytical functions – Cauchy Riemann Conditions Line integrals – Cauchy's theorem – Cauchy's integral formula Derivatives of analytical functions – Power series Taylor's theorem – Laurent's theorem Calculus of residues Evaluation of definite integrals of cos Θ and sin Θ Certain improper real integers.

UNIT III

Bessel function

Bessel function of first kind. Generating function Recurrence relations. Jn (x) as solution of Bessel differential equation. Expansion of Jn (x) where n is half and odd integer Integral representation Laguerre's differential equation and Laguerre polynomials Generating function Rodrigue's formula Recurrence relations Orthogonal property of lauguerre polynomials Associated laugurre polynomials

UNIT IV

Fourier transform

Introduction-Fourier transform Properities of fourier transfom Fourier transform of a derivative Fourier sine and cosine transform of derivatives. Laplace transform (LT) Properities of LT LT of derivative and integral of a function LT of periodic function Inverse of LT Properities of inverse LT Application of LT to electrical circuits

UNIT V

Numerical Integration

Introduction –numerical integration. Trapezoidal rule Simpson's rule Solution of ordinary differential equations of first order. Euler's method. Modified Euler's method Taylor series method. Runge kutta method Approximate solution of algebraic and transcendental equations Newton raphson method Method of iteration Monte-carlo technique Simpson's rule Solution of ordinary differential equations of first order.

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 3.12.2014
1-L1	Matrices: Introduction – special types of matrices
2-L2	Transpose – Conjugate – transposed conjugate
3- L3	Symmetric and antisymmetric matrices
4-L4	Hermitian and skew Hermitian matrices

5-L5	Determinant – Adjoint
6-L6	Orthogonal and unitary matrices
7-L7	Orthogonal and unitary matrices
8- P1	**Welcoming of First year and Inauguration of Mathematics Association**
9- L8	Eigen values and eigen vectors of the matrix
10- L9	Characteristic equation of a matrix – Cayley Hamilton theorem
11-L10	Complex variables: Analytical functions – Cauchy Riemann Conditions
12-L11	Line integrals – Cauchy's theorem – Cauchy's integral formula
13-L12	Derivatives of analytical functions – Power series
14-L13	Taylor's theorem – Laurent's theorem
15-L14	Calculus of residues.
16-L15	Evaluation of definite integrals of cos Θ and sin Θ
17- L16	Certain improper real integers.
18- L17	Bessel function of first kind.
19- L18	Generating function.
20- L19	Recurrence relations.
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (19.01.2015)
22- L21	Jn (x) as solution of Bessel differential equation.
23- IT-1	**Internal Test-I**
24- L22	Expansion of Jn (x) where n is half and odd integer.
25- L23	Integral representation
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Laguerre's differential equation and Laguerre polynomials
28- L26	Generating function
29- L27	Rodrigue's formula
30- P2	**College level meeting/Cell function**
31-L28	Recurrence relations.
32-L29	Orthogonal property of lauguerre polynomials.
33-L30	Associated laugurre polynomials.
34- L31	Introduction-Fourier transform.
35- L32	Properities of fourier transfom.
36- L33	Fourier transform of a derivative.
37- L34	Fourier sine and cosine transform of derivatives.
38-L35	Laplace transform (LT)
39- L36	Properities of LT
40- L37	LT of derivative and integral of a function
41- L38	LT of periodic function.
42-P3	**Department Seminar**
43- L39	Inverse of LT
44- L40	Properities of inverse LT
45- L41	Application of LT to electrical circuits
46- L42	Introduction –numerical integration.
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins (16.02.2015)
48- L44	Trapezoidal rule
49-IT-II	**Internal Test-II**

50-L45	Simpson's rule
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Solution of ordinary differential equations of first order.
53- L48	Euler's method.
54- L49	Modified Euler's method
55- L50	Taylor series method.
56- L51	Runge kutta method.
57- L52	Approximate solution of algebraic and transcendental equations.
58- L53	Newton raphson method.
59-P4	**College level meeting/ function**
60- L54	Method of iteration
61- L55	Monte-carlo technique
62- L56	Simpson's rule
63- L57	Solution of ordinary differential equations of first order.
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins (16.03.2015)
65- L59	Modified Euler's method
66- L60	Runge kutta method.
67-IT-III	**Internal Test-III**
68- L61	Approximate solution of algebraic and transcendental equations
69- L62	Monte-carlo technique
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (16.04.2015)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.4.2015

Course Outcomes

Learning Outcomes	**COs** of the course **"Mathematical physics II"**
CO1	Introduction about types of matrices.
CO2	Find the eigen value and eigen vectors of the matrix.
CO3	Derive the Cauchy's integral formula.
CO4	Derive the recurrence relations.
CO5	Study about the laplace transform.
CO6	Find roots of the equation using Newton raphson method.
CO7	Solve the differential equation using Euler's method.
CO8	Solve the numerical integration using sympson's rule.
CO9	Introduction of Monte-carlo method

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Solid State Physics
Course Code	HPHM22
Class	I year (2014-2015)
Semester	Even
Staff Name	C.Stella Rani
Credits	4
L. Hours /P. Hours	5 / WK
Total 75 Hrs / Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To understand Bravis lattice
- To discuss Brillouine zone
- To explain Crystal binding and study
- To describe Dulong and petits law
- Explain types of super conductors
- To Discuss about electronic devices

Syllabus

SOLID STATE PHYSICS

UNIT I:

CRYSTAL STRUCTURE AND DIFFRACTION

Recapitulation of basic concepts- crystal systems- Bravais Lattice- Miller indices-symmetry elements- symmetry groups- simple crystal structures (sodium chloride, cesium chloride, diamond and zincblende structures) Bragg's law- Laue equations- reciprocal lattice- Brillouine zones- atomic scattering factor- geometrical structure factor- experimental methods of structure analysis (the laue, rotating crystal and powder methods)

UNIT II:

CRYSTAL BINDING AND ELASTIC PROPERTIES OF SOLIDS

Crystal bindings: Ionic bond- covalent bond- molecular bond- Hydrogen bondmetallic bond-Vanderwaal's bond-Binding energy of crystals- polaron Elastic properties: Stress components-displacement and strain components- elastic compliances and stiffness constants- relation between elastic compliances and stiffness constants -elastic constants for cubic isotropic crystals-elastic waves-experimental determination of elastic constants

UNIT III:

LATTICE DYNAMICS AND THERMAL PROPERTIES

Lattice dynamics: Concept of phonons- momentum of phonons- normal and Umklapp process-vibrations of one dimensional monoatomic and diatomic linear lattices- inelastic scattering of neutrons by phonons Thermal properties: Theories of specific heat- Dulong and Petit's law- Einstein theory and Debye's theory- Widemann Franz law

UNIT IV:

ELECTRONIC PROPERTIES OF SOLIDS

Free electron gas model in three dimensions: Density of states- Fermi energyEffect of temperature- heat capacity of electrons- experimental heat capacity of metalsthermal effective mass-electrical conductivity and ohm's law- Hall effect- failure of the free electron gas Band theory of solids-periodic potential and Bloch's theorem- KronigPenny model-wave equation of electron in a periodic potential- periodic, extended and reduced zone schemes of energy representation- number of orbitals in an energy bandclassification of metals, semi conductors and insulators- tight binding method and its applications to FC and BCC structures.

UNIT V:

SUPER CONDUCTIVITY

Experimental survey: Superconductivity and its occurrence- destruction of superconductivity by magnetic field- Meissner effect- Type I and II super conductorsentropy- free energy- heat capacity-energy gap- isotope effect Theoretical survey: Thermodynamics of the superconducting transition-London equation- coherence length- salient features of the BCS theory of super conductivity- flux quantization in a superconductivity ring- DC and AC Josephson effects

Books for Study and Reference

1. Introduction to Solid State Physics - 7 The edition - by Charles kittel
2. Solid State Physics by Neil W Ashroff and N.DavidMermin
3. Solid State Physics by S.L. Kakani and C. Hemarajani
4. Elementary Solid State Physics by M. Ali Omar

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on3.12.2014
1-L1	Recapitulation of basic concepts
2-L2	Crystal systems, Bravais Lattice
3- L3	Miller indices
4-L4	Symmetry elements, Symmetry groups
5-L5	simple crystal structures (sodium chloride, cesium chloride, diamond and zincblende structures)
6-L6	Bragg's law,Laue equations
7-L7	reciprocal lattice,Brillouine zones
8- P1	**Welcoming of First year and Inauguration of Mathematics Association**
9- L8	atomic scattering factor, Geometrical structure factor
10- L9	Experimental methods of structure analysis (the laue, rotating crystal and powder methods)
11-L10	Crystal bindings: Ionic bond,covalent bond
12-L11	molecular bond,Hydrogenbondmetallic bond
13-L12	Vanderwaal's bond
14-L13	Binding energy of crystals
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (19.01.2015)
16-L15	polaron Elastic properties: Stress components
17-IT-1	**Internal Test-I**
18-L16	displacement and strain components
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	elastic compliances and stiffness constants
21- L19	relation between elastic compliances and stiffness constants
22- P2	**College level meeting/Cell function**
23-L20	elastic constants for cubic isotropic crystals
24-L21	elastic waves
25-L22	experimental determination of elastic constants
26-L23	Lattice dynamics: Concept of phonons
27-L24	momentum of phonons
28-L25	normal and Umklapp process
29-L26	vibrations of one dimensional monoatomic and diatomic linear lattices
30-L27	inelastic scattering of neutrons by phonons Thermal properties: Theories of specific heat
31-L28	Dulong and Petit's law Einstein theory and Debye's theory,Widemann Franz law
32-L29	Free electron gas model in three dimensions: Density of states, Fermi energyEffect of temperature
33-L30	heat capacity of electrons, experimental heat capacity of metalsthermal effective mass

34- P3	electrical conductivity and ohm's law, Hall effect-
35-L31	failure of the free electron gas Band theory of solids
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (16.02.2015)
37- L33	periodic potential and Bloch's theorem, KronigPenny model
38- IT-II	**Internal Test-II**
39-L34	wave equation of electron in a periodic potential
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	periodic, extended and reduced zone schemes of energy representation
42- L37	number of orbitals in an energy bandclassification of metals, semiconductors and insulators
43- L38	tight binding method and its applications to FC and BCC structures.
44- P4	**College level meeting/ function**
45-L39	Experimental survey: Superconductivity and its occurrence, destruction of superconductivity by magnetic field
46-L40	Meissner effect, Type I and II super conductors entropy,
47-L41	free energy,heat capacity ,energy gap, isotope effect
48-L42	Theoretical survey: Thermodynamics of the superconducting transition
49-L43	London equation, coherence length
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (16.03.2015)
51 L45	salient features of the BCS theory of super conductivity
52- L46	flux quantization in a superconductivity ring,DC and AC Josephson effects
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (16.04.2015)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.4.2015

Course Outcomes

Learning Outcomes	**COs** of the course "**Solid State Physics"**
CO1	elastic waves
CO2	experimental determination of elastic constants
CO3	Lattice dynamics: Concept of phonons
CO4	elastic compliances and stiffness constants

CO5	relation between elastic compliances and stiffness constants
CO6	tight binding method and its applications to FC and BCC structures.
CO7	wave equation of electron in a periodic potential- periodic, extended and reduced zone schemes of energy representation
CO8	KronigPenny model
CO9	number of orbitals in an energy bandclassification of metals, semiconductors and insulators

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For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

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Extension activity : Motivate student to take classes for school students.

HOD Signature

Staff Signature

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St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Microprocessor and Microcontroller
Course Code	HPHM23
Class	I year (2014-2015)
Semester	Even
Staff Name	C.Stella Rani
Credits	4
L. Hours /P. Hours	5 / WK
Total 75 Hrs / Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- The objective of this course is to become familiar with the architecture and the instruction set of an Intel microprocessor
- Assembly language programming will be studied as well as the design of various types of digital and analog interfaces
- Understand the architecture of 8085 and 8051

Syllabus

Microprocessor and Microcontroller

UNIT I

Evolution and Architecture of Microprocessors 8085& 8086

Evolution of microprocessors-computers and its classifications-INTEL 8085 microprocessor pin out configuration-Pins and their functions-Bus system-control and status signals-externally initiated signals including interrupts-architecture-ALU-Flags-Registers-INTEL 8086 microprocessor-Pins description, Operating modes, Pin description for minimum mode –Operation of8086-Registers,flags,and interrupts of 8086

UNITII

Instruction set of 8085 and assembly language programming

Software-Assembly language-Assembler, Assembler Directives-Instruction set of 8085: Data transfer instructions, Arithmetic instructions, Logical instructions, Branching instructions, Machine control instructions processor cycles- Instruction &machine cycle, Timing diagram& Instruction format – Timing diagram for memory read machine cycle & executing an instruction –addressing modes of 8085A –Assembly language programming using 8085A- Sequence , branching and loop programming – Subroutines and ISR

UNIT III

Peripheral interfacing Devices and techniques

Address space- Partitioning, interfacing – Memory and I/O ports: non programmable I/o port INTEL 8212, Programmable peripheral interface INTEL 8255, programmable interval timer INTEL 8253-Data transfers: Types of parallel and serial data transfer schemes – Direct memory Access controller INTEL 8257 – 8085A interrupt system : software & hardware interrupts – interfacing , working and programming of PIC 8259 with 8085

UNIT IV

Programming of 8086 and microcontroller 8051

8086 instructions- Data transfer and arithmetic instructions, addressing modes of INTEL 8086. INTEL 8051: Architecture –Hardware features, registers, I/O ports, External memory, counter and timers, serial I/O, Interrupts. 8051 programming: Instruction set, Addresssing modes, Data transfer, logical, arithmetic operations, jump/call instructions, interrupt handler

UNIT V

Microprocessor system design and applications

Delays- Generation of square waves of pulses- interfacing of 7 – segment LED display – formation of codes for alphanumeric characters – sensors and transducers in physical instruments – Temperature measurements and control – frequency and resistance measurements – Digital clock – DC motor speed control – Traffic control system

BOOKS FOR STUDY

1. Microprocessor architecture, programming and applications with8085, Ramesh S.Gaonkar, III Edition , Penram International publishing 1997
2. Fundamentals of microprocessor and microcomputers, B.Ram, V Edition, DhanpatRai publications (P) Ltd. New Delhi, 2003.
3. The 8051 Microcontroller – Architecture, Programming & Applications, Kenneth J.Ayala, II Edition. Penram International, India, 1996.

BOOKS FOR REFERENCE

1. Microprocessor and its Applications, NagoorKani, RBA publications I edition, Chennai, 2004.
2. Microprocessors and interfacing – Programming and hardware, Dougles. V.Hall, II edition ,MCGraw Hill, India,1999.
3. The 8051 microcontroller and embedded systems, Mohammed Ali Mazidi, Janice Gillispiemazidi, Pearson education, India,2001.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 3.12.2014
1-L1	Evolution of microprocessors,computers and its classifications
2-L2	INTEL 8085 microprocessor pin out configuration, Pins and their functions
3- L3	Bus system, control and status signals
4-L4	externally initiated signals including interrupts, architecture
5-L5	ALU, Flags
6-L6	Registers, INTEL 8086 microprocessor
7-L7	Pins description, Operating modes, Pin description for minimum mode
8- P1	**Welcoming of First year and Inauguration of Mathematics Association**
9- L8	Operation of8086
10- L9	Registers, flags and interrupts of 8086
11-L10	Software, Assembly language
12-L11	Assembler, Assembler Directives
13-L12	Instruction set of 8085: Data transfer instructions, Arithmetic instructions
14-L13	Logical instructions, Branching instructions
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (19.01.2015)
16-L15	Machine control instructions processor cycles
17-IT-1	**Internal Test-I**
18-L16	Instruction &machine cycle, Timing diagram& Instruction format
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Timing diagram for memory read machine cycle & executing an instruction
21- L19	addressing modes of 8085A, Assembly language programming using 8085A
22- P2	**College level meeting/Cell function**
23-L20	Sequence , branching and loop programming, Subroutines and ISR
24-L21	Address space, Partitioning, interfacing
25-L22	Memory and I/O ports: non programmable I/o port INTEL 8212
26-L23	Programmable peripheral interface INTEL 8255
27-L24	programmable interval timer INTEL 8253
28-L25	Data transfers: Types of parallel and serial data transfer schemes
29-L26	Direct memory Access controller INTEL 8257
30-L27	8085A interrupt system : software & hardware interrupts
31-L28	interfacing , working and programming of PIC 8259 with 8085

32-L29	8086 instructions, Data transfer and arithmetic instructions
33-L30	Addressing modes of INTEL 8086, INTEL 8051: Architecture
34- P3	**Department Seminar**
35-L31	Hardware features, registers, I/O ports
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (16.02.2015)
37- L33	External memory, counter and timers, serial I/O, Interrupts
38- IT-II	**Internal Test-II**
39-L34	8051 programming: Instruction set, Addresssing modes, Data transfer
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	logical, arithmetic operations
42- L37	jump/call instructions, interrupt handler
43- L38	Delays
44- P4	**College level meeting/ function**
45-L39	Generation of square waves of pulses- interfacing of 7
46-L40	segment LED display
47-L41	formation of codes for alphanumeric characters
48-L42	sensors and transducers in physical instruments
49-L43	Temperature measurements and control
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (16.03.2015)
51 L45	frequency and resistance measurements, Digital clock
52- L46	DC motor speed control , Traffic control system
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (16.04.2015)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.4.2015

Course Outcomes

Learning Outcomes	**COs** of the course **"Microprocessor and Microcontroller"**
CO1	Design and implement programs on 8086, ARM, PIC.
CO2	Design I/O circuit.
CO3	The program prepares students to successfully compete for employment in Electronics, Manufacturing and Embedded fields
CO4	Design Memory Interfacing circuits
CO5	Design and implement 8051 microcontroller based system
CO6	Describe the architecture and instruction set of ARM microcontroller

CO7	Understand and realize the Interfacing of memory & various I/O devices with 8085 microprocessor
CO8	Understand and classify the instruction set of 8085 microprocessor and distinguish the use of different instructions and apply it in assembly language programming
CO9	Understand the architecture and operation of Programmable Interface Devices and realize the programming & interfacing of it with 8085 microprocessor
Experimental Learning	
EL1	Microprocessor kits and data acquisition cards DC Power Supplies
EL2	Microcontroller Programmer
EL3	Universal Programmer
EL4	Universal IC Tester
Integrated Activity	
IA1	The program prepares students to successfully compete for employment in Electronics, Manufacturing and Embedded fields
IA2	Design and implement 8051 microcontroller based system

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Quantum Mechanic I
Course Code	HPHM31
Class	I year (2014-2015)
Semester	Odd
Staff Name	E .Christy Jerin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To develop the schrodinger wave equation. .
- To derive Ehrenfest theorem.
- To find energy eigen value of square well potential.
- To discuss the postulates of quantum mechanics.
- To derive the energy eigen value of harmonic oscillator.
- To discuss about scattering.
- To find scattering cross section of rigid sphere.

Syllabus

UNIT 1

Development of wave equation Travelling harmonic waves

The one dimensional wave equation Interpretation of the wave function Normalization Probability current density Expectation values Ehrenfest’s theorem Energy Eigen functions One dimensional square well potential

UNIT II

Interpretative postulates and energy eigen functions

Motion of a free wave packet in one dimension Discrete Eigen values(bound states) Linear Harmonic oscillator Spherically symmetric potential in three dimension

UNIT III

Dimensional square potential

One dimensional square potential barrier Scattering coefficients Collisions in three dimensions Scattering cross sections Asymmetric behavior Scattering by spherically symmetric potentials Scattering by a perfect rigid sphere Scattering by a square well potential

UNIT IV

Transformation theory

Transformation theory Transformation of Hamiltonian with U Transformation of Hamiltonian with V Dirac's bra and ket notation Equations of motion Matrix theory of the linear harmonic oscillator

UNIT V

Rotational angular momentum and unitary groups.

Proper rotation group Infinitesimal rotations. Spin of vector particle Commutation relation for the generators Choice of representation Angular momentum matric Combination of angular momentum states And tensor operations Clebsch gordan coefficients Combination of angular momentum states Spin of vector paricle Commutation relation for the generators Dirac's bra ket notation Equation of motion.

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2014
1-L1	Development of wave equation
2-L2	Travelling harmonic waves
3- L3	The one dimensional wave equation
4-L4	Interpretation of the wave function
5-L5	Normalization
6-L6	Probability current density
7-L7	Expectation values
8- P1	**Welcoming of First year and Inauguration of Mathematics Association**

9- L8	Ehrenfest's theorem
10- L9	Energy Eigen functions
11-L10	One dimensional square well potential
12-L11	Interpretative postulates and energy eigen functions
13-L12	Motion of a free wave packet in one dimension
14-L13	Discrete Eigen values(bound states)
15-L14	Linear Harmonic oscillator
16-L15	Spherically symmetric potential in three dimension
17- L16	One dimensional square potential barrier
18- L17	Scattering coefficients
19- L18	Collisions in three dimensions
20- L19	Scattering cross sections
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (30.07.2014)
22- L21	Asymmetric behaviour
23- IT-1	**Internal Test-I**
24- L22	Scattering by spherically symmetric potentials
25- L23	Scattering by a perfect rigid sphere
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Scattering by a square well potential
28- L26	Scattering by a square well potential
29- L27	Transformation theory
30- P2	**College level meeting/Cell function**
31-L28	Transformation theory
32-L29	Transformation of Hamiltonian with U
33-L30	Transformation of Hamiltonian with U
34- L31	Transformation of Hamiltonian with V
35- L32	Transformation of Hamiltonian with V
36- L33	Dirac's bra and ket notation
37- L34	Dirac's bra and ket notation
38-L35	Equations of motion
39- L36	Equations of motion
40- L37	Matrix theory of the linear harmonic oscillator
41- L38	Matrix theory of the linear harmonic oscillator
42-P3	**Department Seminar**
43- L39	Rotational angular momentum and unitary groups.
44- L40	Rotational angular momentum and unitary groups.
45- L41	Proper rotation group.
46- L42	Proper rotation group.
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins (18.08.2014)
48- L44	Infinitesimal rotations.
49-IT-II	**Internal Test-II**
50-L45	Spin of vector particle.
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Commutation relation for the generators.

53- L48	Choice of representation.
54- L49	Angular momentum matrices.
55- L50	Angular momentum matrices.
56- L51	Combination of angular momentum states
57- L52	And tensor operations.
58- L53	Clebsch gordan coefficients.
59-P4	**College level meeting/ function**
60- L54	Clebsch gordan coefficients.
61- L55	Combination of angular momentum states
62- L56	Spin of vector paricle.
63- L57	
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins (15.09.2014)
65- L59	Commutation relation for the generators
66- L60	Dirac's bra ket notation.
67-IT-III	**Internal Test-III**
68- L61	Equation of motion
69- L62	Equation of motion
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (24.10.2014)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2014

Course Outcomes

Learning Outcomes	**COs** of the course **"Quantum Mechanic I"**
CO1	Develop the wave equation.
CO2	Derive Ehrenfest theorem.
CO3	Derive eigen value of square well potential.
CO4	Derive the eigen value of harmonic oscillator.
CO5	Calculate the scattering cross section for square well potential
CO6	Derive the energy eigen value of harmonic oscillator using matrix theory.
CO7	Derive C.G coefficients.
CO8	Discuss about the choice of representation.
CO9	Discuss about the rotational groups

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature　　　　　　　　　　　　　　　　　　　　Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Electromagnetic theory
Course Code	HPHM22
Class	I year (2014-2015)
Semester	Even
Staff Name	E. Christy jerin
Credits	4
L. Hours /P. Hours	4 / WK

Total 60Hrs/Sem
Internal Test-3 Hrs
Model Test-3 Hrs
Dept. Meetings-2 Hrs
College Meetings-2 Hrs
Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)

Course Objectives

- To expose the students to the ideas of fundamental laws.
- To identify formulate and solve fields and electromagnetic wave propagation.
- To study the importance of the Boundary conditions.
- To derive the Reflection and transmission of the Electromagnetic wave.
- To calculate the electric and magnetic dipole radiation.
- To acquire the knowledge of Electromagnetic wave propagation.

Syllabus

UNIT I

Coulomb's Law-Derivation Gauss law in differential and Integral form.

Gauss law in differential and Integral form. Poisson's equation and Laplace's equation. Work done to move a point charge. Energy of a point charge and continuous charge distribution. Electric field in dielectric materials. Induced dipoles and polarizability. Connection between polarizability and susceptibility.

UNIT II

Lorentz force law.

Biot-Savart law and ampere law - Magnetic vector potential- Expansion of vector potential - Effect of a magnetic field on atomic orbits- Bound current and its physical interpretations- Ampere's law in magnetic material- Dia , para , Ferro Magnetism. Magnetic susceptibility and permeability in linear and non linear media

UNIT III

Electrodynamics Electromagnetic

Induction- Faraday law- Maxwell's equation differential and integral form. Boundary conditions on field vectors D,E,B and H Scalar and vector potential. Gauge transformations. Lorentz and coulomb gauge. Pointing vector and pointing theorem. Maxwell's stress tensor. Conservation of momentum.

UNIT IV

Wave equation

The wave equation for A and B-Mono chromatic plane waves Reflection and transmission at normal Incidence Reflection and transmission at oblique Incidence. EM waves in conductor wave guide. The coaxial transmission line.

UNIT V

Retarded Potential.

Lenard – wiechart potential. Electric dipole radiation. Magnetic dipole radiation. And derivation. Larmour formula definition. And derivation. Abraham Lorentz formula for the radiation reaction. Physical origin of radiation reaction

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 18.06.2014
1-L1	Coulomb's Law-Derivation.
2-L2	Gauss law in differential and Integral form.
3- L3	Gauss law in differential and Integral form.
4-L4	Poisson's equation and Laplace's equation.
5-L5	Work done to move a point charge.
6-L6	Energy of a point charge and continuous charge distribution.
7-L7	Energy of a point charge and continuous charge distribution.
8- P1	**Welcoming of First year and Inauguration of Mathematics Association**
9- L8	Electric field in dielectric materials.
10- L9	Induced dipoles and polarizability.
11-L10	Connection between polarizability and susceptibility.

12-L11	Connection between polarizability and susceptibility.
13-L12	Lorentz force law.
14-L13	Biot-Savart law
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (30.07.2014)
16-L15	Magnetic vector potential.
17-IT-1	**Internal Test-I**
18-L16	Effect of a magnetic field on atomic orbits.
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Dia , para , Ferro Magnetism.
21- L19	Magnetic susceptibility and permeability.
22- P2	**College level meeting/Cell function**
23-L20	Maxwell’s equation differential and integral form.
24-L21	Maxwell’s equation differential and integral form.
25-L22	Boundary conditions on field vectors
26-L23	D,E,B and H
27-L24	Scalar and vector potential.
28-L25	Gauge transformations.
29-L26	Lorentz and coulomb gauge.
30-L27	Pointing vector and pointing theorem.
31-L28	Maxwell’s stress tensor.
32-L29	Conservation of momentum.
33-L30	Mono chromatic plane waves
34- P3	**Department Seminar**
35-L31	Reflection and transmission at normal Incidence.
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (18.08.2014)
37- L33	Reflection and transmission at oblique Incidence.
38- IT-II	**Internal Test-II**
39-L34	EM waves in conductor wave guide.
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	The coaxial transmission line.
42- L37	Retarded Potential.
43- L38	Lenard – wiechart potential.
44- P4	**College level meeting/ function**
45-L39	Electric dipole radiation.
46-L40	Magnetic dipole radiation.
47-L41	And derivation.
48-L42	Larmour formula definition.
49-L43	And derivation.
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (15.09.2014)
51 L45	Abraham Lorentz formula for the radiation reaction.
52- L46	Physical origin of radiation reaction.
53-IT-III	**Internal Test-III**
54-L47	

55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (24.10.2014)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2014

Course Outcomes

Learning Outcomes	**COs** of the course **"Electromagnetic theory"**
CO1	Explain the fundamental laws governing electromagnetic fields.
CO2	Determine the electromagnetic force exerted on charged particles, current elements, working priniciple of various electric and EMT conversion devices are based on this force.
CO3	Design maxwell's equation and Boundary condition.
CO4	Deduce the Reflection and Transmission wave equation
CO5	Derive the Pointing Theorem.
CO6	Design Larmour formula.
CO7	Reduce the gauge transformation .
CO8	Calculate magnetic vector potential
CO9	To derive the basic laws.

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HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Statistical Mechanics
Course Code	HPHM33
Class	II year (2014-2015)
Semester	odd
Staff Name	RUBY JEMIMA
Credits	4
L. Hours /P. Hours	5 / WK
Total 75 Hrs / Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To import the knowledge about fundamentals of statistical mechanics.
- To study about the Ensembles.
- To derive the expression for Sackur - Tetrode equation.
- To define Helmholtz free energy.
- To analysis the Chemical equilibrium and saha ionisation formula.
- To import the knowledge about phase transistion.
- To describe the application of density matrices.

Syllabus

Statistical Mechanics

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 probabilityGeneral statistical distribution law-Classical Maxwell-Boltzmann distribution law-Evaluation of constants in the Maxwell Boltzmann distribution law-Maxwell's law of distribution of velocitiesprinciple 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 solidsDebye theory of specific heat of solids-Criticism of Debye's theory-Ideal Bose Einstein GasEnergy 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

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2014
1-L1	Classification of molecules based on moment of inertia
2-L2	Rotational spectra of rigid and non-rigid diatomic molecules
3- L3	Isotopic effect
4-L4	Linear polyatomic molecule
5-L5	Symmetric top molecule
6-L6	Chemical analysis
7-L7	Microwave spectrometer
8- P1	**Welcoming of First year and Inauguration of Mathematics Association**
9- L8	Vibrating diatomic and poly-21atomic molecules
10- L9	Simple harmonic oscillator
11-L10	Anhormonicity
12-L11	Hydrogen bonding
13-L12	Fermi resonance
14-L13	Rotation vibration spectra of polyatomic molecule
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (30.07.2014)
16-L15	Information from IR spectra
17-IT-1	**Internal Test-I**
18-L16	IR spectrometer
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	FTIR
21- L19	Theory of Raman scattering
22- P2	**College level meeting/Cell function**
23-L20	Rotation vibration Raman spectra
24-L21	Mutual exclusion principle
25-L22	Raman spectrometer
26-L23	Polarization of Raman scattered light
27-L24	Structure determination using Raman spectrum
28-L25	Phase transition
29-L26	Reasonance Raman scattering
30-L27	Magnetic properties of nuclei
31-L28	Relaxation time
32-L29	Chemical shift
33-L30	Application to molecular structure
34- P3	**Department Seminar**
35-L31	Bloch equation
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (18.08.2014)
37- L33	NMR instrumentation
38- IT-II	**Internal Test-II**
39-L34	NMR imaging
40-L35	**Test Paper distribution and result analysis**

	Entering Internal Test-II Marks into University portal
41-L36	ESR theory and hyperfine structure ESR spectra of hydrogen atom and anisotropic systems
42- L37	Crystal defects and biological studies
43- L38	ESR spectrometer
44- P4	**College level meeting/ function**
45-L39	Electron Energy Loss Spectroscopy EELS
46-L40	Reflection
47-L41	Absorption IR spectroscopy RAIRS
48-L42	Surface Enhanced Raman Scattering SERS
49-L43	Inelastic Helium Scattering
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (15.09.2014)
51 L45	X Ray Photoelectron Spectroscopy XEPS
52- L46	
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (24.10.2014)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2014

Course Outcomes

Learning Outcomes	**COs** of the course **"Statistical Mechanics"**
CO1	Explain the ensembles.
CO2	Calculation of entrophy of ideal gas.
CO3	Derive Quantum Lioville's theorem.
CO4	Illustrate Identical particle.
CO5	Calculation of exponent from mean field theory.
CO6	Calculation of chemical equilibrium.
CO7	Derive the Saha ionisation formula.
CO8	Describe the mean field theory.
CO9	Explain about Iising model

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Quantum Mechanics II
Course Code	HPHM41
Class	I year (2014-2015)
Semester	Even
Staff Name	E.Christy Jerin
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To introduce Pertubation theory
- To derive the dirac equation
- To explain orbital angular momentum
- To explain transition probablity

Syllabus

UNIT I

Orbital angular momentum Eigen pairs

Orbital angular momentum Eigen pairs of L2 and Lz Properties of components of L and L 2 Matrix representation of L2 , Lz and L± spin state of an electron spin orbit coupling Addition of angular momenta

UNIT II

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

UNIT III

Time Dependent Perturbation Theory

Introduction Transition probability constant perturbation Harmonic perturbation adiabatic perturbation sudden approximation Semi classical theory of radiation calculation of Einstein coefficients

UNIT IV

Classical scattering cross section

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

UNIT V

Klein – Gordon equation Dirac equation

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.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 3.12.2014
1-L1	Orbital angular momentum
2-L2	Eigen pairs of L2 and Lz
3- L3	Properties of components of L and L 2
4-L4	Matrix representation of L2 , Lz and L±
5-L5	spin state of an electron
6-L6	spin orbit coupling
7-L7	Addition of angular momenta
8- P1	**Welcoming of First year and Inauguration of Mathematics Association**
9- L8	Time Independent Perturbation Theory: Introduction- Theory for non-degenerate case
10- L9	Application to non-degenerate levels
11-L10	Theory for degenerate levels
12-L11	First order Stark effect in Hydrogen atom
13-L12	Time Dependent Perturbation Theory: Introduction
14-L13	Transition probability
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (19.01.2015)
16-L15	constant perturbation
17-IT-1	**Internal Test-I**
18-L16	Harmonic perturbation
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal

20-L18	adiabatic perturbation
21- L19	sudden approximation
22- P2	**College level meeting/Cell function**
23-L20	Semi classical theory of radiation
24-L21	calculation of Einstein coefficients
25-L22	Classical scattering cross section
26-L23	Centre of mass and laboratory co-ordinate systems
27-L24	Scattering amplitude
28-L25	Green’s function approach
29-L26	Born approximation
30-L27	Partial wave analysis
31-L28	Scattering form a square well system
32-L29	Scattering form a square well system
33-L30	Klein – Gordon equation
34- P3	**Department Seminar**
35-L31	Klein – Gordon equation
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (16.02.2015)
37- L33	Dirac equation for a free particle
38- IT-II	**Internal Test-II**
39-L34	Dirac equation for a free particle
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Spin of a Dirac particle
42- L37	Spin of a Dirac particle
43- L38	Particle in a potential
44- P4	**College level meeting/ function**
45-L39	Relativistic particle in a box
46-L40	Relativistic hydrogen atom
47-L41	Relativistic hydrogen atom
48-L42	Electron in a field
49-L43	Electron in a field
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (16.03.2015)
51 L45	Electron in a field
52- L46	Electron in a field
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (16.04.2015)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.4.2015

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2014-20150

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Molecular spectroscopy
Course Code	HPHM42
Class	I year (2014-2015)
Semester	Even
Staff Name	E.Christy Jerin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To develop the knowledge of molecular spectroscopy. .
- To classify the molecules .
- To discuss the isotope effect in rotational spectra.
- To calculate the vibrational energy of the diatomic molecule.
- To derive the Bloch equation.
- To study about fortrait parabola.

Syllabus

UNIT I

Microwave spectroscopy :

Classification of molecules- Rotational spectra of rigid diatomic molecule - Isotopic effect in rotational spectra –Intensity of rotational lines –Non rigid rotator Linear polyatomic molecule Symmetric molecules Asymmetric molecules. Microwave spectrometer- Information derived from rotational spectra.

UNIT II

Infrared spectroscopy

Vibrational energy of a diatomic molecule-Selection rules- Vibrating diatomic molecule -Diatomic vibrating rotator - Assymetry of vibration -Vibration band- Rotational vibrational spectra of polyatomic- molecule Linear molecules -Symmetric top molecules - Information derived from vibrational spectra

UNIT III

RAMAN SPECTROSCOPY

Theory of raman scattering- Classical theory- Quantum theory- Rotational raman spectra- Linear molecules Symmetric top molecules- Vibrational raman spectra- Raman spectrometer- Hyper raman effect- Classical treatment of hyper raman effect-Stimulated raman effect- Inverse raman scattering- CARS-PARS -Multi photon process

UNIT IV

ELECTRONIC SPECTROSCOPY

Vibrational coarse structure - Vibrational analysis of band system -Deslandres table Progression and sequences- Franck Condon principle -Rotational fine structure of electronic vibrational spectra -The fortrat parabola -Dissociation –PreDissociation- Photoelectron spectroscopy- Principle- instrumentation

UNIT V

NMR,ESR AND NQR:NMR

NMR-Magnetic properities of nuclei- resonance conditions – relaxation process - Bloch equations- Chemical shift –NMR instrumentations,ESR- Principle - ESR spectrometer- Hyperfine structure- ESR spectrum of hydrogen atom-ESR spectra of free radicals in solution .NQR -The Quadrapole nucleus- principle- Transistions for axially symmetric systems -transitions for non axially symmetric systems- NQR instrumentations.

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 3.12.2014
1-L1	Classification of molecules.
2-L2	Rotational spectra of rigid diatomic molecule.
3- L3	Isotopic effect in rotational spectra.
4-L4	Linear polyatomic molecule.

5-L5	Symmetric molecules.
6-L6	Asymmetric molecules.
7-L7	Microwave spectrometer.
8- P1	**Welcoming of First year and Inauguration of Mathematics Association**
9- L8	Information derived from rotational spectra.
10- L9	Vibrational energy of a diatomic molecule.
11-L10	Selection rules.
12-L11	Vibrating diatomic molecule.
13-L12	Diatomic vibrating rotator.
14-L13	Assymetry of vibration ,Vibration band.
15-L14	Rotational vibratioal spectra of poyatomic molecule.
16-L15	Linear molecules.
17- L16	Symmetric top molecules
18- L17	Information derived from vibrational spectra.
19- L18	Theory of raman scattering.
20- L19	Classical theory.
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (19.01.2015)
22- L21	Quantum theory.
23- IT-1	**Internal Test-I**
24- L22	Rotational raman spectra.
25- L23	Linear molecules.
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Symmetric top molecules.
28- L26	Vibrational raman spectra.
29- L27	Raman spectrometer.
30- P2	**College level meeting/Cell function**
31-L28	Hyper raman effect.
32-L29	Classical treatment of hyper raman effect.
33-L30	Stimulated raman effect.
34- L31	Inverse raman scattering.
35- L32	CARS,PARS
36- L33	Multi photon process.
37- L34	Vibrational ocarse structure.
38-L35	Vibrational analysis of band system.
39- L36	Deslandres table.
40- L37	Progression and sequences.
41- L38	Franck Condon principle.
42-P3	**Department Seminar**
43- L39	Rotational fine structure of electronic vibrational spectra.
44- L40	The fortrat parabola.
45- L41	Dissociation
46- L42	Predissociation.
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins (16.02.2015)
48- L44	Photoelectron spectroscopy.
49-IT-II	**Internal Test-II**

50-L45	Principle- instrumentation.
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	NMR-Magnetic properities of nuclei.
53- L48	Bloch equations.
54- L49	Chemical shift
55- L50	ESR
56- L51	Principle of ESR spectrometer.
57- L52	ESR spectrum of hydrogen atom.
58- L53	Resonance conditions.
59-P4	**College level meeting/ function**
60- L54	NQR-The Quadrapole nucleus.
61- L55	Transistions for axially symmetric systems.
62- L56	NQR instrumentations.
63- L57	Relaxation process.
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins (16.03.2015)
65- L59	ESR spectra of free radicals in solution.
66- L60	NQR Instrmentations.
67-IT-III	**Internal Test-III**
68- L61	NMR Instrumentations.
69- L62	Chemical shift
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (16.04.2015)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.4.2015

Course Outcomes

Learning Outcomes	**COs** of the course **"Molecular spectroscopy"**
CO1	Study about the different type of molecule.
CO2	Discuss the isotope effect
CO3	Derive the raman effect on linear , symmetriv top molecule.
CO4	Explain franck- condon principle.
CO5	Derive resonance condition.
CO6	Explain chemical shift.
CO7	Explain the principle of ESR
CO8	Explain the principle of NQR
CO9	Derive Bloch equation.

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Nuclear and Particle Physics
Course Code	HPHM43
Class	II year (2014-2015)
Semester	Even
Staff Name	C.Stella Rani
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- .To understand about the nuclear forces in the deutron
- To study the nuclear decays
- To understand the nuclear models
- To learn about the nuclear reactions

Syllabus

Nuclear and Particle Physics

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.

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.

Unit III

Nuclear Model

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.

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.

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.

Books For Study:

1. Nuclear Physics, D. C. Tayal, Himalaya Publications
2. . 2. Elements of Nuclear Physics, M. C. Pandia and R. P. S. YadavKedarnath.

Books For Reference:

1. Concepts of Nuclear Physics, Bernard L Cohen, Tata McGraw-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.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 03.12.2014
1-L1	Ground and excited states of deuteron
2-L2	magnetic dipole and electric quadrupole moments of deuteron
3- L3	n-p scattering at low energies
4-L4	shape independent effective range theory of np scattering
5-L5	pp scattering at low energies
6-L6	exchange forces
7-L7	meson theory of nuclear force.
8- P1	**Welcoming of First year and Inauguration of Mathematics Association**
9- L8	Gamow'stheory of alpha decay
10- L9	lineand Continuous spectrum of β decay
11-L10	Fermi theory of beta decay
12-L11	Fermi and Gamow-Teller selection rules
13-L12	parity violation
14-L13	Gamma decay
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (19.01.2015)
16-L15	multipole transitions in nuclei
17-IT-1	**Internal Test-I**
18-L16	selection rules
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	internal conversion
21- L19	nuclear isomerism.
22- P2	**College level meeting/Cell function**
23-L20	Liquid drop model
24-L21	Weizsackers mass formula
25-L22	nuclear stability
26-L23	Bohr Wheeler theory of nuclear fission

27-L24	magic numbers
28-L25	evidence for magic numbers
29-L26	shell model
30-L27	spin orbit coupling
31-L28	angular momenta and parities of nuclear ground states
32-L29	magnetic moments
33-L30	Schmidt line
34- P3	**Department Seminar**
35-L31	collective model.
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (16.02.2015)
37- L33	Types of nuclear reactions
38- IT-II	**Internal Test-II**
39-L34	Q-equation
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	solution of the equation
42- L37	compound nuclear theory
43- L38	reciprocity theorem , nuclear cross section resonance scattering Breit
44- P4	**College level meeting/ function**
45-L39	Wigner dispersion formula nuclear chain reaction , four factor formula.
46-L40	Classification of elementary particles
47-L41	fundamental interactions conservations laws
48-L42	CPT theorem , SU(3) multiplet
49-L43	meson octet – baryon octet and baryon decouplet
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (16.03.2015)
51 L45	Gellmann-Okubo mass formula, Quark theory.
52- L46	
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (16.04.2015)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2015

Course Outcomes

Learning Outcomes	**COs** of the course **“Nuclear and Particle Physics”**
CO1	Fermi theory of Beta decay
CO2	Solution of the equation
CO3	Magnetic dipole and electric quadrupole moments of deuteron
CO4	Fermi and gamow teller selection rules
CO5	Gamma decay
CO6	Multipole transistions in nuclei
CO7	Compound nuclear theory
CO8	Baryon octet and baryon decouplet
CO9	Gellmann – Okubo mass formula

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2015-2016)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Opto Electronics
Course Code	HPHE12
Class	I year (2015-2016)
Semester	Odd
Staff Name	Dr. J. Ruby Jemima
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To expose the students to the ideas of the optoelectronics and lasers
- To study the fundamentals of Light wave
- To acquire the knowledge of Integrated wave guides
- To gain knowledge of about fiber optic communications
- This course gives detailed knowledge of about Optic fiber wave guides
- The applications of Laser and Holography are to be studied.

Syllabus

Unit-I

Light wave fundamentals

Electromagnetic waves- dispersion-pulse distortion-and information rate-polarization- reasonant cavities at plane boundary – critical angle reflections.

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 optic network

Unit-III

Optic fiber wave guides:

Step index fiber – graded index fiber – attenuation in fibers – modes in step index fiber – modes in graded index fiber pulse distortion and information rate in optic fibers – construction of optical fibers.

Unit-IV

Lasers:

Emission and absorption of radiation – Einstein relations – absorption of radiation – population inversion – threshold conditions – laser losses – line shape functions – population inversion and pumping threshold conditions – laser modes – Axial modes – Transverse modes – classes of laser – doped insulator laser – semiconductor laser – gas lasers – liquid gas lasers- single mode operation – frequency stabilation – mode locking – active mode – passive mode locking- Q- switching methods

Unit-V

Holography:

Wavefront reconstruction - linearity of hologralphic process – image formation of holographic process – Gabour hologram – limitations –Recording the hologram – minimum reference angle –holography of three dimensions – practical problems in holography – types of holograms – Fresnel – Fraunhofer- transmission –reflection – rainbow multiplex-embossed and thick holograms – application of holography – holography interferometry – holography computer memories.

Books for study:

4. Fiber Optic communications, Joseph C.Palais, Prentice Hall Publications (unit1-3)
5. Opto electronics, J. Wilson and J.F.B Hawkes, Prentice Hall Publications(unit-4)
6. Introduction to Fourier optics, Joseph W.Goodman, McGraw Hill/ person Education (unit-5)

Reference Books:

1. Photonics Optical Electronics in Modern Communications, Ammon Yariv and Pochi Yeh, Oxford University Press
2. Optical Fibers and Fiber Optic communiation systems, Subir Kumar Sarkar, S. Chand& Co
3. Introduction to Fiber Optics, Ajay Ghatak and K. Thiagarajan, Tata McGraw Hill

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2015
1-L1	Light wave fundamentals: Electromagnetic waves -dispersion
2-L2	Pulse distortion
3- L3	Information rate
4-L4	Polarisation-reasonant cavities at plane boundary
5-L5	Critical angle reflections
6-L6	Integrated wave guides:Dielectric slab guide
7-L7	Modes in the symmetric slab guide
8- P1	**Welcoming of First year and Inauguration of Phycs Association**
9- L8	Modes in the asymmetric slab wave guide
10- L9	Coupling to the wave guide
11-L10	Integrated optic network
12-L11	Optic fiber wave guides: Step index fiber
13-L12	Graded index fiber
14-L13	Attenuation in fibers
15-L14	Modes in step index fiber
16-L15	Modes in graded index fiber pulse distortion and information rate in optic fibers
17- L16	Construction of optical fibers
18- L17	Lasers : Emission and absorption of radiation
19- L18	Einstein relations
20- L19	Absorption of radiation
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (20.07.2015)
22- L21	Population inversion
23- IT-1	**Internal Test-I**
24- L22	Threshold conditions
25- L23	Laser losses
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Line shape functions
28- L26	Population inversion and pumping threshold conditions
29- L27	Laser modes
30- P2	**College level meeting/Cell function**
31-L28	Axial modes
32-L29	Transverse modes
33-L30	Classes of laser

34- L31	Doped insulator laser
35- L32	Semiconductor laser
36- L33	Gas lasers
37- L34	Liquid gas lasers
38-L35	Single mode operation
39- L36	Frequency stabilization
40- L37	Mode locking
41- L38	Active mode
42-P3	**Department Seminar**
43- L39	Passive mode locking-Q-switching methods
44- L40	Holography : Wavefront reconstruction
45- L41	Linearity of holographic process
46- L42	Image formation of holographic process
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins (31.08.2015)
48- L44	Gabour hologram
49-IT-II	**Internal Test-II**
50-L45	Limitations
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Recording the hologram
53- L48	Minimum reference angle
54- L49	Holography of three dimentions
55- L50	Practical problems in holography
56- L51	Types of holograms
57- L52	Fresnel
58- L53	Fraunhofer
59-P4	**College level meeting/ function**
60- L54	Transmission
61- L55	Reflection
62- L56	Rainbow multiplex
63- L57	Embossed and thick holograms
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins (05.10.2015)
65- L59	Application of holography
66- L60	Holography interferometry
67-IT-III	**Internal Test-III**
68- L61	Holography computer memories
69- L62	Revision
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (16.10.2015)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 29.10.2015

Course Outcomes

Learning Outcomes	**COs** of the course **"Opto Electronics"**
CO1	To studied about the Electromagnetic wave dispersion
CO2	To discuss the application of Holography
CO3	To describe the coupling of the wave guide
CO4	To construct the practical problems in Holography
CO5	To learn the Rainbow Multiplex
CO6	To studied about the Reflection and Transmission
CO7	To deduce the threshold conditions
CO8	To define the Einstein relations
CO9	To know about the Optic fiber wave guides
Experimental Learning	
EL1	Fiber optic characterisation was studied in lab

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2015-2016)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Classical Mechanics and relativity
Course Code	HPHM11
Class	I year (2015-2016)
Semester	Odd
Staff Name	E .Christy Jerin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs / Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To study the mechanics of the particle. .
- To derive the Lagrange's equation.
- To generalise the advantages of Variational principle formulation.
- To derive the Virial theorem.
- To study about the Euler's angle.
- To expose the special theory of relativity.

Syllabus

UNIT I

FUNDAMENTAL PRINCIPLE and LAGRANGIAN FORMULATION:

Mechanics of the particle and a System of the Particles -Constraints. D'Alembert's principle. Lagrange's equation. Velocity dependence force Dissipation functions Application of Lagrange's formulation. Hamilton's principle Lagrange's equation from Hamilton's principle Advantages of Variational principle formulation

Unit II

Reduction of two body problems

Reduction of two body problems into one body and equivalent dimensional problems. Equation of motion of first integral Virial theorem Bertrand's theorem Kepler's problem Scattering in a central force field. Transformation of scattering problems to laboratory coordinates

UNIT III

Rigid body motion Independent coordinates of a rigid body.

Matrix transformation Euler's angle Coriolis force Angular momentum and kinetic energy Principle of least action Hamilton's equation from Variational principle. Small oscillations Normal coordinates Linear tri atomic molecule Forced vibrations

UNIT IV

Hamilton,s formulationCanonical transformation Generating function.

Poisson's brakets. Poisson braket formula tion for equations of motion. Hamilton's Jacobi theory. Harmonic oscillator Problems. Hamilton's characteristic function. Seperation of variables Action angle variables.

UNIT V

Mechanics of small oscillations:

The special theory of relativity. Lorentz transformation. Four dimensional formulation. Relativistic elastic scattering. The Lagrangian and Hamiltonian of a relativistic particle.

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2015
1-L1	Mechanics of the particle.
2-L2	System of the Particles ,Constraints.
3- L3	D'Alembert's principle.
4-L4	Lagrange's equation.
5-L5	Velocity dependence force
6-L6	Dissipation functions.
7-L7	Application of Lagrange's formulation.
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Hamilton's principle.
10- L9	Lagrange's equation from Hamilton's principle.
11-L10	Advantages of Variational principle formulation.
12-L11	Reduction of two body problems into one body and equivalent dimensional

	problems.
13-L12	Equation of motion of first integral.
14-L13	Virial theorem.
15-L14	Bertrand’s theorem.
16-L15	Kepler’s problem.
17- L16	Scattering in a central force field.
18- L17	Transformation of scattering problems to laboratory coordinates.
19- L18	Transformation of scattering problems to laboratory coordinates
20- L19	Kepler’s problem.
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (20.07.2015)
22- L21	Rigid body motion.
23- IT-1	**Internal Test-I**
24- L22	Independent coordinates of a rigid body.
25- L23	Matrix transformation
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Matrix transformation.
28- L26	Euler’s angle
29- L27	Euler’s angle
30- P2	**College level meeting/Cell function**
31-L28	Coriolis force
32-L29	Coriolis force
33-L30	Angular momentum and kinetic energy
34- L31	Angular momentum and kinetic energy.
35- L32	Principle of least action
36- L33	Hamilton’s equation from Variational principle.
37- L34	Small oscillations.
38-L35	Normal coordinates
39- L36	Linear tri atomic molecule
40- L37	Forced vibrations.
41- L38	Canonical transformation
42-P3	**Department Seminar**
43- L39	Generating function.
44- L40	Poisson’s brakets.
45- L41	Poisson braket formulation for equations of motion.
46- L42	Hamilton’s Jacobi theory.
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins (31.08.2015)
48- L44	Harmonic oscillator Problems.
49-IT-II	**Internal Test-II**
50-L45	Hamilton’s characteristic function.
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Seperation of variables.
53- L48	Action angle variables.
54- L49	The special theory of relativity.
55- L50	The special theory of relativity.

56- L51	Lorentz transformation.
57- L52	Lorentz transformation.
58- L53	Four dimensional formulation.
59-P4	**College level meeting/ function**
60- L54	Relativistic elastic scattering.
61- L55	Relativistic elastic scattering
62- L56	The Lagrangian and Hamiltonian of a relativistic particle
63- L57	The Lagrangian and Hamiltonian of a relativistic particle
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins (05.10.2015)
65- L59	Covariant formulation
66- L60	Covariant formulation
67-IT-III	**Internal Test-III**
68- L61	Action angle variables
69- L62	Seperation of variables
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (16.10.2015)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 29.10.2015

Course Outcomes

Learning Outcomes	**COs** of the course **"Classical Mechanics and relativity"**
CO1	Explain the D'Alembert's principle.
CO2	Determine the scattering in a central force field.
CO3	Deduce Euler's equation.
CO4	Generalise the canonical transformation.
CO5	Determine the action angle variables.
CO6	Derive Euler angle.
CO7	Describe abut small oscillations.
CO8	Derive poisson bracket.
CO9	Describe Hamilton's Jacobi theory.

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2015-2016)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Mathematical physics I
Course Code	HPHM12
Class	I year (2015-2016)
Semester	Odd
Staff Name	Uma
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To acquire the knowledge about the vector analysis.
- To identify the eigen value /eigen vector of the matrix. .
- To study the differentiation and integration of matrices.
- To derive the polynomials.
- To calculate the laplace integral transform.
- To explain the convolution theorm.
- To calculate the Fourier integral transform.

Syllabus

UNIT I

Gauss divergence theorem.

Deduction from Gauss divergence theorem. Green's theorem. Green's theorem in a plane. Classification of vector fields

UNIT II

Eigen values,Eigen vectors

Charecteristic equation of matrix. Cayley Hamilton theorem. Some Important theorems of eigen value and eigen vectors Diagonalisation of matrices Differentiation and integration of matrices. Power of matrices. Exponential of a matrix Matrices in physics

UNIT III

Bessel differential equation

Bessel differential equation Bessel 's function of I kind Generating function Recurrence relations Laguarre's differential equation. Laguerie polynomial. Generating function Recurrence relations

UNIT IV

Fourier's transform

Introduction Fourier's transform(FT) Properities of FT-FT of a derivative Fourier sin and cosine transforms of derivatives FT of function of function of two or three variables Finite FT Simple applications of FT

UNIT V

Laplace Transform

Laplace Transform(LT) Properties of LT LT of derivation of a function L T of periodic functions Properties of inverse LT LT of derivation of a function L T of periodic functions Properties of inverse LT Convolution theorem Evaluation of inverse LT by convolution theorem Application of LT

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2015
1-L1	Gauss divergence theorem.
2-L2	Deduction from Gauss divergence theorem.
3- L3	Green's theorem.
4-L4	Green's theorem in a plane.
5-L5	Classification of vector fields
6-L6	Eigen values,Eigen vectors.
7-L7	Charecteristic equation of matrix.
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Cayley Hamilton theorem.
10- L9	Some Important theorems of eigen value and eigen vectors

11-L10	Some important theorems of eigen value and eigen vectors.
	Diagonalisation of matrices
13-L12	Differentiation and integration of matrices.
14-L13	Power of matrices.
15-L14	Exponential of a matrix
16-L15	Matrices in physics
17- L16	Bessel differential equation
18- L17	Bessel ‘s function of I kind
19- L18	Generating function
20- L19	Recurrence relations
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (20.07.2015)
22- L21	Recurrence Relations.
23- IT-1	**Internal Test-I**
24- L22	Laguarre’s differential equation.
25- L23	
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Laguerie polynomial.
28- L26	Generating function
29- L27	Recurrence relations
30- P2	**College level meeting/Cell function**
31-L28	Recurrence relations
32-L29	Recurrence relations.
33-L30	Introduction
34- L31	Fourier’s transform(FT)
35- L32	Properities of FT-FT of a derivative
36- L33	Fourier sin and cosine transforms of derivatives
37- L34	FT of function of function of two or three variables
38-L35	Finite FT
39- L36	Simple applications of FT
40- L37	Laplace Transform(LT)
41- L38	Properties of LT
42-P3	**Department Seminar**
43- L39	LT of derivation of a function
44- L40	L T of periodic functions
45- L41	Properties of inverse LT
46- L42	Convolution theorem
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins (31.08.2015)
48- L44	Evaluation of inverse LT by convolution theorem
49-IT-II	**Internal Test-II**
50-L45	Application of Lt
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Laplace Transform(LT)
53- L48	Properties of LT
54- L49	LT of a function of a function

55- L50	LT of periodic functions
56- L51	Properties of inverse LT
57- L52	Convolution theorem
58- L53	Evaluation of inverse LT by convolution theorem
59-P4	**College level meeting/ function**
60- L54	Application of LT
61- L55	Eigen values: Eigen Vector
62- L56	Characteristic equation of matrix
63- L57	Cayley Hamilton theorem
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins (05.10.2015)
65- L59	Some important theorem
66- L60	Diagonalisation of matrices
67-IT-III	**Internal Test-III**
68- L61	Differentiation and integration of matrices
69- L62	Power of matrices
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (16.10.2015)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 29.10.2015

Course Outcomes

Learning Outcomes	**COs** of the course **"Mathematical physics I"**
CO1	Explain the classification of vector field.
CO2	Determine the eigen value and eigen vector of the characteristic equation of matrix.
CO3	Design the recurrence relation.
CO4	Determine the fourier transform for a given function
CO5	Explain about the convolution theorem.
CO6	Explain the properities of fourier transform.
CO7	Application of matrix in physics.
CO8	Application of laplace transform.
CO9	Application of fourier transform.

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2015-2016)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Electronic device
Course Code	HPHM13
Class	I year (2015-2016)
Semester	Odd
Staff Name	C.Stella Rani
Credits	4
L. Hours /P. Hours	5 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To understand different types of electronic devices and preparation of IC
- To discuss logical families in the digital electronics and study the counters and registers
- To describe the application of operational amplifier in the different field
- To study the various electronics instrumentation through basics of science

Syllabus

Electronic devices

UNIT I

Transistors:

JFET, BJT, MOSFET& MESFET- Structure-working- Derivations of the equations for I-V characteristics under different conditions- High frequency limits.

UNIT II

Photonic devices:

Eradicative and non radiative transitions- Optical absorption- Bulk and thin film- Photoconductive devices(LDR)- diode photodectors- soloar cell-(open circuit voltage and short circuit current, fill factor)- LED (high frequency limit- effect of surface and indirect combination current, operation of LED)- diode lasers(conditions for population inversion in active region, line confinement factor)- Optical gain and threshold current for lasing- Fabry-Perrot cavity length for lasing and the separation.

UNIT III

Memory devices:

Static and dynamic random access memories SRAM and DRAM- CMOS and NMOS- non volatile- NMOS- magnetic- optical and ferroelectric memories- charge cupled(CCD).

UNIT IV

Other electronic devices:

Electro optic- magneto optic and Acousto- Optic effects- material properties related to get these effects- Important Ferro electric, Liquid Crystal and Polymeric materials of these devices- Piezoelectric- To discuss about - Important exhibiting these properties and their applications in sensors and activated devices. Acoustic Delay lines- Piezoelectric resonators and filters- High frequency piezoelectric devices- Surface acoustic wave devices.

UNIT V

Microwave devices:

Tunnel diode- transfer electron devices- avalanche transit time devices-impatt diodes-parametric devices.

BOOKS FOR STUDY

5. Semiconductor devices- Physics and technology, S.M. Sze, John Wiley& Sons,1985.
6. Introduction to semiconductors devices, M.S. Tyagi, John Wiley and Sons,1991.
7. Measurement, Instrumentation and Experiment design in physics and eengineering, M. Sayer and A. Mansingh, Prentice Hall, India,2000.
8. Optical Electronics, AjoyGhatak and K. Thygarajan, Cambridge Univ. Press, 1989.

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2015
1-L1	JFET, BJT
2-L2	MOSFET& MESFET
3- L3	Structure-working
4-L4	Derivations of the equations for I-V characteristics under different conditions
5-L5	High frequency limits.

6-L6	Eradicative and non radiative transitions
7-L7	Optical absorption
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Bulk and thin film
10- L9	Photoconductive devices(LDR)
11-L10	diode photodectors
12-L11	soloar cell(open circuit voltage and short circuit current, fill factor)
13-L12	LED (high frequency limit effect of surface and indirect combination current operation of LED)
14-L13	diode lasers(conditions for population inversion in active region, line confinement factor)
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (20.07.2015)
16-L15	Optical gain and threshold current for lasing
17-IT-1	**Internal Test-I**
18-L16	Fabry- Perrot cavity length for lasing and the separation.
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Static and dynamic random access memories SRAM and DRAM
21- L19	CMOS and NMOS
22- P2	**College level meeting/Cell function**
23-L20	non volatile
24-L21	NMOS
25-L22	magnetic
26-L23	optical and ferroelectric memories
27-L24	chargecupled(CCD).
28-L25	Electro optic
29-L26	magneto optic and Acousto
30-L27	Optic effects
31-L28	material properties related to get these effects
32-L29	Important Ferro electric
33-L30	Liquid Crystal and Polymeric materials of these devices
34- P3	**Department Seminar**
35-L31	Piezoelectric
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (31.08.2015)
37- L33	Electrostrictive and MagnetostrictiveEfeects- Important exhibiting these properties and their applications in sensors and activated devices.
38- IT-II	**Internal Test-II**
39-L34	Acoustic Delay lines
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Piezoelectric resonators and filters
42- L37	High frequency piezoelectric devices
43- L38	Surface acoustic wave devices.
44- P4	**College level meeting/ function**
45-L39	Tunnel diode
46-L40	transfer electron devices

47-L41	avalanche transit time devices
48-L42	impatt diodes
49-L43	parametric devices.
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (05.10.2015)
51 L45	
52- L46	
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (16.10.2015)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 29.10.2015

Course Outcomes

Learning Outcomes	**COs** of the course **"Electronic device"**
CO1	JFET, BJT
CO2	MOSFET& MESFET
CO3	NMOS
CO4	soloar cell(open circuit voltage and short circuit current, fill factor)
CO5	LED (high frequency limit effect of surface and indirect combination current operation of LED)
CO6	optical and ferroelectric memories
CO7	chargecupled(CCD).
CO8	transfer electron devices
CO9	avalanche transit time devices

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2015-2016)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Solid State Physics
Course Code	HPHM22
Class	I year (2015-2016)
Semester	odd
Staff Name	C.Stella Rani
Credits	4
L. Hours /P. Hours	5 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To understand Bravis lattice
- To discuss Brillouine zone
- To explain Crystal binding and study
- To describe Dulong and petits law
- Explain types of super conductors
- To Discuss about electronic devices

Syllabus

SOLID STATE PHYSICS

UNIT I:

CRYSTAL STRUCTURE AND DIFFRACTION

Recapitulation of basic concepts- crystal systems- Bravais Lattice- Miller indices-symmetry elements- symmetry groups- simple crystal structures (sodium chloride, cesium chloride, diamond and zincblende structures) Bragg’s law- Laue equations- reciprocal lattice- Brillouine zones- atomic scattering factor- geometrical structure factor- experimental methods of structure analysis (the laue, rotating crystal and powder methods)

UNIT II:

CRYSTAL BINDING AND ELASTIC PROPERTIES OF SOLIDS

Crystal bindings: Ionic bond- covalent bond- molecular bond- Hydrogen bondmetallic bond- Vanderwaal’s bond-Binding energy of crystals- polaron Elastic properties: Stress components- displacement and strain components- elastic compliances and stiffness constants- relation between elastic compliances and stiffness constants -elastic constants for cubic isotropic crystals-elastic waves- experimental determination of elastic constants

UNIT III:

LATTICE DYNAMICS AND THERMAL PROPERTIES

Lattice dynamics: Concept of phonons- momentum of phonons- normal and Umklapp process- vibrations of one dimensional monoatomic and diatomic linear lattices- inelastic scattering of neutrons by phonons Thermal properties: Theories of specific heat- Dulong and Petit’s law- Einstein theory and Debye’s theory- Widemann Franz law

UNIT IV:

ELECTRONIC PROPERTIES OF SOLIDS

Free electron gas model in three dimensions: Density of states- Fermi energyEffect of temperature- heat capacity of electrons- experimental heat capacity of metalsthermal effective mass- electrical conductivity and ohm’s law- Hall effect- failure of the free electron gas Band theory of solids- periodic potential and Bloch’s theorem- KronigPenny model-wave equation of electron in a periodic potential- periodic, extended and reduced zone schemes of energy representation- number of orbitals in an energy bandclassification of metals, semi conductors and insulators- tight binding method and its applications to FC and BCC structures.

UNIT V:

SUPER CONDUCTIVITY

Experimental survey: Superconductivity and its occurrence- destruction of superconductivity by magnetic field- Meissner effect- Type I and II super conductorsentropy- free energy- heat capacity- energy gap- isotope effect Theoretical survey: Thermodynamics of the superconducting transition- London equation- coherence length- salient features of the BCS theory of super conductivity- flux quantization in a superconductivity ring- DC and AC Josephson effects

Books for Study and Reference

1. Introduction to Solid State Physics - 7 The edition - by Charles kittel
2. Solid State Physics by Neil W Ashroff and N.DavidMermin
3. Solid State Physics by S.L. Kakani and C. Hemarajani
4. Elementary Solid State Physics by M. Ali Omar

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2015
1-L1	Recapitulation of basic concepts
2-L2	Crystal systems, Bravais Lattice
3- L3	Miller indices
4-L4	Symmetry elements, Symmetry groups
5-L5	simple crystal structures (sodium chloride, cesium chloride, diamond and zincblende structures)
6-L6	Bragg's law, Laue equations
7-L7	reciprocal lattice, Brillouine zones
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	atomic scattering factor, Geometrical structure factor
10- L9	Experimental methods of structure analysis (the laue, rotating crystal and powder methods)
11-L10	Crystal bindings: Ionic bond, covalent bond
12-L11	molecular bond,Hydrogenbondmetallic bond
13-L12	Vanderwaal's bond
14-L13	Binding energy of crystals
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (20.07.2015)
16-L15	polaron Elastic properties: Stress components

17-IT-1	**Internal Test-I**
18-L16	displacement and strain components
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	elastic compliances and stiffness constants
21- L19	relation between elastic compliances and stiffness constants
22- P2	**College level meeting/Cell function**
23-L20	elastic constants for cubic isotropic crystals
24-L21	elastic waves
25-L22	experimental determination of elastic constants
26-L23	Lattice dynamics: Concept of phonons
27-L24	momentum of phonons
28-L25	normal and Umklapp process
29-L26	vibrations of one dimensional monoatomic and diatomic linear lattices
30-L27	inelastic scattering of neutrons by phonons Thermal properties: Theories of specific heat
31-L28	Dulong and Petit's law Einstein theory and Debye's theory,Widemann Franz law
32-L29	Free electron gas model in three dimensions: Density of states, Fermi energyEffect of temperature
33-L30	heat capacity of electrons, experimental heat capacity of metalsthermal effective mass
34- P3	electrical conductivity and ohm's law, Hall effect-
35-L31	failure of the free electron gas Band theory of solids
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (31.08.2015)
37- L33	periodic potential and Bloch's theorem, KronigPenny model
38- IT-II	**Internal Test-II**
39-L34	wave equation of electron in a periodic potential
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	periodic, extended and reduced zone schemes of energy representation
42- L37	number of orbitals in an energy bandclassification of metals, semiconductors and insulators
43- L38	tight binding method and its applications to FC and BCC structures.
44- P4	**College level meeting/ function**
45-L39	Experimental survey: Superconductivity and its occurrence, destruction of superconductivity by magnetic field
46-L40	Meissner effect, Type I and II super conductors entropy,
47-L41	free energy, heat capacity ,energy gap, isotope effect
48-L42	Theoretical survey: Thermodynamics of the superconducting transition
49-L43	London equation, coherence length
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (05.10.2015)
51 L45	salient features of the BCS theory of super conductivity
52- L46	flux quantization in a superconductivity ring,DC and AC Josephson effects
53-IT-III	**Internal Test-III**
54-L47	

55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (16.10.2015)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.10.2016

Course Outcomes

Learning Outcomes	**COs** of the course **"Solid State Physics"**
CO1	elastic waves
CO2	experimental determination of elastic constants
CO3	Lattice dynamics: Concept of phonons
CO4	elastic compliances and stiffness constants
CO5	relation between elastic compliances and stiffness constants
CO6	tight binding method and its applications to FC and BCC structures.
CO7	wave equation of electron in a periodic potential
CO8	KronigPenny model
CO9	number of orbitals in an energy bandclassification of metals, semiconductors and insulators

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

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Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2015-2016)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Quantum Mechanics I
Course Code	HPHM31
Class	II year (2015-2016)
Semester	Odd
Staff Name	J RUBY JEMIMA
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To develop the schrodinger wave equation. .
- To derive Ehrenfest theorem.
- To find energy eigen value of square well potential.
- To discuss the postulates of quantum mechanics.
- To derive the energy eigen value of harmonic oscillator.
- To discuss about scattering.
- To find scattering cross section of rigid sphere.

Syllabus

UNIT 1

Development of wave equation Travelling harmonic waves The one dimensional wave equation Interpretation of the wave function Normalization Probability current density Expectation values Ehrenfest's theorem Energy Eigen functions One dimensional square well potential

UNIT II

Interpretative postulates and energy eigen functions Motion of a free wave packet in one dimension Discrete Eigen values(bound states) Linear Harmonic oscillator Spherically symmetric potential in three dimension

UNIT III

One dimensional square potential barrier Scattering coefficients Collisions in three dimensions Scattering cross sections Asymmetric behavior Scattering by spherically symmetric potentials Scattering by a perfect rigid sphere Scattering by a square well potential

UNIT IV

Transformation theory Transformation of Hamiltonian with U Transformation of Hamiltonian with V Dirac's bra and ket notation Equations of motion Matrix theory of the linear harmonic oscillator

UNIT V

Rotational angular momentum and unitary groups. Proper rotation group Infinitesimal rotations. Spin of vector particle Commutation relation for the generators Choice of representation Angular momentum matric Combination of angular momentum states And tensor operations Clebsch gordan coefficients Combination of angular momentum states Spin of vector paricle Commutation relation for the generators Dirac's bra ket notation Equation of motion.

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2015
1-L1	Development of wave equation
2-L2	Travelling harmonic waves
3- L3	The one dimensional wave equation
4-L4	Interpretation of the wave function
5-L5	Normalization
6-L6	Probability current density
7-L7	Expectation values
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Ehrenfest's theorem
10- L9	Energy Eigen functions
11-L10	One dimensional square well potential
12-L11	Interpretative postulates and energy eigen functions
13-L12	Motion of a free wave packet in one dimension
14-L13	Discrete Eigen values(bound states)
15-L14	Linear Harmonic oscillator

16-L15	Spherically symmetric potential in three dimension
17- L16	One dimensional square potential barrier
18- L17	Scattering coefficients
19- L18	Collisions in three dimensions
20- L19	Scattering cross sections
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (20.07.2015)
22- L21	Asymmetric behaviour
23- IT-1	**Internal Test-I**
24- L22	Scattering by spherically symmetric potentials
25- L23	Scattering by a perfect rigid sphere
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Scattering by a square well potential
28- L26	Scattering by a square well potential
29- L27	Transformation theory
30- P2	**College level meeting/Cell function**
31-L28	Transformation theory
32-L29	Transformation of Hamiltonian with U
33-L30	Transformation of Hamiltonian with U
34- L31	Transformation of Hamiltonian with V
35- L32	Transformation of Hamiltonian with V
36- L33	Dirac's bra and ket notation
37- L34	Dirac's bra and ket notation
38-L35	Equations of motion
39- L36	Equations of motion
40- L37	Matrix theory of the linear harmonic oscillator
41- L38	Matrix theory of the linear harmonic oscillator
42-P3	**Department Seminar**
43- L39	Rotational angular momentum and unitary groups.
44- L40	Rotational angular momentum and unitary groups.
45- L41	Proper rotation group.
46- L42	Proper rotation group.
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins (31.08.2015)
48- L44	Infinitesimal rotations.
49-IT-II	**Internal Test-II**
50-L45	Spin of vector particle.
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Commutation relation for the generators.
53- L48	Choice of representation.
54- L49	Angular momentum matrices.
55- L50	Angular momentum matrices.
56- L51	Combination of angular momentum states
57- L52	And tensor operations.
58- L53	Clebsch gordan coefficients.
59-P4	**College level meeting/ function**

60- L54	Clebsch gordan coefficients.
61- L55	Combination of angular momentum states
62- L56	Spin of vector paricle.
63- L57	
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins (05.10.2015)
65- L59	Commutation relation for the generators
66- L60	Dirac's bra ket notation.
67-IT-III	**Internal Test-III**
68- L61	Equation of motion
69- L62	Equation of motion
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (16.10.2015)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 29.10.2015

Course Outcomes

Learning Outcomes	**COs** of the course **" Quantum Mechanics I"**
CO1	Develop the wave equation.
CO2	Derive Ehrenfest theorem.
CO3	Derive eigen value of square well potential.
CO4	Derive the eigen value of harmonic oscillator.
CO5	Calculate the scattering cross section for square well potential
CO6	Derive the energy eigen value of harmonic oscillator using matrix theory.
CO7	Derive C.G coefficients.
CO8	Discuss about the choice of representation.
CO9	Discuss about the rotational groups

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2015-2016)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Statistical Mechanics
Course Code	HPHM33
Class	II year (2015-2016)
Semester	Odd
Staff Name	E. Christy Jerin
Credits	4
L. Hours /P. Hours	5 / WK
Total 60Hrs/ Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To import the knowledge about fundamentals of statistical mechanics.
- To study about the Ensembles.
- To derive the expression for Sackur - Tetrode equation.
- To define Helmholtz free energy.
- To analysis the Chemical equilibrium and saha ionisation formula.
- To import the knowledge about phase transistion.
- To describe the application of density matrices.

Syllabus

Statistical Mechanics

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 probabilityGeneral statistical distribution law-Classical Maxwell-Boltzmann distribution law-Evaluation of constants in the Maxwell Boltzmann distribution law-Maxwell's law of distribution of velocitiesprinciple 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 solidsDebye theory of specific heat of solids-Criticism of Debye's theory-Ideal Bose Einstein GasEnergy 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

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2015
1-L1	Classification of molecules based on moment of inertia
2-L2	Rotational spectra of rigid and non-rigid diatomic molecules
3- L3	Isotopic effect
4-L4	Linear polyatomic molecule
5-L5	Symmetric top molecule
6-L6	Chemical analysis
7-L7	Microwave spectrometer
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Vibrating diatomic and poly-21atomic molecules
10- L9	Simple harmonic oscillator
11-L10	Anhormonicity
12-L11	Hydrogen bonding
13-L12	Fermi resonance
14-L13	Rotation vibration spectra of polyatomic molecule
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (20.07.2015)
16-L15	Information from IR spectra
17-IT-1	**Internal Test-I**
18-L16	IR spectrometer
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	FTIR
21- L19	Theory of Raman scattering
22- P2	**College level meeting/Cell function**
23-L20	Rotation vibration Raman spectra
24-L21	Mutual exclusion principle
25-L22	Raman spectrometer
26-L23	Polarization of Raman scattered light
27-L24	Structure determination using Raman spectrum
28-L25	Phase transition
29-L26	Reasonance Raman scattering
30-L27	Magnetic properties of nuclei
31-L28	Relaxation time
32-L29	Chemical shift
33-L30	Application to molecular structure
34- P3	**Department Seminar**
35-L31	Bloch equation
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (31.08.2015)
37- L33	NMR instrumentation
38- IT-II	**Internal Test-II**
39-L34	NMR imaging

40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	ESR theory and hyperfine structure ESR spectra of hydrogen atom and anisotropic systems
42- L37	Crystal defects and biological studies
43- L38	ESR spectrometer
44- P4	**College level meeting/ function**
45-L39	Electron Energy Loss Spectroscopy EELS
46-L40	Reflection
47-L41	Absorption IR spectroscopy RAIRS
48-L42	Surface Enhanced Raman Scattering SERS
49-L43	Inelastic Helium Scattering
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (05.10.2015)
51 L45	X Ray Photoelectron Spectroscopy XEPS
52- L46	
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (16.10.2015)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.10.2015

Course Outcomes

Learning Outcomes	**COs** of the course "**Statistical Mechanics"**
CO1	Explain the ensembles.
CO2	Calculation of entrophy of ideal gas.
CO3	Derive Quantum Lioville's theorem.
CO4	Illustrate Identical particle.
CO5	Calculation of exponent from mean field theory.
CO6	Calculation of chemical equilibrium.
CO7	Derive the Saha ionisation formula.
CO8	Describe the mean field theory.
CO9	Explain about Iising model

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2015-2016)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	COMMUNICATION ELECTRONICS
Course Code	HPHE22
Class	I year (2015-2016)
Semester	EVEN
Staff Name	G.GOMATHI SANKARI
Credits	6
L. Hours /P. Hours	6 / WK
Total 90 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 80 Hrs (5 units; 5×16=80; 16Hrs /unit)	

Course Objectives

- To study the basic concept of communication and different modulation system based on basic parameters.
- To study the AM, FM, PM process & compute modulation Index
- To study the fundamentals of AM and FM Receivers.
- To develop knowledge about fundamentals of Broadband Communication System

Syllabus

COMMUNICATION ELECTRONICS

Unit I

Amplitude modulation:

Modulation index for AM- Frequency spectrum for AM- Average power- AM receiver- AM transmitter- Single side band principles- Frequency Modulation- Frequency spectrum- Average power- FM transmitter- Phase modulation- Pulse am To study the concept of noise, properties & its effects plitude modulation- pulse code modulation- Pulse Frequency modulation- Pulse Time modulation.

Unit II

Synchronization

Asynchronous Transmission- Probability of bit Error in baseband transmission-Matched Filter- Optimum Terminal Filters- Bit time recovery –Digital carrier systems-carrier recovery circuits- Differential Phase Shift Keying (DPSK)- Hard and soft decision decoders.

Unit III

Propagation of waves:

Ground waves- Sky wave propagation- the ionosphere- Space wave troposphere scatter propagation-extra terrestrial communications.

Unit IV

Optical Communication:

Transmission in fiber- Losses in fibers- Dispersion- Light sources for fiber optics-photodetectors-Connectors and splices- Fiber optic communication link.

Unit V

Kepler's law:

Keplers' I,II and III law – Orbits- Geostationary orbits- power systems – altitude Control- Satellite station Keeping- Antenna look angles- limits of visibility – Transponders-Uplink and down link power budget calculation- Digital carrier Transmission- Multiple access methods

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 02.12.2015
1-L1	Amplitude modulation.
2-L2	Modulation index for AM
3- L3	Frequency spectrum for AM
4-L4	Average power
5-L5	AM receiver
6-L6	AM transmitter
7-L7	Single side band principles
8-L8	Frequency Modulation
9-L9	Frequency spectrum
10-P1	**Welcoming of First year and Inauguration of Physics Association**
11-L10	Average power

12-L11	FM transmitter
13-L12	Phase modulation
14-L13	Pulse amplitude modulation
15-L14	pulse code modulation
16-L15	Pulse Frequency modulation
17-L16	Pulse Time modulation
18-L17	Synchronization:
19-L18	Asynchronous Transmission
20-L19	Probability of bit Error in baseband transmission
21-L20	Matched Filter
22-L21	Optimum Terminal Filters
23-L22	**Allotting portion for Internal Test-I**
	Internal Test I begins (25.01.2016)
24-L23	Bit time recovery
25-L24	Digital carrier systems
26-IT-1	**Internal Test-I**
27-L25	carrier recovery circuits
28-L26	Differential Phase Shift Keying (DPSK)
29-L27	Hard and soft decision decoders.
30-L28	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
31- L29	Propagation of waves
32- L30	Ground waves
33- L31	Sky wave propagation
34-P2	**College level meeting/Cell function**
35- L32	The ionosphere
36- L33	Space wave troposphere scatter propagation
37- L34	Extra terrestrial communications
38- L35	Ground waves
39- L36	Sky wave propagation
40- L37	Space wave troposphere scatter propagation
41- L38	Optical Communication
42- L39	Transmission in fiber
43- L40	Losses in fibers
44- L41	Dispersion
45- L42	Light sources for fiber optics
46- L43	photodetectors
47- L44	Connectors and splices
48- L45	Fiber optic communication link
49- L46	Revision for losses in fibers
50- L47	Light sources for fiber optics
51- P3	**Department Seminar**
52- L48	Dispersion
53- L49	Connectors and splices
54- L50	Fiber optic communication link
55- L51	Solved problem
56-L52	**Allotting portion for Internal Test-II**

	Internal Test II begins (22.02.2016)
57-L53	Kepler's law:
58-L54	Keplers' I,II and III law
59-IT-II	**Internal Test-II**
60- L55	Orbits
61- L56	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
62- L57	Geostationary orbits
63- L58	power systems
64- L59	altitude Control
65- L60	Satellite station Keeping
66- L61	Antenna look angles
67- L62	limits of visibility –
68- L63	Transponders
69- L64	Uplink and down link power budget calculation
70- L65	Digital carrier Transmission
71- L66	Multiple access methods
72- L67	power systems
73- L68	Transponders
74-P4	**College level meeting/ function**
75- L69	Uplink and down link power budget calculation
76- L70	Geostationary orbits
77- L71	Revision for multiple access methods
78- L72	Solved problem
79- L73	**Allotting portion for Internal Test-III**
	Internal Test III begins (28.03.2016)
80- L74	Previous year question discussion
81- L75	Question paper solved problem
82-IT-III	**Internal Test-III**
83- L76	Fiber optic communication link
84- L77	**Test Paper distribution and result analysis**
85- L78	
	Entering Internal Test-III Marks into University portal
	Model Test begins
86- L79	**Model Test (11.04.2016)**
87-MT	**Model Test**
88-MT	**Model Test**
89-MT	**Model test paper distribution and previous year university question paper discussion**
90-L-80	**Feedback of the Course, analysis and report preparation**
	Last Working day on 22.04.2016

Course Outcomes

Learning Outcomes	**COs** of the course **" Communication Electronics"**
CO1	Demonstrate different modulation techniques used in electronic communication system.
CO2	Calculate bandwidth and bit rate requirement of system.
CO3	Solve the problems involving representation & Generation of an AM sine wave
CO4	Integrate different modulation techniques of Generation of FM (Direct & Indirect Method) in a communication system design
CO5	Identify, formulate & solve communication engineering problems
CO6	The basic concept of communication and different modulation system based on basic parameters.
CO7	The AM, FM, PM process & compute modulation Index
CO8	The fundamentals of AM and FM Receivers
CO9	Develop knowledge about fundamentals of Broadband Communication System
Experimental Learning	
EL1	the study of analog and digital communication systems
EL2	Experiments based on amplitude modulation, frequency modulation, double side band modulation, single side band modulation are performed.
EL3	Various parameters of receiver like sensitivity, selectivity & fidelity are tested.
EL4	Experiments of PAM, PWM, PPM, PCM, Delta modulation & adaptive delta modulation are performed.
Integrated Activity	
IA1	Advanced digital common training boards are available for performing
IA2	Experiments based on digital modulation techniques ASK, PSK & FSK and their demodulation using Parity Generator, Error Detection & Correction.

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2015-2016)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Microprocessor and Microcontroller
Course Code	HPHM13
Class	I year (2015-2016)
Semester	even
Staff Name	C.Stella Rani
Credits	4
L. Hours /P. Hours	5 / WK
Total 75 Hrs / Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- The objective of this course is to become familiar with the architecture and the instruction set of an Intel microprocessor
- Assembly language programming will be studied as well as the design of various types of digital and analog interfaces
- Understand the architecture of 8085 and 8051

Syllabus

Microprocessor and Microcontroller

UNIT I

Evolution and Architecture of Microprocessors 8085& 8086

Evolution of microprocessors-computers and its classifications-INTEL 8085 microprocessor pin out configuration-Pins and their functions-Bus system-control and status signals-externally initiated signals including interrupts-architecture-ALU-Flags-Registers-INTEL 8086 microprocessor-Pins description, Operating modes, Pin description for minimum mode –Operation of8086-Registers,flags,and interrupts of 8086

UNITII

Instruction set of 8085 and assembly language programming

Software-Assembly language-Assembler, Assembler Directives-Instruction set of 8085: Data transfer instructions, Arithmetic instructions, Logical instructions, Branching instructions, Machine control instructions processor cycles- Instruction &machine cycle, Timing diagram& Instruction format – Timing diagram for memory read machine cycle & executing an instruction –addressing modes of 8085A –Assembly language programming using 8085A- Sequence , branching and loop programming – Subroutines and ISR

UNIT III

Peripheral interfacing Devices and techniques

Address space- Partitioning, interfacing – Memory and I/O ports: non programmable I/o port INTEL 8212, Programmable peripheral interface INTEL8255, programmable interval timer INTEL 8253-Data transfers: Types of parallel and serial data transfer schemes – Direct memory Access controller INTEL 8257 – 8085A interrupt system : software & hardware interrupts – interfacing , working and programming of PIC 8259 with 8085

UNIT IV

Programming of 8086 and microcontroller 8051

8086 instructions- Data transfer and arithmetic instructions, addressing modes of INTEL 8086. INTEL 8051: Architecture –Hardware features,registers, I/O ports, External memory, counter and timers, serial I/O, Interrupts. 8051 programming: Instruction set, Addresssing modes, Data transfer, logical, arithmetic operations, jump/call instructions, interrupt handler

UNIT V

Microprocessor system design and applications

Delays- Generation of square waves of pulses- interfacing of 7 – segment LED display – formation of codes for alphanumeric characters – sensors and transducers in physical instruments – Temperature measurements and control – frequency and resistance measurements – Digital clock – DC motor speed control – Traffic control system

BOOKS FOR STUDY

4. Microprocessor architecture, programming and applications with8085, Ramesh S.Gaonkar, III Edition , PenramInternational publishing 1997
5. Fundamentals of microprocessor and microcomputers, B.Ram, V Edition, DhanpatRai publications (P) Ltd. New Delhi, 2003.
6. The 8051 Microcontroller – Architecture, Programming & Applications, Kenneth J.Ayala, II Edition. Penram International, India, 1996.

BOOKS FOR REFERENCE

4. Microprocessor and its Applications, NagoorKani, RBA publications I edition, Chennai, 2004.
5. Microprocessors and interfacing – Programming and hardware, Dougles. V.Hall, II edition ,MCGraw Hill, India,1999.
6. The 8051 microcontroller and embedded systems, Mohammed Ali Mazidi, Janice Gillispiemazidi, Pearson education, India,2001.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 2.12.2015
1-L1	Evolution of microprocessors,computers and its classifications
2-L2	INTEL 8085 microprocessor pin out configuration, Pins and their functions
3- L3	Bus system, control and status signals
4-L4	externally initiated signals including interrupts, architecture
5-L5	ALU, Flags
6-L6	Registers, INTEL 8086 microprocessor
7-L7	Pins description, Operating modes, Pin description for minimum mode
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Operation of8086
10- L9	Registers, flags and interrupts of 8086
11-L10	Software, Assembly language
12-L11	Assembler, Assembler Directives
13-L12	Instruction set of 8085: Data transfer instructions, Arithmetic instructions
14-L13	Logical instructions, Branching instructions
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (25.01.2016)
16-L15	Machine control instructions processor cycles
17-IT-1	**Internal Test-I**
18-L16	Instruction &machine cycle, Timing diagram& Instruction format
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Timing diagram for memory read machine cycle & executing an instruction
21- L19	addressing modes of 8085A, Assembly language programming using 8085A
22- P2	**College level meeting/Cell function**
23-L20	Sequence , branching and loop programming, Subroutines and ISR
24-L21	Address space, Partitioning, interfacing
25-L22	Memory and I/O ports: non programmable I/o port INTEL 8212
26-L23	Programmable peripheral interface INTEL 8255
27-L24	programmable interval timer INTEL 8253
28-L25	Data transfers: Types of parallel and serial data transfer schemes
29-L26	Direct memory Access controller INTEL 8257

30-L27	8085A interrupt system : software & hardware interrupts
31-L28	interfacing , working and programming of PIC 8259 with 8085
32-L29	8086 instructions, Data transfer and arithmetic instructions
33-L30	Addressing modes of INTEL 8086, INTEL 8051: Architecture
34- P3	**Department Seminar**
35-L31	Hardware features, registers, I/O ports
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (22.02.2016)
37- L33	External memory, counter and timers, serial I/O, Interrupts
38- IT-II	**Internal Test-II**
39-L34	8051 programming: Instruction set, Addresssing modes, Data transfer
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	logical, arithmetic operations
42- L37	jump/call instructions, interrupt handler
43- L38	Delays
44- P4	**College level meeting/ function**
45-L39	Generation of square waves of pulses- interfacing of 7
46-L40	segment LED display
47-L41	formation of codes for alphanumeric characters
48-L42	sensors and transducers in physical instruments
49-L43	Temperature measurements and control
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (28.03.2016)
51 L45	frequency and resistance measurements, Digital clock
52- L46	DC motor speed control , Traffic control system
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (11.04.2016)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 22.4.2016

Course Outcomes

Learning Outcomes	**COs** of the course **"Microprocessor and Microcontroller"**
CO1	Design and implement programs on 8086, ARM, PIC.
CO2	Design I/O circuit.
CO3	The program prepares students to successfully compete for employment in Electronics, Manufacturing and Embedded fields
CO4	Design Memory Interfacing circuits
CO5	Design and implement 8051 microcontroller based system

CO6	Describe the architecture and instruction set of ARM microcontroller
CO7	Understand and realize the Interfacing of memory & various I/O devices with 8085 microprocessor
CO8	Understand and classify the instruction set of 8085 microprocessor and distinguish the use of different instructions and apply it in assembly language programming
CO9	Understand the architecture and operation of Programmable Interface Devices and realize the programming & interfacing of it with 8085 microprocessor
Experimental Learning	
EL1	Microprocessor kits and data acquisition cards DC Power Supplies
EL2	Microcontroller Programmer
EL3	Universal Programmer
EL4	Universal IC Tester
Integrated Activity	
IA1	The program prepares students to successfully compete for employment in Electronics, Manufacturing and Embedded fields
IA2	Design and implement 8051 microcontroller based system

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2015-2016)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Mathematical physics II
Course Code	HPHM21
Class	I year (2015-2016)
Semester	Even
Staff Name	E .Christy Jerin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To introduce the special type of matrices. .
- To derive Cayley – hamilton theorem.
- To derive Cauchy's theorem.
- To derive Taylor' s theorem.
- To study the Polynomials.
- To import the knowledge of fourier transform.
- To apply then laplace transform into the electrical circuits.

Syllabus

UNIT 1

Matrices:

Introduction – special types of matrices Transpose – Conjugate – transposed conjugate Symmetric and antisymmetric matrices Hermitian and skew Hermitian matrices Determinant – Adjoint Orthogonal and unitary matrices Orthogonal and unitary matrices Eigen values and eigen vectors of the matrix Characteristic equation of a matrix – Cayley Hamilton theorem

UNIT II

Complex variables:

Analytical functions – Cauchy Riemann Conditions Line integrals – Cauchy's theorem – Cauchy's integral formula Derivatives of analytical functions – Power series Taylor's theorem – Laurent's theorem Calculus of residues Evaluation of definite integrals of cos Θ and sin Θ Certain improper real integers.

UNIT III

Bessel function of first kind. Generating function Recurrence relations.

Jn (x) as solution of Bessel differential equation. Expansion of Jn (x) where n is half and odd integer Integral representation Laguerre's differential equation and Laguerre polynomials Generating function Rodrigue's formula Recurrence relations Orthogonal property of lauguerre polynomials Associated laugurre polynomials

UNIT IV

Fourier transform

Introduction-Fourier transform Properities of fourier transfom Fourier transform of a derivative Fourier sine and cosine transform of derivatives. Laplace transform (LT) Properities of LT LT of derivative and integral of a function LT of periodic function Inverse of LT Properities of inverse LT Application of LT to electrical circuits

UNIT V

Numerical integration.

Introduction –numerical integration. Trapezoidal rule Simpson's rule Solution of ordinary differential equations of first order. Euler's method. Modified Euler's method Taylor series method. Runge kutta method Approximate solution of algebraic and transcendental equations Newton raphson method Method of iteration Monte-carlo technique Simpson's rule Solution of ordinary differential equations of first order.

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 2.12.2015
1-L1	Matrices: Introduction – special types of matrices
2-L2	Transpose – Conjugate – transposed conjugate
3- L3	Symmetric and antisymmetric matrices
4-L4	Hermitian and skew Hermitian matrices
5-L5	Determinant – Adjoint
6-L6	Orthogonal and unitary matrices

7-L7	Orthogonal and unitary matrices
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Eigen values and eigen vectors of the matrix
10- L9	Characteristic equation of a matrix – Cayley Hamilton theorem
11-L10	Complex variables: Analytical functions – Cauchy Riemann Conditions
12-L11	Line integrals – Cauchy's theorem – Cauchy's integral formula
13-L12	Derivatives of analytical functions – Power series
14-L13	Taylor's theorem – Laurent's theorem
15-L14	Calculus of residues.
16-L15	Evaluation of definite integrals of cos Θ and sin Θ
17- L16	Certain improper real integers.
18- L17	Bessel function of first kind.
19- L18	Generating function.
20- L19	Recurrence relations.
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (25.01.2016)
22- L21	Jn (x) as solution of Bessel differential equation.
23- IT-1	**Internal Test-I**
24- L22	Expansion of Jn (x) where n is half and odd integer.
25- L23	Integral representation
26- L24	**_Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Laguerre's differential equation and Laguerre polynomials
28- L26	Generating function
29- L27	Rodrigue's formula
30- P2	**College level meeting/Cell function**
31-L28	Recurrence relations.
32-L29	Orthogonal property of lauguerre polynomials.
33-L30	Associated laugurre polynomials.
34- L31	Introduction-Fourier transform.
35- L32	Properities of fourier transfom.
36- L33	Fourier transform of a derivative.
37- L34	Fourier sine and cosine transform of derivatives.
38-L35	Laplace transform (LT)
39- L36	Properities of LT
40- L37	LT of derivative and integral of a function
41- L38	LT of periodic function.
42-P3	**Department Seminar**
43- L39	Inverse of LT
44- L40	Properities of inverse LT
45- L41	Application of LT to electrical circuits
46- L42	Introduction –numerical integration.
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins (22.02.2016)
48- L44	Trapezoidal rule
49-IT-II	**Internal Test-II**
50-L45	Simpson's rule
51- L46	**Test Paper distribution and result analysis**

	Entering Internal Test-II Marks into University portal
52- L47	Solution of ordinary differential equations of first order.
53- L48	Euler's method.
54- L49	Modified Euler's method
55- L50	Taylor series method.
56- L51	Runge kutta method.
57- L52	Approximate solution of algebraic and transcendental equations.
58- L53	Newton raphson method.
59-P4	**College level meeting/ function**
60- L54	Method of iteration
61- L55	Monte-carlo technique
62- L56	Simpson's rule
63- L57	Solution of ordinary differential equations of first order.
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins (28.03.2016)
65- L59	Modified Euler's method
66- L60	Runge kutta method.
67-IT-III	**Internal Test-III**
68- L61	Approximate solution of algebraic and transcendental equations
69- L62	Monte-carlo technique
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (11.04.2016)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 22.4.2016

Course Outcomes

Learning Outcomes	**COs** of the course **"Mathematical physics II"**
CO1	Introduction about types of matrices.
CO2	Find the eigen value and eigen vectors of the matrix.
CO3	Derive the Cauchy's integral formula.
CO4	Derive the recurrence relations.
CO5	Study about the laplace transform.
CO6	Find roots of the equation using Newton raphson method.
CO7	Solve the differential equation using Euler's method.
CO8	Solve the numerical integration using sympson's rule.
CO9	Introduction of Monte-carlo method

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2015-2016)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Electromagnetic theory
Course Code	HPHM22
Class	I year (2015-2016)
Semester	Even
Staff Name	Uma
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To expose the students to the ideas of fundamental laws.
- To identify formulate and solve fields and electromagnetic wave propagation.
- To study the importance of the Boundary conditions.
- To derive the Reflection and transmission of the Electromagnetic wave.
- To calculate the electric and magnetic dipole radiation.
- To acquire the knowledge of Electromagnetic wave propagation.

Syllabus

UNIT I

Coulomb's Law-Derivation Gauss law in differential and Integral form. Gauss law in differential and Integral form. Poisson's equation and Laplace's equation. Work done to move a point charge. Energy of a point charge and continuous charge distribution. Electric field in dielectric materials. Induced dipoles and polarizability. Connection between polarizability and susceptibility.

UNIT II

Lorentz force law. Biot-Savart law and ampere law - Magnetic vector potential- Expansion of vector potential - Effect of a magnetic field on atomic orbits- Bound current and its physical interpretations- Ampere's law in magnetic material- Dia , para , Ferro Magnetism. Magnetic susceptibility and permeability in linear and non linear media

UNIT III

Electrodynamics Electromagnetic induction- Faraday law- Maxwell's equation differential and integral form. Boundary conditions on field vectors D,E,B and H Scalar and vector potential. Gauge transformations. Lorentz and coulomb gauge. Pointing vector and pointing theorem. Maxwell's stress tensor. Conservation of momentum.

UNIT IV

The wave equation for A and B-Mono chromatic plane waves Reflection and transmission at normal Incidence Reflection and transmission at oblique Incidence. EM waves in conductor wave guide. The coaxial transmission line.

UNIT V

Retarded Potential. Lenard – wiechart potential. Electric dipole radiation. Magnetic dipole radiation. And derivation. Larmour formula definition. And derivation. Abraham Lorentz formula for the radiation reaction. Physical origin of radiation reaction

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 2.12.2015
1-L1	Coulomb's Law-Derivation.
2-L2	Gauss law in differential and Integral form.
3- L3	Gauss law in differential and Integral form.
4-L4	Poisson's equation and Laplace's equation.
5-L5	Work done to move a point charge.
6-L6	Energy of a point charge and continuous charge distribution.
7-L7	Energy of a point charge and continuous charge distribution.
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Electric field in dielectric materials.
10- L9	Induced dipoles and polarizability.
11-L10	Connection between polarizability and susceptibility.
12-L11	Connection between polarizability and susceptibility.
13-L12	Lorentz force law.
14-L13	Biot-Savart law
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (25.01.2016)
16-L15	Magnetic vector potential.
17-IT-1	**Internal Test-I**
18-L16	Effect of a magnetic field on atomic orbits.
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal

20-L18	Dia , para , Ferro Magnetism.
21- L19	Magnetic susceptibility and permeability.
22- P2	**College level meeting/Cell function**
23-L20	Maxwell's equation differential and integral form.
24-L21	Maxwell's equation differential and integral form.
25-L22	Boundary conditions on field vectors
26-L23	D,E,B and H
27-L24	Scalar and vector potential.
28-L25	Gauge transformations.
29-L26	Lorentz and coulomb gauge.
30-L27	Pointing vector and pointing theorem.
31-L28	Maxwell's stress tensor.
32-L29	Conservation of momentum.
33-L30	Mono chromatic plane waves
34- P3	**Department Seminar**
35-L31	Reflection and transmission at normal Incidence.
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (22.02.2016)
37- L33	Reflection and transmission at oblique Incidence.
38- IT-II	**Internal Test-II**
39-L34	EM waves in conductor wave guide.
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	The coaxial transmission line.
42- L37	Retarded Potential.
43- L38	Lenard – wiechart potential.
44- P4	**College level meeting/ function**
45-L39	Electric dipole radiation.
46-L40	Magnetic dipole radiation.
47-L41	And derivation.
48-L42	Larmour formula definition.
49-L43	And derivation.
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (28.03.2016)
51 L45	Abraham Lorentz formula for the radiation reaction.
52- L46	Physical origin of radiation reaction.
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (11.04.2016)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 22.4.2016

Course Outcomes

Learning Outcomes	**COs** of the course **" Electromagnetic theory"**
CO1	Explain the fundamental laws governing electromagnetic fields.
CO2	Determine the electromagnetic force exerted on charged particles, current elements, working priniciple of various electric and EMT conversion devices are based on this force.
CO3	Design maxwell's equation and Boundary condition.
CO4	Deduce the Reflection and Transmission wave equation
CO5	Derive the Pointing Theorem.
CO6	Design Larmour formula.
CO7	Reduce the gauge transformation .
CO8	Calculate magnetic vector potential
CO9	To derive the basic laws.

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Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2015-2016)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Material science
Course Code	HPHE41
Class	II year (2015-2016)
Semester	Even
Staff Name	J Ruby Jemima
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To introduce the crystalline ,material.
- To explain X-ray diffraction .
- To derive London equation
- To describe BCS theory
- To explain hall effect
- To introduce optical and nano material.

Syllabus

MATERIAL SCIENCE

UNIT I

Crystalline Materials :

Introduction – Crystal symmetry – simple crystal structures- Polymorphism and Allotropy – Crystal direction – crystal imperfections – Structure determination by X ray diffraction – Bragg's law production of X ray - determination of lattice parameters(Bragg's X – ray spectrometer method) – The Laue method – The powder method – The rotating crystal method.

UNIT II

Conducting Materials:

Introduction – The classical free electron theory – Wiedemann – Franz law – The quantum free electron theory – Fermi distribution function – density of energy states-electrons in a periodic potential – conductors – high resistivity materials- superconductivity – General features – Effects of magnetic field – The Meissner effect – Thermal properties – London equation – penetration depth – BCS theory – Josephson effect.

UNIT III

Semiconducting Materials:

Introduction – Elemental intrinsic semiconductors - Carrier concentration in intrinsic semiconductor- Eletrical conductivity – Extrinsic semiconductor- carrier concentration in N-type and P-type semiconductors – Variation of carrier concentration with temperature. Direct and indirect band gap semiconductors- semiconductor – Hall effect – applications.

UNIT IV

Dielectric materials:

Fundamental definitions – Measurement of relative dielectric constant – Various polarization process – electronic polarization – Ionic polarization – orientational polarization – space charge polarization – frequency effect on polarization – Dielectric loss- Internal field – Lorentz method – Clausius Mossoti relation – dielectric break down – required qualities of good insulating materials- classification – applications.

UNIT V

Optical and Nano materials:

Luminescence – photoluminescence – cathode –luminescence – electro luminescence – injection luminescence – PN Junction theory –PN junction as a light sources – Light emitting diode – LED materials – construction – Liquid crystal display – characteristics – action –photo detectors – photo detective material – Nano phase materials – synthesis variation of physical properties with geometry.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 2.12.2015
1-L1	Crystalline Materials : Introduction
2-L2	Crystal symmetry
3- L3	simple crystal structures
4-L4	Polymorphism and Allotropy
5-L5	Crystal direction ,crystal imperfections
6-L6	Structure determination by X ray diffraction
7-L7	Bragg's law production of X ray - determination of lattice parameters(Bragg's X – ray spectrometer method)
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	The Laue method – The powder method
10- L9	The rotating crystal method
11-L10	Conducting Materials: Introduction – The classical free electron theory
12-L11	Wiedemann – Franz law
13-L12	The quantum free electron theory
14-L13	Fermi distribution function
15-L14	density of energy states- electrons in a periodic potential
16-L15	conductors – high resistivity materials
17- L16	superconductivity – General features
18- L17	Effects of magnetic field – The Meissner effect
19- L18	Thermal properties – London equation – penetration depth
20- L19	Thermal properties – London equation – penetration depth
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (25.01.2016)
22- L21	BCS theory
23- IT-1	**Internal Test-I**
24- L22	Josephson effect.
25- L23	Semiconducting Materials: Introduction – Elemental intrinsic semiconductors
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Carrier concentration in intrinsic semiconductor
28- L26	Eletrical conductivity – Extrinsic semiconductor
29- L27	carrier concentration in N-type and P-type semiconductors
30- P2	**College level meeting/Cell function**
31-L28	Variation of carrier concentration with temperature.
32-L29	Direct and indirect band gap semiconductors- semiconductor
33-L30	Hall effect
34- L31	Applications
35- L32	Dielectric materials: Fundamental definitions
36- L33	Measurement of relative dielectric constant – Various polarization process
37- L34	electronic polarization – Ionic polarization
38-L35	orientational polarization – space charge polarization
39- L36	frequency effect on polarization
40- L37	Dielectric loss

41- L38	Internal field
42-P3	**Department Seminar**
43- L39	Lorentz method
44- L40	Clausius Mossoti relation
45- L41	dielectric break down
46- L42	required qualities of good insulating materials
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins (22.02.2016)
48- L44	Classification
49-IT-II	**Internal Test-II**
50-L45	Optical and Nano materials
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Luminescence – photoluminescence
53- L48	cathode –luminescence – electro luminescence
54- L49	injection luminescence – PN Junction theory
55- L50	junction as a light sources – Light emitting diode
56- L51	LED materials – construction – Liquid crystal display
57- L52	Liquid crystal display
58- L53	characteristics – action
59-P4	**College level meeting/ function**
60- L54	photo detectors
61- L55	photo detective material
62- L56	Nano phase materials
63- L57	Nano phase materials
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins (28.03.2016)
65- L59	PN Junction theory
66- L60	electro luminescence
67-IT-III	**Internal Test-III**
68- L61	Optical and Nano materials
69- L62	synthesis variation of physical properties with geometry
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (11.04.2016)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 22.4.2016

Course Outcomes

Learning Outcomes	**COs** of the course **“Material science”**
CO1	Define crystal symmetry
CO2	Explain X-RAY DIFFRACTION
CO3	Explain BCS theory
CO4	Deduce hall effect.
CO5	Theory about PN junction
CO6	Explain Lorentz method
CO7	Application of hall effect
CO8	Application of nano material
CO9	Application of optical material.

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HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2015-2016)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Quantum Mechanics II
Course Code	HPHM41
Class	II year (2015-2016)
Semester	Even
Staff Name	E.Christy Jerin
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To introduce Pertubation theory
- To derive the dirac equation
- To explain orbital angular momentum
- To explain transition probablity

Quantum Mechanics II

UNIT I

Orbital angular momentum Eigen pairs of L2 and Lz Properties of components of L and L 2 Matrix representation of L2 , Lz and L± spin state of an electron spin orbit coupling Addition of angular momenta

UNIT II

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

UNIT III

Time Dependent Perturbation Theory: Introduction Transition probability constant perturbation Harmonic perturbation adiabatic perturbation sudden approximation Semi classical theory of radiation calculation of Einstein coefficients

UNIT IV

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

UNIT V

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

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 2.12.2015
1-L1	Orbital angular momentum
2-L2	Eigen pairs of L2 and Lz
3- L3	Properties of components of L and L 2
4-L4	Matrix representation of L2 , Lz and L±
5-L5	spin state of an electron
6-L6	spin orbit coupling
7-L7	Addition of angular momenta
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Time Independent Perturbation Theory: Introduction- Theory for non-degenerate case
10- L9	Application to non-degenerate levels
11-L10	Theory for degenerate levels
12-L11	First order Stark effect in Hydrogen atom
13-L12	Time Dependent Perturbation Theory: Introduction
14-L13	Transition probability
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (25.01.2016)
16-L15	constant perturbation
17-IT-1	**Internal Test-I**
18-L16	Harmonic perturbation
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	adiabatic perturbation
21- L19	sudden approximation
22- P2	**College level meeting/Cell function**
23-L20	Semi classical theory of radiation
24-L21	calculation of Einstein coefficients
25-L22	Classical scattering cross section
26-L23	Centre of mass and laboratory co-ordinate systems
27-L24	Scattering amplitude
28-L25	Green's function approach
29-L26	Born approximation
30-L27	Partial wave analysis
31-L28	Scattering form a square well system
32-L29	Scattering form a square well system

33-L30	Klein – Gordon equation
34- P3	**Department Seminar**
35-L31	Klein – Gordon equation
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (22.02.2016)
37- L33	Dirac equation for a free particle
38- IT-II	**Internal Test-II**
39-L34	Dirac equation for a free particle
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Spin of a Dirac particle
42- L37	Spin of a Dirac particle
43- L38	Particle in a potential
44- P4	**College level meeting/ function**
45-L39	Relativistic particle in a box
46-L40	Relativistic hydrogen atom
47-L41	Relativistic hydrogen atom
48-L42	Electron in a field
49-L43	Electron in a field
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (28.03.2016)
51 L45	Electron in a field
52- L46	Electron in a field
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (11.04.2016)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 22.4.2016

Course Outcomes

Learning Outcomes	**COs** of the course **"Quantum Mechanics II"**
CO1	Properties of components of L and L 2
CO2	Matrix representation of L2 , Lz and L±
CO3	Time Independent Perturbation Theory: Introduction- Theory for non-degenerate case
CO4	Application to non-degenerate levels

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
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HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2015-2016)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Molecular spectroscopy
Course Code	HPHM42
Class	II year (2015-2016)
Semester	Even
Staff Name	E.Christy Jerin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To develop the knowledge of molecular spectroscopy. .
- To classify the molecules .
- To discuss the isotope effect in rotational spectra.
- To calculate the vibrational energy of the diatomic molecule.
- To derive the Bloch equation.
- To study about fortrait parabola.

Syllabus

UNIT I

Microwave spectroscopy

Classification of molecules- Rotational spectra of rigid diatomic molecule - Isotopic effect in rotational spectra –Intensity of rotational lines –Non rigid rotator Linear polyatomic molecule Symmetric molecules Asymmetric molecules. Microwave spectrometer-Information derived from rotational spectra.

UNIT II

Infrared spectroscopy

Vibrational energy of a diatomic molecule-Selection rules- Vibrating diatomic molecule -Diatomic vibrating rotator - Assymetry of vibration -Vibration band- Rotational vibrational spectra of polyatomic- molecule Linear molecules -Symmetric top molecules - Information derived from vibrational spectra

UNIT III

RAMAN SPECTROSCOPY

Theory of raman scattering- Classical theory- Quantum theory- Rotational raman spectra- Linear molecules Symmetric top molecules- Vibrational raman spectra- Raman spectrometer- Hyper raman effect- Classical treatment of hyper raman effect-Stimulated raman effect- Inverse raman scattering- CARS-PARS -Multi photon process

UNIT IV

ELECTRONIC SPECTROSCOPY

Vibrational coarse structure - Vibrational analysis of band system -Deslandres table Progression and sequences- Franck Condon principle -Rotational fine structure of electronic vibrational spectra -The fortrat parabola -Dissociation –PreDissociation- Photoelectron spectroscopy- Principle- instrumentation

UNIT V

NMR,ESR AND NQR

NMR NMR-Magnetic properities of nuclei- resonance conditions – relaxation process - Bloch equations- Chemical shift –NMR instrumentations,ESR- Principle - ESR spectrometer-Hyperfine structure- ESR spectrum of hydrogen atom-ESR spectra of free radicals in solution .NQR -The Quadrapole nucleus- principle- Transistions for axially symmetric systems -transitions for non axially symmetric systems- NQR instrumentations.

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 2.12.2015
1-L1	Classification of molecules.
2-L2	Rotational spectra of rigid diatomic molecule.
3- L3	Isotopic effect in rotational spectra.
4-L4	Linear polyatomic molecule.
5-L5	Symmetric molecules.

6-L6	Asymmetric molecules.
7-L7	Microwave spectrometer.
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Information derived from rotational spectra.
10- L9	Vibrational energy of a diatomic molecule.
11-L10	Selection rules.
12-L11	Vibrating diatomic molecule.
13-L12	Diatomic vibrating rotator.
14-L13	Assymetry of vibration ,Vibration band.
15-L14	Rotational vibratioal spectra of poyatomic molecule.
16-L15	Linear molecules.
17- L16	Symmetric top molecules
18- L17	Information derived from vibrational spectra.
19- L18	Theory of raman scattering.
20- L19	Classical theory.
21- L20	**____ - Allotting portion for Internal Test-I**
	Internal Test I begins (25.01.2016)
22- L21	Quantum theory.
23- IT-1	**Internal Test-I**
24- L22	Rotational raman spectra.
25- L23	Linear molecules.
26- L24	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Symmetric top molecules.
28- L26	Vibrational raman spectra.
29- L27	Raman spectrometer.
30- P2	**College level meeting/Cell function**
31-L28	Hyper raman effect.
32-L29	Classical treatment of hyper raman effect.
33-L30	Stimulated raman effect.
34- L31	Inverse raman scattering.
35- L32	CARS,PARS
36- L33	Multi photon process.
37- L34	Vibrational ocarse structure.
38-L35	Vibrational analysis of band system.
39- L36	Deslandres table.
40- L37	Progression and sequences.
41- L38	Franck Condon principle.
42-P3	**Department Seminar**
43- L39	Rotational fine structure of electronic vibrational spectra.
44- L40	The fortrat parabola.
45- L41	Dissociation
46- L42	Predissociation.
47- L43	**____ - Allotting portion for Internal Test-II**
	Internal Test II begins (22.02.2016)
48- L44	Photoelectron spectroscopy.
49-IT-II	**Internal Test-II**
50-L45	Principle- instrumentation.

51- L46	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	NMR-Magnetic properities of nuclei.
53- L48	Bloch equations.
54- L49	Chemical shift
55- L50	ESR
56- L51	Principle of ESR spectrometer.
57- L52	ESR spectrum of hydrogen atom.
58- L53	Resonance conditions.
59-P4	**College level meeting/ function**
60- L54	NQR-The Quadrapole nucleus.
61- L55	Transistions for axially symmetric systems.
62- L56	NQR instrumentations.
63- L57	Relaxation process.
64- L58	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins (28.03.2016)
65- L59	ESR spectra of free radicals in solution.
66- L60	NQR Instrmentations.
67-IT-III	**Internal Test-III**
68- L61	NMR Instrumentations.
69- L62	Chemical shift
70- L63	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (11.04.2016)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 22.4.2016

Course Outcomes

Learning Outcomes	**COs** of the course **“Molecular spectroscopy”**
CO1	Study about the different type of molecule.
CO2	Discuss the isotope effect
CO3	Derive the raman effect on linear , symmetriv top molecule.
CO4	Explain franck- condon principle.
CO5	Derive resonance condition.
CO6	Explain chemical shift.
CO7	Explain the principle of ESR
CO8	Explain the principle of NQR
CO9	Derive Bloch equation.

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# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2015-2016)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Nuclear and Particle Physics
Course Code	HPHM43
Class	II year (2015-2016)
Semester	Even
Staff Name	C.Stella Rani
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- .To understand about the nuclear forces in the deutron
- To study the nuclear decays
- To understand the nuclear models
- To learn about the nuclear reactions

Nuclear and Particle Physics

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.

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.

Unit III

Nuclear Model

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.

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.

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.

Books For Study:

3. Nuclear Physics, D. C. Tayal, Himalaya Publications
4. . 2. Elements of Nuclear Physics, M. C. Pandia and R. P. S. YadavKedarnath.

Books For Reference:

1. Concepts of Nuclear Physics, Bernard L Cohen, Tata McGraw-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.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 02.12.2015
1-L1	Ground and excited states of deuteron
2-L2	magnetic dipole and electric quadrupole moments of deuteron
3- L3	n-p scattering at low energies
4-L4	shape independent effective range theory of np scattering
5-L5	pp scattering at low energies
6-L6	exchange forces
7-L7	meson theory of nuclear force.
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Gamow'stheory of alpha decay
10- L9	lineand Continuous spectrum of β decay
11-L10	Fermi theory of beta decay
12-L11	Fermi and Gamow-Teller selection rules
13-L12	parity violation
14-L13	Gamma decay
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (25.01.2016)
16-L15	multipole transitions in nuclei
17-IT-1	**Internal Test-I**
18-L16	selection rules
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	internal conversion
21- L19	nuclear isomerism.
22- P2	**College level meeting/Cell function**
23-L20	Liquid drop model
24-L21	Weizsackers mass formula
25-L22	nuclear stability
26-L23	Bohr Wheeler theory of nuclear fission
27-L24	magic numbers
28-L25	evidence for magic numbers
29-L26	shell model
30-L27	spin orbit coupling
31-L28	angular momenta and parities of nuclear ground states
32-L29	magnetic moments
33-L30	Schmidt line
34- P3	**Department Seminar**
35-L31	collective model.
36-L32	**Allotting portion for Internal Test-II**

	Internal Test II begins (22.02.2016)
37- L33	Types of nuclear reactions
38- IT-II	**Internal Test-II**
39-L34	Q-equation
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	solution of the equation
42- L37	compound nuclear theory
43- L38	reciprocity theorem , nuclear cross section resonance scatteringBreit
44- P4	**College level meeting/ function**
45-L39	Wigner dispersion formula nuclear chain reaction , four factor formula.
46-L40	Classification of elementary particles
47-L41	fundamental interactions conservations laws
48-L42	CPT theorem , SU(3) multiplet
49-L43	meson octet – baryon octet and baryon decouplet
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (28.03.2016)
51 L45	Gellmann-Okubo mass formula, Quark theory.
52- L46	
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (11.04.2016)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 22.04.2016

Course Outcomes

Learning Outcomes	**COs** of the course "**Nuclear and Particle Physics"**
CO1	Fermi theory of Beta decay
CO2	Solution of the equation
CO3	Magnetic dipole and electric quadrupole moments of deuteron
CO4	Fermi and gamow teller selection rules
CO5	Gamma decay
CO6	Multipole transistions in nuclei
CO7	Compound nuclear theory
CO8	Baryon octet and baryon decouplet
CO9	Gellmann – Okubo mass formula

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2016-2017)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	RENEWABLE ENERGY SOURCES
Course Code	KPHE11
Class	I year (2016-2017)
Semester	Odd
Staff Name	G.GOMATHI SANKARI
Credits	6
L. Hours /P. Hours	6 / WK
Total 90 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 80 Hrs (5 units; 5×16=80; 16Hrs /unit)	

Course Objectives

- Understand the various forms of conventional energy resources.
- Learn the present energy scenario and the need for energy conservation
- Explain the concept of various forms of renewable energy
- Outline division aspects and utilization of renewable energy sources for both domestics and industrial application
- Analyse the environmental aspects of renewable energy

RENEWABLE ENERGY SOURCES

Unit I:

Introduction : Primary and secondary energy – commercial nd non-commercial energy – renewable and non-renewable energy sources 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

Unit II:

Solar Energy: Introduction- extraterrestrial solar radiation-radiation at ground level-collectors-solar cells- application of solar energy-Biomass energy-introduction-biomass conversion-biogas production-pyrolysis and gasification-direct combustion-applications

Unit III:

Wind energy: Introduction-basic theory-types of turbines-applications. Geothermal energy: Introduction-geothermal resources types-resource base-application for heating and electrically generation. Tidal energy: Introduction-origin of tides-power generation scheme. Wave energy: Introduction-basic theory-wave power devices.

Unit IV:

Other Renewable Energy Sources: Introduction-open and closed OTEC cycles-biophotolysis-ocean currents-Hydropower-introduction-basic concept-site selection-types of turbine-small scale hydropower-Magnetohydrodynamics(MHD),Theroelectric and thermionic energy resources- basic principles-power generation-Nuclear energy-basic principle-power generation

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-Hydrogen energy-production-electrolysis-thermochemical methods- solar energy method-hydrogen storage.

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 16.06.2016
1-L1	Introduction : Primary and secondary energy
2-L2	commercial nd non-commercial energy
3- L3	renewable importance
4-L4	non-renewable energy sources
5-L5	world energy use
6-L6	reserves of energy resources
7-L7	energy cycle of earth
8-L8	Indian energy scenario
9-L9	Long term energy scenario for India
10-P1	**Welcoming of First year and Inauguration of PhysicsAssociation**

11-L10	environmental aspects of utilization
12-L11	Solar Energy: Introduction.
13-L12	extraterrestrial solar radiation
14-L13	radiation at ground level-
15-L14	collectors-solar cells
16-L15	application of solar energy
17-L16	Biomass energy
18-L17	introduction-biomass conversion
19-L18	biogas production
20-L19	pyrolysis and gasification
21-L20	direct combustion-applications
22-L21	Wind energy
23-L22	**Allotting portion for Internal Test-I**
	Internal Test I begins (25.07.2016)
24-L23	Introduction-basic theory
25-L24	types of turbines
26-IT-1	**Internal Test-I**
27-L25	applications
28-L26	Geothermal energy: Introduction-geothermal resources
29-L27	types-resource
30-L28	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
31- L29	base-application for heating and electrically generation
32- L30	Tidal energy
33- L31	Introduction-origin of tides
34-P2	**college level meeting/Cell function**
35- L32	power generation scheme
36- L33	Wave energy
37- L34	Introduction-basic theory-wave power devices
38- L35	Other Renewable Energy Sources
39- L36	Introduction-open and closed OTEC cycles
40- L37	biophotolysis
41- L38	ocean currents-
42- L39	Hydropower-introduction
43- L40	-basic concept-site selection
44- L41	types of turbine
45- L42	small scale hydropower
46- L43	Magnetohydrodynamics(MHD)
47- L44	Theroelectric and thermionic energy resources
48- L45	basic principles-power generation
49- L46	Nuclear energy
50- L47	basic principle-power generation
51- P3	**Department Seminar**
52- L48	Chemical Energy Sources:
53- L49	Introduction-Fuel cells
54- L50	design and principle
55- L51	-classification-types

56-L52	**Allotting portion for Internal Test-II**
	Internal Test II begins (22.08.2016)
57-L53	advantages and disadvantages
58-L54	applications
59-IT-II	**Internal Test-II**
60- L55	Batteries-Introduction
61- L56	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
62- L57	theory-different types of batteries arrangements-
63- L58	classification of batteries
64- L59	advantages of batteries for bulk storage
65- L60	Hydrogen energy
66- L61	production-electrolysis-
67- L62	thermochemical methods
68- L63	solar energy method
69- L64	hydrogen storage.
70- L65	Revision for reserves of energy resources
71- L66	commercial nd non-commercial energy
72- L67	application of solar energy
73- L68	pyrolysis and gasification
74-P4	**College level meeting/ function**
75- L69	types of turbine
76- L70	Magnetohydrodynamics(MHD)
77- L71	Nuclear energy
78- L72	Chemical Energy Sources:
79- L73	**Allotting portion for Internal Test-III**
	Internal Test III begins (03.10.2016)
80- L74	classification of batteries
81- L75	production-electrolysis-
82-IT-III	**Internal Test-III**
83- L76	thermochemical methods
84- L77	**Test Paper distribution and result analysis**
85- L78	small scale hydropower
	Entering Internal Test-III Marks into University portal
	Model Test begins (17.10.2016)
86- L79	**Model Test**
87-MT	**Model Test**
88-MT	**Model Test**
89-MT	**Model test paper distribution and previous year university question paper discussion**
90-L-80	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.10.2016

Course Outcomes

Learning Outcomes	**COs** of the course **"Renewable Energy Sources"**
CO1	Describe the environmental aspects of non-conventional energy resources. In Comparison with various conventional energy systems, their prospects and limitations
CO2	Know the need of renewable energy resources, historical and latest developments
CO3	Describe the use of solar energy and the various components used in the energy production with respect to applications like - heating, cooling, desalination, power generation, drying, cooking etc.
CO4	Appreciate the need of Wind Energy and the various components used in energy generation and know the classifications
CO5	Understand the concept of Biomass energy resources and their classification, types of biogas Plants- applications
CO6	Compare Solar, Wind and bio energy systems, their prospects, Advantages and limitations
CO7	Acquire the knowledge of fuel cells, wave power, tidal power and geothermal principles and applications.
CO8	Understand the various forms of conventional energy resources
CO9	Analyse the environmental aspects of renewable energy
Experimental Learning	
EL1	Describe sources and uses of energy
EL2	Define renewable and non-renewable energy
EL3	Provide examples of common types of renewable and non-renewable resources
EL4	Understand and explain general ways to save energy at a personal,community and global level.
Integrated Activity	
IA1	Understand and explain, in general terms, how passive solar heating, hydropower and wind power work
IA2	Understand the benefits and disadvantages to using renewable resources

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2016-2017)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Classical Mechanics and relativity
Course Code	KPHM11
Class	I year (2016-2017)
Semester	Odd
Staff Name	J Ruby Jemima
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs / Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To study the mechanics of the particle. .
- To derive the Lagrange's equation.
- To generalise the advantages of Variational principle formulation.
- To derive the Virial theorem.
- To study about the Euler's angle.
- To expose the special theory of relativity.

Classical Mechanics and relativity

UNIT I

FUNDAMENTAL PRINCIPLE and LAGRANGIAN FORMULATION: Mechanics of the particle and a System of the Particles -Constraints. D'Alembert's principle. Lagrange's equation. Velocity dependence force Dissipation functions Application of Lagrange's formulation. Hamilton's principle Lagrange's equation from Hamilton's principle Advantages of Variational principle formulation

Unit II

Reduction of two body problems into one body and equivalent dimensional problems. Equation of motion of first integral Virial theorem Bertrand's theorem Kepler's problem Scattering in a central force field. Transformation of scattering problems to laboratory coordinates

UNIT III

Rigid body motion Independent coordinates of a rigid body. Matrix transformation Euler's angle Coriolis force Angular momentum and kinetic energy Principle of least action Hamilton's equation from Variational principle. Small oscillations Normal coordinates Linear tri atomic molecule Forced vibrations

UNIT IV

Hamilton,s formulationCanonical transformation Generating function. Poisson's brakets. Poisson braket formula tion for equations of motion. Hamilton's Jacobi theory. Harmonic oscillator Problems. Hamilton's characteristic function. Seperation of variables Action angle variables.

UNIT V

Mechanics of small oscillations: The special theory of relativity. Lorentz transformation. Four dimensional formulation. Relativistic elastic scattering. The Lagrangian and Hamiltonian of a relativistic particle.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2016
1-L1	Mechanics of the particle.
2-L2	System of the Particles ,Constraints.
3- L3	D'Alembert's principle.
4-L4	Lagrange's equation.
5-L5	Velocity dependence force
6-L6	Dissipation functions.
7-L7	Application of Lagrange's formulation.
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Hamilton's principle.
10- L9	Lagrange's equation from Hamilton's principle.
11-L10	Advantages of Variational principle formulation.
12-L11	Reduction of two body problems into one body and equivalent dimensional problems.
13-L12	Equation of motion of first integral.
14-L13	Virial theorem.
15-L14	Bertrand's theorem.
16-L15	Kepler's problem.
17- L16	Scattering in a central force field.
18- L17	Transformation of scattering problems to laboratory coordinates.
19- L18	Transformation of scattering problems to laboratory coordinates
20- L19	Kepler's problem.
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (25.07.2016)
22- L21	Rigid body motion.

23- IT-1	**Internal Test-I**
24- L22	Independent coordinates of a rigid body.
25- L23	Matrix transformation
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Matrix transformation.
28- L26	Euler’s angle
29- L27	Euler’s angle
30- P2	**College level meeting/Cell function**
31-L28	Coriolis force
32-L29	Coriolis force
33-L30	Angular momentum and kinetic energy
34- L31	Angular momentum and kinetic energy.
35- L32	Principle of least action
36- L33	Hamilton’s equation from Variational principle.
37- L34	Small oscillations.
38-L35	Normal coordinates
39- L36	Linear tri atomic molecule
40- L37	Forced vibrations.
41- L38	Canonical transformation
42-P3	**Department Seminar**
43- L39	Generating function.
44- L40	Poisson’s brakets.
45- L41	Poisson braket formulation for equations of motion.
46- L42	Hamilton’s Jacobi theory.
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins 922.08.2016)
48- L44	Harmonic oscillator Problems.
49-IT-II	**Internal Test-II**
50-L45	Hamilton’s characteristic function.
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Seperation of variables.
53- L48	Action angle variables.
54- L49	The special theory of relativity.
55- L50	The special theory of relativity.
56- L51	Lorentz transformation.
57- L52	Lorentz transformation.
58- L53	Four dimensional formulation.
59-P4	**College level meeting/ function**
60- L54	Relativistic elastic scattering.
61- L55	Relativistic elastic scattering
62- L56	The Lagrangian and Hamiltonian of a relativistic particle
63- L57	The Lagrangian and Hamiltonian of a relativistic particle
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins (03.10.2016)
65- L59	Covariant formulation
66- L60	Covariant formulation

67-IT-III	**Internal Test-III**
68- L61	Action angle variables
69- L62	Seperation of variables
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (17.10.2016)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.10.2016

Course Outcomes

Learning Outcomes	**COs** of the course **"Classical Mechanics and relativity"**
CO1	Explain the D'Alembert's principle.
CO2	Determine the scattering in a central force field.
CO3	Deduce Euler's equation.
CO4	Generalise the canonical transformation.
CO5	Determine the action angle variables.
CO6	Derive Euler angle.
CO7	Describe abut small oscillations.
CO8	Derive poisson bracket.
CO9	Describe Hamilton's Jacobi theory.

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

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Department of Physics

COURSE ACADEMIC PLAN (2016-2017)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Mathematical physics I
Course Code	KPHM12
Class	I year (2016-2017)
Semester	Odd
Staff Name	E.Christy Jerin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To acquire the knowledge about the vector analysis.
- To identify the eigen value /eigen vector of the matrix. .
- To study the differentiation and integration of matrices.
- To derive the polynomials.
- To calculate the laplace integral transform.
- To explain the convolution theorm.
- To calculate the Fourier integral transform.

Syllabus

UNIT I

Gauss divergence theorem. Deduction from Gauss divergence theorem. Green's theorem. Green's theorem in a plane. Classification of vector fields

UNIT II

Eigen values,Eigen vectors . Charecteristic equation of matrix. Cayley Hamilton theorem. Some Important theorems of eigen value and eigen vectors Diagonalisation of matrices Differentiation and integration of matrices. Power of matrices. Exponential of a matrix Matrices in physics

UNIT III

Bessel differential equation Bessel 's function of I kind Generating function Recurrence relations Laguarre's differential equation. Laguerie polynomial. Generating function Recurrence relations

UNIT IV

Introduction Fourier's transform(FT) Properities of FT-FT of a derivative Fourier sin and cosine transforms of derivatives FT of function of function of two or three variables Finite FT Simple applications of FT

UNIT V

Laplace Transform(LT) Properties of LT LT of derivation of a function L T of periodic functions Properties of inverse LT LT of derivation of a function L T of periodic functions Properties of inverse LT Convolution theorem Evaluation of inverse LT by convolution theorem Application of LT

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 16.06.2016
1-L1	Gauss divergence theorem.
2-L2	Deduction from Gauss divergence theorem.
3- L3	Green's theorem.
4-L4	Green's theorem in a plane.
5-L5	Classification of vector fields
6-L6	Eigen values,Eigen vectors.
7-L7	Charecteristic equation of matrix.
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Cayley Hamilton theorem.
10- L9	Some Important theorems of eigen value and eigen vectors
11-L10	Some important theorems of eigen value and eigen vectors.
	Diagonalisation of matrices
13-L12	Differentiation and integration of matrices.
14-L13	Power of matrices.
15-L14	Exponential of a matrix
16-L15	Matrices in physics
17- L16	Bessel differential equation
18- L17	Bessel 's function of I kind
19- L18	Generating function
20- L19	Recurrence relations
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (25.07.2016)
22- L21	Recurrence Relations.
23- IT-1	**Internal Test-I**
24- L22	Laguarre's differential equation.

25- L23	
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Laguerie polynomial.
28- L26	Generating function
29- L27	Recurrence relations
30- P2	**College level meeting/Cell function**
31-L28	Recurrence relations
32-L29	Recurrence relations.
33-L30	Introduction
34- L31	Fourier's transform(FT)
35- L32	Properities of FT-FT of a derivative
36- L33	Fourier sin and cosine transforms of derivatives
37- L34	FT of function of function of two or three variables
38-L35	Finite FT
39- L36	Simple applications of FT
40- L37	Laplace Transform(LT)
41- L38	Properties of LT
42-P3	**Department Seminar**
43- L39	LT of derivation of a function
44- L40	L T of periodic functions
45- L41	Properties of inverse LT
46- L42	Convolution theorem
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins (22.08.2016)
48- L44	Evaluation of inverse LT by convolution theorem
49-IT-II	**Internal Test-II**
50-L45	Application of Lt
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Laplace Transform(LT)
53- L48	Properties of LT
54- L49	LT of a function of a function
55- L50	LT of periodic functions
56- L51	Properties of inverse LT
57- L52	Convolution theorem
58- L53	Evaluation of inverse LT by convolution theorem
59-P4	**College level meeting/ function**
60- L54	Application of LT
61- L55	Eigen values: Eigen Vector
62- L56	Characteristic equation of matrix
63- L57	Cayley Hamilton theorem
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins (03.10.2016)
65- L59	Some important theorem
66- L60	Diagonalisation of matrices
67-IT-III	**Internal Test-III**

68- L61	Differentiation and integration of matrices
69- L62	Power of matrices
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (17.10.2016)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.10.2016

Course Outcomes

Learning Outcomes	**COs** of the course **"Mathematical physics I"**
CO1	Explain the classification of vector field.
CO2	Determine the eigen value and eigen vector of the characteristic equation of matrix.
CO3	Design the recurrence relation.
CO4	Determine the fourier transform for a given function
CO5	Explain about the convolution theorem.
CO6	Explain the properities of fourier transform.
CO7	Application of matrix in physics.
CO8	Application of laplace transform.
CO9	Application of fourier transform.

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

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Department of Physics

COURSE ACADEMIC PLAN (2016-2017)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Integrated Electronics
Course Code	KPHM13
Class	I year (2016-2017)
Semester	Odd
Staff Name	C.Stella Rani
Credits	4
L. Hours /P. Hours	5 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To understand different types of electronic devices and preparation of IC
- To discuss logical families in the digital electronics and study the counters and registers
- To describe the application of operational amplifier in the different field
- To study the various electronics instrumentation through basics of science

Syllabus

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, I2L,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.

2. 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

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2016
1-L1	FET-Types of FET-Characteristics and applications of FET
2-L2	MOSFET
3- L3	SCR, DIAC, TRIAC
4-L4	High frequency device
5-L5	Inegrated Circuits
6-L6	IC Fabrication Technology
7-L7	Steps in Fabrication
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Integrated Resistors and Capacitors
10- L9	VLSI Technology
11-L10	Logic Families - DTL, RTL,TTL&ECL
12-L11	I2L,CMOS,NMOS and PMOS
13-L12	DTL type AND, OR, NAND & NOR gates
14-L13	RTL and TTL type NAND - CMOS NOR and CMOS NAND
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (25.07.2016)
16-L15	Flip Flops: RS-RST-D
17-IT-1	**Internal Test-I**
18-L16	JK- JK Master/Slave
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Asynchronous Counters and Synchronous Counters
21- L19	Registers
22- P2	**College level meeting/Cell function**
23-L20	Characteristics and Parameters
24-L21	DC Analysis of IC OPAMP
25-L22	Applications of OP AMP
26-L23	Instrumentation amplifier
27-L24	Sample and Hold System
28-L25	Analog Multiplexer , Integrator
29-L26	Differentiator
30-L27	Design of Analog circuits for the solution of Simultaneous and Differential Equations
31-L28	Filters: First and Second order LOW,HIGH and BAND pass filters
32-L29	Timer-555 Timer IC-Internal Architecture and Working
33-L30	Modes of Operation: Monostable and Astable operation
34- P3	**Department Seminar**
35-L31	Applications-Voltage Control Oscillator
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (22.08.2016)
37- L33	IC 566-PLL Concept
38- IT-II	**Internal Test-II**
39-L34	PLL IC 565
40-L35	**Test Paper distribution and result analysis**

	Entering Internal Test-II Marks into University portal
41-L36	Application- Frequency multiplexer
42- L37	FSK Modulation and Demodulation
43- L38	Sensors and Transducers
44- P4	**College level meeting/ function**
45-L39	Measurement and Control
46-L40	Signal Conditioning and Recovery
47-L41	Impedance Matching , Noise and Noise Sources
48-L42	Amplification (OP Amp based Feedback Amp, Instrumentation Amp)
49-L43	Filtering and Noise Reduction, Shielding and Grounding -
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (03.10.2016)
51 L45	Fourier Transform, Lock- in Detector/Amplifier
52- L46	Box-Car Integrator or Averager - Modulation Techniques
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (17.10.2016)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.10.2016

Course Outcomes

Learning Outcomes	**COs** of the course **"Integrated Electronics"**
CO1	The students can able to
CO2	Explain the principle of integrated circuit and its advancement
CO3	Understand the applications of gates in the various fields
CO4	Know the values of integrated circuit in the development of engineering field
CO5	Operate the electronic instrumentation
CO6	
CO7	Solve the problems by constructing the circuit using Op-amp
CO8	Design a circuit using various IC
CO9	
Experimental Learning	Construction of new circuits using chips
EL1	Achievements of Electronics in the New era
EL2	The students can able to

EL3	Explain the principle of integrated circuit and its advancement
EL4	Understand the applications of gates in the various fields
Integrated Activity	Know the values of integrated circuit in the development of engineering field
IA1	Operate the electronic instrumentation
IA2	

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2016-2017)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Solid State Physics
Course Code	KPHM22
Class	II year (2016-2017)
Semester	odd
Staff Name	J Ruby Jemima
Credits	4
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To understand Bravis lattice
- To discuss Brillouine zone
- To explain Crystal binding and study
- To describe Dulong and petits law
- Explain types of super conductors
- To Discuss about electronic devices
-

SOLID STATE PHYSICS

UNIT I:

CRYSTAL STRUCTURE AND DIFFRACTION

Recapitulation of basic concepts- crystal systems- Bravais Lattice- Miller indices-symmetry elements- symmetry groups- simple crystal structures (sodium chloride, cesium chloride, diamond and zincblende structures) Bragg's law- Laue equations- reciprocal lattice- Brillouine zones- atomic scattering factor- geometrical structure factor- experimental methods of structure analysis (the laue, rotating crystal and powder methods)

UNIT II:

CRYSTAL BINDING AND ELASTIC PROPERTIES OF SOLIDS

Crystal bindings: Ionic bond- covalent bond- molecular bond- Hydrogen bondmetallic bond- Vanderwaal's bond-Binding energy of crystals- polaron Elastic properties: Stress components- displacement and strain components- elastic compliances and stiffness constants- relation between elastic compliances and stiffness constants -elastic constants for cubic isotropic crystals-elastic waves- experimental determination of elastic constants

UNIT III:

LATTICE DYNAMICS AND THERMAL PROPERTIES

Lattice dynamics: Concept of phonons- momentum of phonons- normal and Umklapp process- vibrations of one dimensional monoatomic and diatomic linear lattices- inelastic scattering of neutrons by phonons Thermal properties: Theories of specific heat- Dulong and Petit's law- Einstein theory and Debye's theory- Widemann Franz law

UNIT IV:

ELECTRONIC PROPERTIES OF SOLIDS

Free electron gas model in three dimensions: Density of states- Fermi energyEffect of temperature- heat capacity of electrons- experimental heat capacity of metalsthermal effective mass- electrical conductivity and ohm's law- Hall effect- failure of the free electron gas Band theory of solids- periodic potential and Bloch's theorem- KronigPenny model-wave equation of electron in a periodic potential- periodic, extended and reduced zone schemes of energy representation- number of orbitals in an energy bandclassification of metals, semi conductors and insulators- tight binding method and its applications to FC and BCC structures.

UNIT V:

SUPER CONDUCTIVITY

Experimental survey: Superconductivity and its occurrence- destruction of superconductivity by magnetic field- Meissner effect- Type I and II super conductorsentropy- free energy- heat capacity- energy gap- isotope effect Theoretical survey: Thermodynamics of the superconducting transition- London equation- coherence length- salient features of the BCS theory of super conductivity- flux quantization in a superconductivity ring- DC and AC Josephson effects

Books for Study and Reference

1. Introduction to Solid State Physics - 7 The edition - by Charles kittel

2. Solid State Physics by Neil W Ashroff and N.DavidMermin

3. Solid State Physics by S.L. Kakani and C. Hemarajani

4. Elementary Solid State Physics by M. Ali Omar

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2016
1-L1	Recapitulation of basic concepts
2-L2	Crystal systems, Bravais Lattice
3- L3	Miller indices
4-L4	Symmetry elements, Symmetry groups
5-L5	simple crystal structures (sodium chloride, cesium chloride, diamond and zincblende structures)
6-L6	Bragg's law, Laue equations
7-L7	reciprocal lattice, Brillouine zones
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	atomic scattering factor, Geometrical structure factor
10- L9	Experimental methods of structure analysis (the laue, rotating crystal and powder methods)
11-L10	Crystal bindings: Ionic bond, covalent bond
12-L11	molecular bond,Hydrogenbondmetallic bond
13-L12	Vanderwaal's bond
14-L13	Binding energy of crystals
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (25.07.2017)
16-L15	polaron Elastic properties: Stress components
17-IT-1	**Internal Test-I**
18-L16	displacement and strain components
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	elastic compliances and stiffness constants
21- L19	relation between elastic compliances and stiffness constants
22- P2	**College level meeting/Cell function**
23-L20	elastic constants for cubic isotropic crystals
24-L21	elastic waves
25-L22	experimental determination of elastic constants
26-L23	Lattice dynamics: Concept of phonons
27-L24	momentum of phonons
28-L25	normal and Umklapp process
29-L26	vibrations of one dimensional monoatomic and diatomic linear lattices
30-L27	inelastic scattering of neutrons by phonons Thermal properties: Theories of specific heat
31-L28	Dulong and Petit's law Einstein theory and Debye's theory,Widemann Franz law

32-L29	Free electron gas model in three dimensions: Density of states, Fermi energyEffect of temperature
33-L30	heat capacity of electrons, experimental heat capacity of metalsthermal effective mass
34- P3	electrical conductivity and ohm's law, Hall effect-
35-L31	failure of the free electron gas Band theory of solids
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (22.08.2016)
37- L33	periodic potential and Bloch's theorem, KronigPenny model
38- IT-II	**Internal Test-II**
39-L34	wave equation of electron in a periodic potential
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	periodic, extended and reduced zone schemes of energy representation
42- L37	number of orbitals in an energy bandclassification of metals, semiconductors and insulators
43- L38	tight binding method and its applications to FC and BCC structures.
44- P4	**College level meeting/ function**
45-L39	Experimental survey: Superconductivity and its occurrence, destruction of superconductivity by magnetic field
46-L40	Meissner effect, Type I and II super conductors entropy,
47-L41	free energy, heat capacity ,energy gap, isotope effect
48-L42	Theoretical survey: Thermodynamics of the superconducting transition
49-L43	London equation, coherence length
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (03.10.2016)
51 L45	salient features of the BCS theory of super conductivity
52- L46	flux quantization in a superconductivity ring,DC and AC Josephson effects
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (17.10.2016)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.10.2016

Course Outcomes

Learning Outcomes	**COs** of the course **“Solid state physics”**
CO1	elastic waves
CO2	experimental determination of elastic constants
CO3	Lattice dynamics: Concept of phonons
CO4	elastic compliances and stiffness constants
CO5	relation between elastic compliances and stiffness constants
CO6	tight binding method and its applications to FC and BCC structures.
CO7	wave equation of electron in a periodic potential
CO8	KronigPenny model
CO9	number of orbitals in an energy bandclassification of metals, semiconductors and insulators

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2016-2017)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Quantum Mechanic I
Course Code	KPHM31
Class	II year (2016-2017)
Semester	Odd
Staff Name	E .Christy Jerin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To develop the schrodinger wave equation. .
- To derive Ehrenfest theorem.
- To find energy eigen value of square well potential.
- To discuss the postulates of quantum mechanics.
- To derive the energy eigen value of harmonic oscillator.
- To discuss about scattering.
- To find scattering cross section of rigid sphere.

Syllabus

Quantum Mechanic I

UNIT 1

Development of wave equation Travelling harmonic waves The one dimensional wave equation Interpretation of the wave function Normalization Probability current density Expectation values Ehrenfest’s theorem Energy Eigen functions One dimensional square well potential

UNIT II

Interpretative postulates and energy eigen functions Motion of a free wave packet in one dimension Discrete Eigen values(bound states) Linear Harmonic oscillator Spherically symmetric potential in three dimension

UNIT III

One dimensional square potential barrier Scattering coefficients Collisions in three dimensions Scattering cross sections Asymmetric behavior Scattering by spherically symmetric potentials Scattering by a perfect rigid sphere Scattering by a square well potential

UNIT IV

Transformation theory Transformation of Hamiltonian with U Transformation of Hamiltonian with V Dirac's bra and ket notation Equations of motion Matrix theory of the linear harmonic oscillator

UNIT V

Rotational angular momentum and unitary groups. Proper rotation group Infinitesimal rotations. Spin of vector particle Commutation relation for the generators Choice of representation Angular momentum matric Combination of angular momentum states And tensor operations Clebsch gordan coefficients Combination of angular momentum states Spin of vector paricle Commutation relation for the generators Dirac's bra ket notation Equation of motion.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2016
1-L1	Development of wave equation
2-L2	Travelling harmonic waves
3- L3	The one dimensional wave equation
4-L4	Interpretation of the wave function
5-L5	Normalization
6-L6	Probability current density
7-L7	Expectation values
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Ehrenfest's theorem
10- L9	Energy Eigen functions
11-L10	One dimensional square well potential
12-L11	Interpretative postulates and energy eigen functions
13-L12	Motion of a free wave packet in one dimension

14-L13	Discrete Eigen values(bound states)
15-L14	Linear Harmonic oscillator
16-L15	Spherically symmetric potential in three dimension
17- L16	One dimensional square potential barrier
18- L17	Scattering coefficients
19- L18	Collisions in three dimensions
20- L19	Scattering cross sections
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (25.07.2016)
22- L21	Asymmetric behaviour
23- IT-1	**Internal Test-I**
24- L22	Scattering by spherically symmetric potentials
25- L23	Scattering by a perfect rigid sphere
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Scattering by a square well potential
28- L26	Scattering by a square well potential
29- L27	Transformation theory
30- P2	**College level meeting/Cell function**
31-L28	Transformation theory
32-L29	Transformation of Hamiltonian with U
33-L30	Transformation of Hamiltonian with U
34- L31	Transformation of Hamiltonian with V
35- L32	Transformation of Hamiltonian with V
36- L33	Dirac’s bra and ket notation
37- L34	Dirac’s bra and ket notation
38-L35	Equations of motion
39- L36	Equations of motion
40- L37	Matrix theory of the linear harmonic oscillator
41- L38	Matrix theory of the linear harmonic oscillator
42-P3	**Department Seminar**
43- L39	Rotational angular momentum and unitary groups.
44- L40	Rotational angular momentum and unitary groups.
45- L41	Proper rotation group.
46- L42	Proper rotation group.
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins (22.08.2016)
48- L44	Infinitesimal rotations.
49-IT-II	**Internal Test-II**
50-L45	Spin of vector particle.
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Commutation relation for the generators.
53- L48	Choice of representation.
54- L49	Angular momentum matrices.
55- L50	Angular momentum matrices.
56- L51	Combination of angular momentum states
57- L52	And tensor operations.

58- L53	Clebsch gordan coefficients.
59-P4	**College level meeting/ function**
60- L54	Clebsch gordan coefficients.
61- L55	Combination of angular momentum states
62- L56	Spin of vector paricle.
63- L57	
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins (03.10.2016)
65- L59	Commutation relation for the generators
66- L60	Dirac's bra ket notation.
67-IT-III	**Internal Test-III**
68- L61	Equation of motion
69- L62	Equation of motion
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (17.10.2016)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.10.2016

Course Outcomes

Learning Outcomes	**COs** of the course **"Quantum Mechanic I"**
CO1	Develop the wave equation.
CO2	Derive Ehrenfest theorem.
CO3	Derive eigen value of square well potential.
CO4	Derive the eigen value of harmonic oscillator.
CO5	Calculate the scattering cross section for square well potential
CO6	Derive the energy eigen value of harmonic oscillator using matrix theory.
CO7	Derive C.G coefficients.
CO8	Discuss about the choice of representation.
CO9	Discuss about the rotational groups

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2016-2017)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Statistical Mechanics
Course Code	KPHM33
Class	II year (2016-2017)
Semester	Odd
Staff Name	C.Stella Rani
Credits	4
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To understand different types of velocities and its relation Maxwell distribution of molecular velocities
- To discuss how viscosity of gases varies with T and P
- To explain basic principle of photochemistry
- To describe the application of luminance types
- To analyse the stability of radioactive elements
- To illustrate nuclear reactor and its application
- To differentiate crystalline and amorphous solids
- Explain types of crystal
- To derive expression for depression of freezing point
- To define osmotic pressure and application

Syllabus

Statistical Mechanics

Unit I

Basic concepts

Phase space-phase-space diagram of an oscillator-Volume in phase space-EnsemblesMicrocanonical 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 probabilityGeneral statistical distribution law-Classical Maxwell-Boltzmann distribution law-Evaluation of constants in the Maxwell Boltzmann distribution law-Maxwell's law of distribution of velocitiesprinciple 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 solidsDebye theory of specific heat of solids-Criticism of Debye's theory-Ideal Bose Einstein GasEnergy 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,PragatiPrakasan,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 PalashB.PalNarosa First reprint 2009

3.Statistical Mechanics by Kerson Huang 4.Statistical Mechnics by Sears and Salinger.

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 16.06.2016
1-L1	Phase Space
2-L2	Phase-space diagram of an oscillator
3- L3	Volume in phase space
4-L4	Ensembles Microcanonical ensemble
5-L5	Canonical ensemble
6-L6	Grand canonical ensemble
7-L7	Density of distribution in phase space
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Liouvilles theorem
10- L9	Postulate of equal a priori probability
11-L10	Statistical,mechanical and thermal equilibriums
12-L11	Connection between statistical and thermodynamical quantities.
13-L12	Microstates and macro states
14-L13	Stirling's approximation
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (25.07.2016)
16-L15	Thermodynamic probabilityGeneral statistical distribution law
17-IT-1	**Internal Test-I**
18-L16	Boltzmann distribution law
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal

20-L18	Evaluation of constants in the Maxwell Boltzmann distribution law
21- L19	Maxwell's law of distribution of velocitiesprinciple of equipartition of energy
22- P2	**College level meeting/Cell function**
23-L20	Boltzmann entropy relation
24-L21	Probability of magnetic moment distribution of independent atoms.
25-L22	Postulatory foundations of quantum mechanics
26-L23	Transition from classical statistical mechanics to quantum statistical mechanics
27-L24	Indistinguishability and quantum statistics
28-L25	Exchange symmetry of wave functions
29-L26	Bose-Einstein Statistics
30-L27	Fermi-Dirac statistics
31-L28	Maxwell-Boltzmann statistics
32-L29	Results of three statistics,Thermodynamic interpretation of the parameters α & β
33-L30	Black body radiation and the Planck radiation law.
34- P3	**Department Seminar**
35-L31	Specific heat of solids
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (22.08.2016)
37- L33	Dulong and Petit law
38- IT-II	**Internal Test-II**
39-L34	Einstein theory of specific heat of solids
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Debye theory of specific heat of solids
42- L37	Criticism of Debye's theory
43- L38	Ideal Bose Einstein Gas, Energy and pressure of the Gas degeneracy
44- P4	**College level meeting/ function**
45-L39	Bose-Einstein Condensation ,Thermal properties of Bose Einstein Gas-
46-L40	Ideal Fermi Dirac gas,Energy and pressure of the Gas
47-L41	Thermodynamics functions of degenerate Fermi-Dirac gas-Electron Gas.
48-L42	Phase transition,Phase transitions of first and second kind
49-L43	critical exponent,Yang and Lee theory
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (03.10.2016)
51 L45	Phase transitions of second kind: the Ising model-Braggs-Williams approximation,One dimensional Ising model
52- L46	
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (17.10.2006)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.10.2016

Course Outcomes

Learning Outcomes	**COs** of the course **"Statistical Mechanics"**
CO1	Derive the density of states
CO2	Determine the Maxwell Boltzmann distribution velocities
CO3	Define Microstates and macro states
CO4	Application to the Black body distribution
CO5	Analogy between statistical and thermo dynamical quantities
CO6	Determine the specific heat of solids
CO7	Difference between three statistics
CO8	Finding the condensation of Bose - Einstein
CO9	Knowledge about Electron gas
Experimental Learning	
EL1	Phase transitions of first and second kind
EL2	
Integrated Activity	
IA1	Yang and Lee theory
IA2	Stirling's approximation

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2016-2017)

Programme Name	M.Sc. Physics
Course Name	NUMERICAL METHODS AND PROGRAMMING IN C++
Course Code	KPHE21
Class	I year (2016-2017)
Semester	EVEN
Staff Name	G.GOMATHISANKARI
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- The aim is to teach the student various topics in **Numerical Analysis** such as solutions of nonlinear equations in one variable
- Interpolation and approximation, **numerical** differentiation and integration,
- Direct **methods** for solving linear systems
- N**umerical solution** of ordinary differential equations.

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.

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 01.12.2016
1-L1	**Roots of equations and eigen-value problems**
2-L2	Newton-Raphson method. Secant Method
3- L3	Muller's Method - Lin -Bairstow's Method.
4-L4	Linear Algebraic Equations
5-L5	Gauss elimination - Gauss-Jordan
6-L6	Gauss-Jacobi
7-L7	Inverse of a matrix by Gauss Jordan elimination method
8- P1	Physics Assiocation
9- L8	**Curve Fitting / Interpolation** Curve fitting
10- L9	Linear Least square fitting - Nonlinear Fit- Fitting a Polynomial Function, Exponential function
11-L10	Cubic spline fitting – Interpolation
12-L11	Interpolation: Fundamental theorem of finite difference, Finite difference interpolation

	with equally spaced:
13-L12	Newton's forward and backward difference formulae
14-L13	Unequally spaced: Lagrangian interpolation formula.
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (24.01.2017)
16-L15	Numerical Differentiation : Methods based on interpolation:
17-IT-1	**Internal Test-I**
18-L16	non uniform & uniform nodal points - Methods based on finite differences: forward & backward difference formulae
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Numerical Integration: Trapezoidal Rule
21- L19	Simpson Rule
22- P2	**College level meeting/Cell function**
23-L20	Monte-Carlo evaluation of integration.
24-L21	Methods based on undetermined coefficients
25-L22	Gauss-Legendre, Gauss - Lagurre
26-L23	Gauss - Hermite integration methods.
27-L24	**Solution to ordinary and partial differential equations**
28-L25	Ordinary Differential Equations
29-L26	Taylor's Series Method- Euler's Method
30-L27	Euler's modified method - Runge -Kutta 2nd and 4th Order Methods
31-L28	Predictor- Corrector Methods
32-L29	Solution to partial differential equations
33-L30	**C++ Programming applications** Programme structure: header files, local
34- P3	**Department Seminar**
35-L31	global and static variables.
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (24.02.2017)
37- L33	input and output statements
38- IT-II	**Internal Test-II**
39-L34	Euler's Method
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Charging and discharging of a condenser
42- L37	Runge-Kutta methods
43- L38	Radioactive Decay; Newton-Raphson method
44- P4	**College level meeting/ function**
45-L39	Gauss elimination method Solution van der Waals equation;:
46-L40	Currents in Wheatstone's bridge
47-L41	Linear fitting
48-L42	least square method : Cauchy's constant
49-L43	Simpson's and Monte-Carlo methods
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins ( )
51 L45	Evaluation of (integral) area under the curve
52- L46	Eigenvalues and eigenvectors of symmetry matrices;
53-IT-III	**Internal Test-III**
54-L47	Numerical differentiation: Newton's Law of cooling.

55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins (05.04.2017)
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 21.04.2017

Course Outcomes

Learning Outcomes	**COs** of the course "**NUMERICAL METHODS AND PROGRAMMING IN C++"**
CO1	Students will understand basics of numerical analysis
CO2	Students will be able to find roots of polynomial equations using numerical analysis
CO3	Students will be able to conduct numerical integration and differentiation
CO4	Students will be able to use numerical methods to solve the problem
CO5	Demonstrate an understanding of the fundamental principles of digital computing, including number representation and arithmetic operations
CO6	Develop and implement stable and accurate numerical methods to solve linear systems of equations and find roots of linear and non-linear equations.
CO7	Perform numerical interpolation, curve fitting, integration, and differentiation
CO8	Develop and implement Gauss Elimination method
CO9	To perform Eigen values and Eigen vector
Experimental Learning	
EL1	Study of basic matrix operations
EL2	Solution of Linear equations for Underdetermined and Over determined cases.
EL3	Determination of Eigen values and Eigen vectors of a Square matrix.
EL4	Solution of Difference Equations using Euler Method
Integrated Activity	
IA1	Have a strong theoretical background of various numerical methods
IA2	Select the appropriate method for given problem

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2016-2017)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Mathematical physics II
Course Code	KPHM21
Class	I year (2016-2017)
Semester	Even
Staff Name	E .Christy Jerin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To introduce the special type of matrices. .
- To derive Cayley – hamilton theorem.
- To derive Cauchy's theorem.
- To derive Taylor' s theorem.
- To study the Polynomials.
- To import the knowledge of fourier transform.
- To apply then laplace transform into the electrical circuits.

Syllabus

UNIT 1

Matrices:

Introduction – special types of matrices Transpose – Conjugate – transposed conjugate Symmetric and antisymmetric matrices Hermitian and skew Hermitian matrices Determinant – Adjoint Orthogonal and unitary matrices Orthogonal and unitary matrices Eigen values and eigen vectors of the matrix Characteristic equation of a matrix – Cayley Hamilton theorem

UNIT II

Complex variables:

Analytical functions – Cauchy Riemann Conditions Line integrals – Cauchy's theorem – Cauchy's integral formula Derivatives of analytical functions – Power series Taylor's theorem – Laurent's theorem Calculus of residues Evaluation of definite integrals of cos Θ and sin Θ Certain improper real integers.

UNIT III

Bessel function of first kind. Generating function Recurrence relations. Jn (x) as solution of Bessel differential equation. Expansion of Jn (x) where n is half and odd integer Integral representation Laguerre's differential equation and Laguerre polynomials Generating function Rodrigue's formula Recurrence relations Orthogonal property of lauguerre polynomials Associated laugurre polynomials

UNIT IV

Introduction-Fourier transform Properities of fourier transfom Fourier transform of a derivative Fourier sine and cosine transform of derivatives. Laplace transform (LT) Properities of LT LT of derivative and integral of a function LT of periodic function Inverse of LT Properities of inverse LT Application of LT to electrical circuits

UNIT V

Introduction –numerical integration. Trapezoidal rule Simpson's rule Solution of ordinary differential equations of first order. Euler's method. Modified Euler's method Taylor series method. Runge kutta method Approximate solution of algebraic and transcendental equations Newton raphson method Method of iteration Monte-carlo technique Simpson's rule Solution of ordinary differential equations of first order.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 1.12.2016
1-L1	Matrices: Introduction – special types of matrices
2-L2	Transpose – Conjugate – transposed conjugate
3- L3	Symmetric and antisymmetric matrices
4-L4	Hermitian and skew Hermitian matrices
5-L5	Determinant – Adjoint
6-L6	Orthogonal and unitary matrices
7-L7	Orthogonal and unitary matrices
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Eigen values and eigen vectors of the matrix
10- L9	Characteristic equation of a matrix – Cayley Hamilton theorem

11-L10	Complex variables: Analytical functions – Cauchy Riemann Conditions
12-L11	Line integrals – Cauchy’s theorem – Cauchy’s integral formula
13-L12	Derivatives of analytical functions – Power series
14-L13	Taylor’s theorem – Laurent’s theorem
15-L14	Calculus of residues.
16-L15	Evaluation of definite integrals of cos ϴ and sin ϴ
17- L16	Certain improper real integers.
18- L17	Bessel function of first kind.
19- L18	Generating function.
20- L19	Recurrence relations.
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (24.01.2017)
22- L21	Jn (x) as solution of Bessel differential equation.
23- IT-1	**Internal Test-I**
24- L22	Expansion of Jn (x) where n is half and odd integer.
25- L23	Integral representation
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Laguerre’s differential equation and Laguerre polynomials
28- L26	Generating function
29- L27	Rodrigue’s formula
30- P2	**College level meeting/Cell function**
31-L28	Recurrence relations.
32-L29	Orthogonal property of lauguerre polynomials.
33-L30	Associated laugurre polynomials.
34- L31	Introduction-Fourier transform.
35- L32	Properities of fourier transfom.
36- L33	Fourier transform of a derivative.
37- L34	Fourier sine and cosine transform of derivatives.
38-L35	Laplace transform (LT)
39- L36	Properities of LT
40- L37	LT of derivative and integral of a function
41- L38	LT of periodic function.
42-P3	**Department Seminar**
43- L39	Inverse of LT
44- L40	Properities of inverse LT
45- L41	Application of LT to electrical circuits
46- L42	Introduction –numerical integration.
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins (24.02.2017)
48- L44	Trapezoidal rule
49-IT-II	**Internal Test-II**
50-L45	Simpson’s rule
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Solution of ordinary differential equations of first order.
53- L48	Euler’s method.
54- L49	Modified Euler’s method

55- L50	Taylor series method.
56- L51	Runge kutta method.
57- L52	Approximate solution of algebraic and transcendental equations.
58- L53	Newton raphson method.
59-P4	**College level meeting/ function**
60- L54	Method of iteration
61- L55	Monte-carlo technique
62- L56	Simpson's rule
63- L57	Solution of ordinary differential equations of first order.
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins
65- L59	Modified Euler's method
66- L60	Runge kutta method.
67-IT-III	**Internal Test-III**
68- L61	Approximate solution of algebraic and transcendental equations
69- L62	Monte-carlo technique
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (05.04.2017)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 21.4.2017

Course Outcomes

Learning Outcomes	**COs** of the course "Mathematical physics II"
CO1	Introduction about types of matrices.
CO2	Find the eigen value and eigen vectors of the matrix.
CO3	Derive the Cauchy's integral formula.
CO4	Derive the recurrence relations.
CO5	Study about the laplace transform.
CO6	Find roots of the equation using Newton raphson method.
CO7	Solve the differential equation using Euler's method.
CO8	Solve the numerical integration using sympson's rule.
CO9	Introduction of Monte-carlo method

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2016-2017)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Condensed matter physics
Course Code	KPHM22
Class	I year (2016-2017)
Semester	Even
Staff Name	E.Chrsity Jerin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To study the classification of crystals..
- To analysis of elastic strains.
- To calculate the phonons momentum.
- To derive the Bloch function.
- To acquire the knowledge of superconductivity.

Syllabus

UNIT I

Classification of crystals Two dimensional Brava’s Brava’s lattices in 3 dimensional crystals of inert gases ionic crystals covalent crystals ,metals hydrogen bonds analysis of elastic strains elastic compliance and stiffness constants elastic wave in cubic crystals

UNIT II

Lattice waves properties of Lattice waves vibrational modes of a finite one dimensional lattice of identical atoms diatomic linear lattice quantizaion of lattice vibrations phonons momentum Inelastic scattering by phonons, by long wave length phonons X rays by photons neutrons by phonons

UNIT III

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

Langevin diamagnetism equation quantum theory of diamagnetism Hund rule Paramagnetic susceptibility of conduction electrons Ferromagnetic order Magnons antiferro magnetic order ferromagnetic domains origin of domains.

UNIT V

Macroscopic electric field Local field at an atom Dielectric constant and polarizability Structural phase transitions Ferroelectric crystals Ferroelectric domains Piezoelectricity occurrence of superconductivity Meissner effect thermodynamics of superconducting transition London equation coherence length BCS theory of superconductivity Single particle tunneling DC AND AC Josephson effect

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 01.12.2016
1-L1	Classification of crystals
2-L2	Two dimensional Brava's
3- L3	Brava's lattices in 3 dimensional
4-L4	crystals of inert gases
5-L5	ionic crystals
6-L6	covalent crystals ,metals
7-L7	hydrogen bonds
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	analysis of elastic strains
10- L9	elastic compliance and stiffness constants
11-L10	elastic wave in cubic crystals
12-L11	Lattice waves
13-L12	properties of Lattice waves
14-L13	vibrational modes of a finite one
15-L14	dimensional lattice of identical atoms
16-L15	diatomic linear lattice
17- L16	quantizaion of lattice vibrations
18- L17	phonons momentum
19- L18	Inelastic scattering by phonons, by long wave length phonons
20- L19	X rays by photons
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (24.01.2017)
22- L21	neutrons by phonons
23- IT-1	**Internal Test-I**

24- L22	neutrons by phonons
25- L23	Energy levels in one dimension
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	free electron gas in three dimensions
28- L26	heat capacity of the electron gas
29- L27	Electrical conductivity and Ohm's law
30- P2	**College level meeting/Cell function**
31-L28	Hall effect
32-L29	thermal conductivity of metals
33-L30	thermal conductivity of metals
34- L31	Bloch functions
35- L32	Kronig-Forder-magnons
36- L33	antiferro magnetic order
37- L34	Ferromagnetic domains
38-L35	Origin of domains
39- L36	Langevin diamagnetism equation
40- L37	quantum theory of diamagnetism
41- L38	quantum theory of paramagnetism
42-P3	**Department Seminar**
43- L39	Hund rule
44- L40	Paramagnetic susceptibility of conduction electrons
45- L41	Ferromagnetic order
46- L42	Magnons
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins (24.02.2017)
48- L44	antiferro magnetic order
49-IT-II	**Internal Test-II**
50-L45	ferromagnetic domains
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	origin of domains.
53- L48	Macroscopic electric field
54- L49	Local field at an atom
55- L50	Dielectric constant and polarizability
56- L51	Structural phase transitions
57- L52	Ferroelectric crystals
58- L53	Ferroelectric domains
59-P4	**College level meeting/ function**
60- L54	Piezoelectricity
61- L55	occurrence of superconductivity
62- L56	Meissner effect
63- L57	thermodynamics of superconducting transition
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins
65- L59	London equation
66- L60	coherence length
67-IT-III	**Internal Test-III**

68- L61	BCS theory of superconductivity
69- L62	Single particle tunnelling
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (05.04.2017)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 21.04.2017

Course Outcomes

Learning Outcomes	**COs** of the course **"Condensed matter physics"**
CO1	Explain the concept of ionic crystals, covalent crystals.
CO2	Derive the London equation.
CO3	Explain the concept of elastic compliance.
CO4	Calculate the value of phonon momentum.
CO5	Deduce the electrical conductivity.
CO6	Explain Hall effect.
CO7	Design Hund rules.
CO8	Explain the concept of magnons .
CO9	Determine the coherence length

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc., Physics
Course Name	Micoprocessor and Microcontroller
Course Code	KPHM23
Class	I year (2016-2017)
Semester	Even
Staff Name	G.GOMATHI SANKARI
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- The objective of this course is to become familiar with the architecture and the instruction set of an Intel microprocessor
- Assembly language programming will be studied as well as the design of various types of digital and analog interfaces
- Understand the architecture of 8085 and 8051

Syllabus

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.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 01.012.2016
1-L1	**Introduction to 8085 Microprocessor** Pin diagram and description
2-L2	Bus System, Control Signals, Status Signals- Clock System
3- L3	Latching of Address Bus
4-L4	Interrupt System - Direct Memory Access- Internal architecture

5-L5	ALU- Registers organization
6-L6	Special purpose Registers and Counters - Flags - Program Status Word.
7-L7	**Programming 8085** Assembly Language Programming
8- P1	**Welcoming of First year and Inauguration of PhysicsAssociation**
9- L8	- Assembler - Instruction Format of 8085-Instruction Set
10- L9	- Instruction Cycle, Machine Cycle and T-Slates
11-L10	- Timing Diagram of Read, Write machine Cycles and some basic Instructions -
12-L11	8 bit and 16 bit addition and subtraction- Loops and Branching
13-L12	Multiplication and Division in 8085-
14-L13	Searching and Sorting - Finding smallest/biggest number in an array Time delay calculation-
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins
16-L15	Stack and Subroutines - Software Interrupts and ISR-
17-IT-1	**Internal Test-I**
18-L16	Data Transfer Schemes
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	.**Interfacing and peripheral devices** Address Space of 8085- Address space partition- Memory Interfacing
21- L19	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 -
22- P2	**College level meeting/Cell function**
23-L20	Ports- Interfacing chips: Nonprogrammable Port 8212 -
24-L21	- Programmable Peripheral Interface (PPI) 8255 architecture, Control Signals and operating Modes -- Programmable Interval Timer (PIT) 8253 .
25-L22	Introduction - Comparison of Microcontroller & Microprocessor -
26-L23	Pin Diagram and description - Block Diagram of 8051 and Internal Architecture -
27-L24	Clocks
28-L25	Registers
29-L26	Flags-Internal Memory, SFR and I/O Ports-
30-L27	External Memory and decoding
31-L28	Instruction Set and Addressing Modes of 8051-
32-L29	Features available in 8051: Timer and Counters, Timer Modes
33-L30	Internal Memory, SFR and I/O Ports -
34- P3	**Department Seminar**
35-L31	Serial Port and Serial Data TransferFlags
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins
37- L33	**Micro Processor based system design and a Applications** Design considerations -
38- IT-II	**Internal Test-II**
39-L34	Design considerations -
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Sensors and Transducers -
42- L37	Sample and Hold Circuits-

43- L38	Interfacing Keyboard and multiplexed seven segment displays
44- P4	**College level meeting/ function**
45-L39	Interfacing Keyboard and multiplexed seven segment displays
46-L40	DAC and ADC interfacing
47-L41	Square, Rectangular and Ramp Wave Generation -
48-L42	Square, Rectangular and Ramp Wave Generation -
49-L43	Temperature measurement and control -
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Digital Clock
52- L46	Stepper Motor Control
53-IT-III	**Internal Test-III**
54-L47	Stepper Motor Control
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 21.04.2017

Course Outcomes

Learning Outcomes	**COs** of the course “Micoprocessor and Microcontroller”
CO1	Design and implement programs on 8086, ARM, PIC.
CO2	Design I/O circuit.
CO3	The program prepares students to successfully compete for employment in Electronics, Manufacturing and Embedded fields
CO4	Design Memory Interfacing circuits
CO5	Design and implement 8051 microcontroller based system
CO6	Describe the architecture and instruction set of ARM microcontroller
CO7	Understand and realize the Interfacing of memory & various I/O devices with 8085 microprocessor
CO8	Understand and classify the instruction set of 8085 microprocessor and distinguish the use of different instructions and apply it in assembly language programming
CO9	Understand the architecture and operation of Programmable Interface Devices and realize the programming & interfacing of it with 8085 microprocessor
Experimental Learning	
EL1	Microprocessor kits and data acquisition cards DC Power Supplies

EL2	Microcontroller Programmer
EL3	Universal Programmer
EL4	Universal IC Tester
Integrated Activity	
IA1	The program prepares students to successfully compete for employment in Electronics, Manufacturing and Embedded fields
IA2	Design and implement 8051 microcontroller based system

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2016-2017)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Material science
Course Code	KPHE41
Class	IIyear (2016-2017)
Semester	Even
Staff Name	E.Christy jerin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To introduce the crystalline ,material.
- To explain X-ray diffraction .
- To derive London equation
- To describe BCS theory
- To explain hall effect
- To introduce optical and nano material.

Syllabus

MATERIAL SCIENCE

UNIT I

Crystalline Materials

Introduction – Crystal symmetry – simple crystal structures- Polymorphism and Allotropy – Crystal direction – crystal imperfections – Structure determination by X ray diffraction – Bragg's law production of X ray - determination of lattice parameters(Bragg's X – ray spectrometer method) – The Laue method – The powder method – The rotating crystal method.

UNIT II

Conducting Materials

Introduction – The classical free electron theory – Wiedemann – Franz law – The quantum free electron theory – Fermi distribution function – density of energy states- electrons in a periodic potential – conductors – high resistivity materials- superconductivity – General features – Effects of magnetic field – The Meissner effect – Thermal properties – London equation – penetration depth – BCS theory – Josephson effect.

UNIT III

Semiconducting Materials

Introduction – Elemental intrinsic semiconductors - Carrier concentration in intrinsic semiconductor- Eletrical conductivity – Extrinsic semiconductor- carrier concentration in N-type and P-type semiconductors – Variation of carrier concentration with temperature. Direct and indirect band gap semiconductors- semiconductor – Hall effect – applications.

UNIT IV

Dielectric materials

Fundamental definitions – Measurement of relative dielectric constant – Various polarization process – electronic polarization – Ionic polarization – orientational polarization – space charge polarization – frequency effect on polarization – Dielectric loss- Internal field – Lorentz method – Clausius Mossoti relation – dielectric break down – required qualities of good insulating materials- classification – applications.

UNIT V

Optical and Nano materials

Luminescence – photoluminescence – cathode –luminescence – electro luminescence – injection luminescence – PN Junction theory –PN junction as a light sources – Light emitting diode – LED materials – construction – Liquid crystal display – characteristics – action –photo detectors – photo detective material – Nano phase materials – synthesis variation of physical properties with geometry.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 1.12.2016
1-L1	Crystalline Materials : Introduction
2-L2	Crystal symmetry
3- L3	simple crystal structures
4-L4	Polymorphism and Allotropy
5-L5	Crystal direction ,crystal imperfections
6-L6	Structure determination by X ray diffraction
7-L7	Bragg's law production of X ray - determination of lattice parameters(Bragg's X – ray spectrometer method)
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	The Laue method – The powder method
10- L9	The rotating crystal method
11-L10	Conducting Materials: Introduction – The classical free electron theory
12-L11	Wiedemann – Franz law
13-L12	The quantum free electron theory
14-L13	Fermi distribution function
15-L14	density of energy states- electrons in a periodic potential
16-L15	conductors – high resistivity materials
17- L16	superconductivity – General features
18- L17	Effects of magnetic field – The Meissner effect
19- L18	Thermal properties – London equation – penetration depth
20- L19	Thermal properties – London equation – penetration depth
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (24.01.2017)
22- L21	BCS theory
23- IT-1	**Internal Test-I**
24- L22	Josephson effect.
25- L23	Semiconducting Materials: Introduction – Elemental intrinsic semiconductors
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Carrier concentration in intrinsic semiconductor
28- L26	Eletrical conductivity – Extrinsic semiconductor
29- L27	carrier concentration in N-type and P-type semiconductors
30- P2	**College level meeting/Cell function**
31-L28	Variation of carrier concentration with temperature.
32-L29	Direct and indirect band gap semiconductors- semiconductor
33-L30	Hall effect
34- L31	Applications
35- L32	Dielectric materials: Fundamental definitions
36- L33	Measurement of relative dielectric constant – Various polarization process
37- L34	electronic polarization – Ionic polarization
38-L35	orientational polarization – space charge polarization
39- L36	frequency effect on polarization
40- L37	Dielectric loss
41- L38	Internal field

42-P3	**Department Seminar**
43- L39	Lorentz method
44- L40	Clausius Mossoti relation
45- L41	dielectric break down
46- L42	required qualities of good insulating materials
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins (24.02.2017)
48- L44	Classification
49-IT-II	**Internal Test-II**
50-L45	Optical and Nano materials
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Luminescence – photoluminescence
53- L48	cathode –luminescence – electro luminescence
54- L49	injection luminescence – PN Junction theory
55- L50	junction as a light sources – Light emitting diode
56- L51	LED materials – construction – Liquid crystal display
57- L52	Liquid crystal display
58- L53	characteristics – action
59-P4	**College level meeting/ function**
60- L54	photo detectors
61- L55	photo detective material
62- L56	Nano phase materials
63- L57	Nano phase materials
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins
65- L59	PN Junction theory
66- L60	electro luminescence
67-IT-III	**Internal Test-III**
68- L61	Optical and Nano materials
69- L62	synthesis variation of physical properties with geometry
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (05.04.2017)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 21.4.2017

Course Outcomes

Learning Outcomes	**COs** of the course **"Material science"**
CO1	Define crystal symmetry
CO2	Explain X-RAY DIFFRACTION
CO3	Explain BCS theory
CO4	Deduce hall effect.
CO5	Theory about PN junction
CO6	Explain Lorentz method
CO7	Application of hall effect
CO8	Application of nano material
CO9	Application of optical material.

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HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2016-2017)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Quantum Mechanics II
Course Code	KPHM41
Class	II year (2016-2017)
Semester	Even
Staff Name	E.Christy Jerin
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To introduce Pertubation theory
- To derive the dirac equation
- To explain orbital angular momentum
- To explain transition probablity

Syllabus

Quantum Mechanics II

UNIT I

Orbital angular momentum Eigen pairs of L2 and Lz Properties of components of L and L 2 Matrix representation of L2 , Lz and L± spin state of an electron spin orbit coupling Addition of angular momenta

UNIT II

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

UNIT III

Time Dependent Perturbation Theory: Introduction Transition probability constant perturbation Harmonic perturbation adiabatic perturbation sudden approximation Semi classical theory of radiation calculation of Einstein coefficients

UNIT IV

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

UNIT V

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

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 1.12.2016
1-L1	Orbital angular momentum
2-L2	Eigen pairs of L2 and Lz
3- L3	Properties of components of L and L 2
4-L4	Matrix representation of L2 , Lz and L±
5-L5	spin state of an electron
6-L6	spin orbit coupling
7-L7	Addition of angular momenta
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Time Independent Perturbation Theory: Introduction- Theory for non-degenerate case
10- L9	Application to non-degenerate levels
11-L10	Theory for degenerate levels
12-L11	First order Stark effect in Hydrogen atom
13-L12	Time Dependent Perturbation Theory: Introduction
14-L13	Transition probability
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (24.01.2017)
16-L15	constant perturbation
17-IT-1	**Internal Test-I**
18-L16	Harmonic perturbation
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	adiabatic perturbation
21- L19	sudden approximation
22- P2	**College level meeting/Cell function**
23-L20	Semi classical theory of radiation
24-L21	calculation of Einstein coefficients

25-L22	Classical scattering cross section
26-L23	Centre of mass and laboratory co-ordinate systems
27-L24	Scattering amplitude
28-L25	Green's function approach
29-L26	Born approximation
30-L27	Partial wave analysis
31-L28	Scattering form a square well system
32-L29	Scattering form a square well system
33-L30	Klein – Gordon equation
34- P3	**Department Seminar**
35-L31	Klein – Gordon equation
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (24.02.2017)
37- L33	Dirac equation for a free particle
38- IT-II	**Internal Test-II**
39-L34	Dirac equation for a free particle
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Spin of a Dirac particle
42- L37	Spin of a Dirac particle
43- L38	Particle in a potential
44- P4	**College level meeting/ function**
45-L39	Relativistic particle in a box
46-L40	Relativistic hydrogen atom
47-L41	Relativistic hydrogen atom
48-L42	Electron in a field
49-L43	Electron in a field
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Electron in a field
52- L46	Electron in a field
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (05.04.2017)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 21.4.2017

Course Outcomes

Learning Outcomes	**COs** of the course **“Quantum Mechanics II”**
CO1	Properties of components of L and L 2
CO2	Matrix representation of L2 , Lz and L±
CO3	First order Stark effect in Hydrogen atom
CO4	Time Dependent Perturbation Theory: Introduction
CO5	Relativistic hydrogen atom
CO6	Classical scattering cross section
CO7	Centre of mass and laboratory co-ordinate systems
CO8	Scattering amplitude
CO9	Green’s function approach

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Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2016-2017)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Spectroscopy
Course Code	KPHM42
Class	IIyear (2016-2017)
Semester	Even
Staff Name	J Ruby Jemima
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- This course gives detailed knowledge of about various types of spectroscopy.
- The structure of different chemial compounds can be determined by studying these types.
- To study the simple hormonic oscillator.
- To know the structure determination uing Raman spectrum.
- To gain some knowledge of about Raman spectroscopy.
- To expose the students to the idea of the spectroscopy.
- To know the application of molecular structure.

Syllabus

Spectroscopy

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.

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.

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 .

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 1.12.2016
1-L1	Classification of molecules based on moment of inertia
2-L2	Rotational spectra of rigid and non-rigid diatomic molecules
3- L3	Isotopic effect
4-L4	Linear polyatomic molecule
5-L5	Symmetric top molecule
6-L6	Chemical analysis
7-L7	Microwave spectrometer

8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Vibrating diatomic and poly-21atomic molecules
10- L9	Simple harmonic oscillator
11-L10	Anhormonicity
12-L11	Hydrogen bonding
13-L12	Fermi resonance
14-L13	Rotation vibration spectra of polyatomic molecule
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (24.01.2017)
16-L15	Information from IR spectra
17-IT-1	**Internal Test-I**
18-L16	IR spectrometer
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	FTIR
21- L19	Theory of Raman scattering
22- P2	**College level meeting/Cell function**
23-L20	Rotation vibration Raman spectra
24-L21	Mutual exclusion principle
25-L22	Raman spectrometer
26-L23	Polarization of Raman scattered light
27-L24	Structure determination using Raman spectrum
28-L25	Phase transition
29-L26	Reasonance Raman scattering
30-L27	Magnetic properties of nuclei
31-L28	Relaxation time
32-L29	Chemical shift
33-L30	Application to molecular structure
34- P3	**Department Seminar**
35-L31	Bloch equation
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (24.02.2017)
37- L33	NMR instrumentation
38- IT-II	**Internal Test-II**
39-L34	NMR imaging
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	ESR theory and hyperfine structure ESR spectra of hydrogen atom and anisotropic systems
42- L37	Magnetic properties of nuclei
43- L38	ESR spectrometer
44- P4	**College level meeting/ function**
45-L39	Electron Energy Loss Spectroscopy EELS
46-L40	ESR spectra of free radicals in solution.NQR
47-L41	The Quadrupole nucleus-principle
48-L42	Transitions for axially symmetric systems
49-L43	Transitions for non axially symmetric systems
50-L44	**Allotting portion for Internal Test-III**

	Internal Test III begins
51 L45	NQR instrumentation
52- L46	Revision
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (05.04.2017)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 21.4.2017

Course Outcomes

Learning Outcomes	**COs** of the course **"Spectroscopy"**
CO1	Energy equation for diatomic rotator
CO2	Isotopic effect on energy levels of rotator
CO3	Simple hormonic oscillator and its energy diagram
CO4	Hydrogen Bonding.
CO5	
CO6	To know FTIR spectrum.
CO7	To construct the Raman spectrometer.
CO8	To calculate X Ray Photoelectron Spectroscopy XEPS
CO9	To study the ESR spectrometer.
Experimental Learning	
EL1	FTIR Spectrum of some sample nanopowders was analysed

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HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2016-2017)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Nuclear and Particle Physics
Course Code	KPHM43
Class	IIyear (2016-2017)
Semester	Even
Staff Name	C.Stella Rani
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- .To understand about the nuclear forces in the deutron
- To study the nuclear decays
- To understand the nuclear models
- To learn about the nuclear reactions

Syllabus

Nuclear and Particle Physics

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.

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.

Unit III

Nuclear Model

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.

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.

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.

Books For Study:

5. Nuclear Physics, D. C. Tayal, Himalaya Publications
6. . 2. Elements of Nuclear Physics, M. C. Pandia and R. P. S. YadavKedarnath.

Books For Reference:

1. Concepts of Nuclear Physics, Bernard L Cohen, Tata McGraw-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.

Course Calendar

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 1.12.2016
1-L1	Ground and excited states of deuteron
2-L2	magnetic dipole and electric quadrupole moments of deuteron
3- L3	n-p scattering at low energies
4-L4	shape independent effective range theory of np scattering
5-L5	pp scattering at low energies
6-L6	exchange forces
7-L7	meson theory of nuclear force.
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Gamow'stheory of alpha decay
10- L9	lineand Continuous spectrum of β decay
11-L10	Fermi theory of beta decay
12-L11	Fermi and Gamow-Teller selection rules
13-L12	parity violation
14-L13	Gamma decay
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (24.01.2017)
16-L15	multipole transitions in nuclei
17-IT-1	**Internal Test-I**
18-L16	selection rules
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	internal conversion
21- L19	nuclear isomerism.
22- P2	**College level meeting/Cell function**
23-L20	Liquid drop model
24-L21	Weizsackers mass formula
25-L22	nuclear stability
26-L23	Bohr Wheeler theory of nuclear fission
27-L24	magic numbers
28-L25	evidence for magic numbers
29-L26	shell model
30-L27	spin orbit coupling
31-L28	angular momenta and parities of nuclear ground states
32-L29	magnetic moments
33-L30	Schmidt line
34- P3	**Department Seminar**

35-L31	collective model.
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (24.02.2017)
37- L33	Types of nuclear reactions
38- IT-II	**Internal Test-II**
39-L34	Q-equation
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	solution of the equation
42- L37	compound nuclear theory
43- L38	reciprocity theorem , nuclear cross section resonance scattering Breit
44- P4	**College level meeting/ function**
45-L39	Wigner dispersion formula nuclear chain reaction , four factor formula.
46-L40	Classification of elementary particles
47-L41	fundamental interactions conservations laws
48-L42	CPT theorem , SU(3) multiplet
49-L43	meson octet – baryon octet and baryon decouplet
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins
51 L45	Gellmann-Okubo mass formula, Quark theory.
52- L46	
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (05.04.217)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 21.04.2017

Course Outcomes

Learning Outcomes	**COs** of the course **"Nuclear and Particle Physics"**
CO1	Magnetic dipole and electric quadrupole moments of deuteron
CO2	Fermi theory of Beta decay
CO3	Fermi and gamow teller selection rules
CO4	Gamma decay
CO5	Multipole transistions in nuclei
CO6	Solution of the equation
CO7	Compound nuclear theory
CO8	Baryon octet and baryon decouplet
CO9	Gellmann – Okubo mass formula

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HOD Signature   Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2017-2018)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Integrated Electronics
Course Code	KPHM13
Class	I year (2017-2018)
Semester	Odd
Staff Name	C.Stella Rani
Credits	4
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To understand different types of electronic devices and preparation of IC
- To discuss logical families in the digital electronics and study the counters and registers
- To describe the application of operational amplifier in the different field
- To study the various electronics instrumentation through basics of science

Syllabus

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, I2L,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.

2. 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

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2017
1-L1	FET-Types of FET-Characteristics and applications of FET
2-L2	MOSFET
3- L3	SCR, DIAC, TRIAC
4-L4	High frequency device
5-L5	Inegrated Circuits
6-L6	IC Fabrication Technology
7-L7	Steps in Fabrication
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Integrated Resistors and Capacitors
10- L9	VLSI Technology
11-L10	Logic Families - DTL, RTL,TTL&ECL
12-L11	I2L,CMOS,NMOS and PMOS
13-L12	DTL type AND, OR, NAND & NOR gates
14-L13	RTL and TTL type NAND - CMOS NOR and CMOS NAND
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (31.07.2017)
16-L15	Flip Flops: RS-RST-D
17-IT-1	**Internal Test-I**
18-L16	JK- JK Master/Slave
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Asynchronous Counters and Synchronous Counters
21- L19	Registers
22- P2	**College level meeting/Cell function**
23-L20	Characteristics and Parameters
24-L21	DC Analysis of IC OPAMP
25-L22	Applications of OP AMP
26-L23	Instrumentation amplifier
27-L24	Sample and Hold System
28-L25	Analog Multiplexer , Integrator
29-L26	Differentiator
30-L27	Design of Analog circuits for the solution of Simultaneous and Differential Equations
31-L28	Filters: First and Second order LOW,HIGH and BAND pass filters
32-L29	Timer-555 Timer IC-Internal Architecture and Working
33-L30	Modes of Operation: Monostable and Astable operation
34- P3	**Department Seminar**
35-L31	Applications-Voltage Control Oscillator
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (30.08.2017)
37- L33	IC 566-PLL Concept
38- IT-II	**Internal Test-II**
39-L34	PLL IC 565
40-L35	**Test Paper distribution and result analysis**

	Entering Internal Test-II Marks into University portal
41-L36	Application- Frequency multiplexer
42- L37	FSK Modulation and Demodulation
43- L38	Sensors and Transducers
44- P4	**College level meeting/ function**
45-L39	Measurement and Control
46-L40	Signal Conditioning and Recovery
47-L41	Impedance Matching , Noise and Noise Sources
48-L42	Amplification (OP Amp based Feedback Amp, Instrumentation Amp)
49-L43	Filtering and Noise Reduction, Shielding and Grounding -
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (03.10.2017)
51 L45	Fourier Transform, Lock- in Detector/Amplifier
52- L46	Box-Car Integrator or Averager - Modulation Techniques
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (19.10.2017)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 6.11.2017

Course Outcomes

Learning Outcomes	**COs** of the course **"Integrated Electronics"**
CO1	Explain the principle of integrated circuit and its advancement
CO2	Understand the applications of gates in the various fields
CO3	Know the values of integrated circuit in the development of engineering field
CO4	Operate the electronic instrumentation
Experimental Learning	
EL1	Solve the problems by constructing the circuit using Op-amp
EL2	Design a circuit using various IC
Integrated Activity	
IA1	Construction of new circuits using chips
IA2	Achievements of Electronics in the New era

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2017-2018)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Nonlinear Dynamics
Course Code	PPHE11
Class	I year
Semester	ODD
Staff Name	G.GOMATHI SANKARI
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- Designed to provide an introduction to the theory and basic concepts of Nonlinear Dynamics and Chaos.
- The course concentrates on simple models of dynamical systems, their relevance to natural phenomena.
- The main goal of the course is to introduce and describe nonlinear phenomena in physical systems by only using a minimum background in physics and Physics
- The emphasis is on nonlinear phenomena that may be described by few variables that evolve with time

Syllabus

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.

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 16.6.2017
1-L1	**Nonlinearity, linear and nonlinear oscillators**
2-L2	Dynamical systems
3- L3	linear and nonlinear forces
4-L4	Mathematical implications of nonlinearlty-
5-L5	Working definition of nonlinearity-
6-L6	Effects of nonlinearity-
7-L7	Linear oscillators
8- P1	**Physics Association**
9- L8	predictability

10- L9	Damped and driven nonlinear- oscillators.
11-L10	Revision for Dynamical system
12-L11	Solved problem
13-L12	Previous Question discussion
14-L13	**Equilibrium points, bifurcations and chaos**
15-L14	Equilibrium points
16-L15	General criteria for stability-Classification
17- L16	some simple bifurcations -Saddle node, pitch fork,
18- L17	Transcritical and Hopf bifurcations-
19- L18	Discrete dynamical systems
20- L19	Logistic map
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins(31.07.17)
22- L21	Equilibrium points and their stability
23- IT-1	**Internal Test-I**
24- L22	period doubling phenomenon
25- L23	chaos.
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Revision for Pitchfork bifurcation
28- L26	Hopf Bifurcation
29- L27	Discuss the dynamical system
30- P2	**College level meeting/Cell function**
31-L28	Worked Exercise problem
32-L29	Previous question discussion
33-L30	**Chaos in nonlinear electronic circuits**
34- L31	Linear and nonlinear circuit
35- L32	elements-nonlinear circuits
36- L33	Chua's diode
37- L34	Autonomous case-Bifurcations and chaos
38-L35	Analogue circuit simulation-
39- L36	Chaotic dynamics of MLC circuit
40- L37	Some other useful nonlinear circuit
41- L38	Colpitt's oscillator
42-P3	**Department Seminar**
43- L39	**Fractals**
44- L40	Self similarity
45- L41	Properties and examples of fractals
46- L42	Fractal dimension
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins(30.08.17)
48- L44	Construction and properties of some fractals

49-IT-II	**Internal Test-II**
50-L45	Middle one third cantor set
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Koch curve
53- L48	Julia set
54- L49	Applications of fractals
55- L50	Sierpinski triangle
56- L51	Mandelbrot set
57- L52	**Introduction to Solitons**.
58- L53	Linear waves-Linear non dispersive wave propagation
59-P4	**College level meeting/ function**
60- L54	Linear dispersive wave propagation
61- L55	Nonlinear dispersive systems
62- L56	-Korteweg de vries equation
63- L57	solitary and cnoidal waves
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins(03.10.17)
65- L59	Numerical experiments of Zabusky and Kruskal
66- L60	birth of solitons
67-IT-III	**Internal Test-III**
68- L61	Properties of solitons
69- L62	applications of solitons
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
71-MT	**Model Test(17.10.17)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 6.11.2017

Course Outcomes

Learning Outcomes	**COs** of the course **"Nonlinear Dynamics"**
CO1	Students will be able to analyze the behavior of dynamical systems expressed as either a discrete-time mapping or a continuous-time flow
CO2	Students will be able to apply the techniques of nonlinear dynamics to physical processes drawn from a variety of scientific and engineering disciplines

CO3	Students will be able to analyze changes (i.e. bifurcations) to dynamical systems as system parameters are varied.
CO4	Students will be able to independently research topics in nonlinear dynamics and synthesize this work into coherent written and oral presentations.
CO5	Draw bifurcation diagrams and stability diagrams. For two-dimensionalsystems,.
CO6	The student is able to draw phase portraits and find basins of attraction.
CO7	The student is able to analyze limit cycles and their stability
CO8	The student has basic knowledge of the most important fractals, and their topological and metric properties
CO9	The students will improve their communication skills by solving problems on the blackboard and training in solving nonlinear problems using numerical methods.
Experimental Learning	
EL1	Describing the nonlinear system using a linear model
EL2	Representing the nonlinear system in a series expansion, and obtaining the respective coefficients either by using a regression estimation technique,
EL3	By minimizing a cost functional, by using correlation techniques
EL4	obtaining a graphical representation of the nonlinear term(s), then finding an analytical model for the nonlinearity
Integrated Activity	
IA1	The network must **integrate** the torques to obtain the angular velocities which in turn must be **integrated** for the angles
IA2	Learning these **dynamics** is difficult due to these sequential integrations involving **non-linear** functions of the state variables and the input

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN(2017-2018)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Classical Mechanics
Course Code	PPHM11
Class	I year (2017-2018)
Semester	Odd
Staff Name	J Ruby Jemima
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To expose the students to the idea of the fundamental principle
- To learn the Lagrangian formulations
- To study the rigid body dynamics
- To derive the Hamilton's equations
- To calculate the Principle of least action
- To discuss the postulates of special theory of relativity

Syllabus

Classical Mechanics

UNIT I

Mechanics of a particle and a system of particles Conservation laws-Constraints Generalised coordinates Principle of virtual work-D'Alembert's Principle and Lagrange's equations Applications of Lagrange's equations Hamilton's principle-Lagrange's equation from Hamilton's principle-examples Conservation theorems and symmetry properties Motion under central force-General feature Differential equation for the orbit and classification of orbits Kepler problem-Scattering in a central force field Rutherford scattering

UNIT II

Mechanics of a rigid body-Displacement of a rigid body Orthogonal transformation Infinitesimal rotation-coriolis effect Kinematics of a rigid body Kinetic energy of a rigid body-Euler's equation of motion Torque free motion-Spinning top. Oscillatary motion: Theory of small oscillations-Periodic motion Frequencies of vibration and normal modes-Linear tri atomic molecules

UNIT III

Hamilton's equation from variational principle Principle of least action-applicationLegendre transformations Lagrange and Poisson brackets Equation of motion and conservation theorms in Poisson brackets. Hamilton-Jacobi method-application to harmonic oscillator Hamilton's Characteristic function-separation of variables Action angle variables-kepler problem in action angle variable.

UNIT IV

Linear,nonlinear systems-Integration of linear equation Quadrature method-Integration of nonlinear second order equation Pendulum equation Phase curve of simple harmonic oscillator Phase portrait of the pendulum Bifurcation in Logistic map-atttractors Universality of chaos Routes to chaos Quasi periodicity-Intermittency Crises

UNIT V

Postualtes of special theory of relativity Lorentz transformation equation Variation of masss with velocity Evaluation of inverse LT by convolution theorem Relativistic Lagrangian and Hamiltonian Kinematic effects of Lorentz transformation Minkowski's splace Four vectors Covariant four dimensional formulation of the law of mechanics Covariance of Maxwellfield equations under Lorentz transformation. Phase plane analysis of dynamical systems Canonical transformations Lyapunov exponent and chaos Period doubling Moments and products of inertia Eulerian angles

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 16.06.2017
1-L1	Mechanics of a particle and a system of particles
2-L2	Conservation laws-Constraints
3- L3	Generalised coordinates
4-L4	Principle of virtual work-D'Alembert's Principle and Lagrange's equations
5-L5	Applications of Lagrange's equations
6-L6	Hamilton's principle-Lagrange's equation from Hamilton's principle-examples
7-L7	Conservation theorems and symmetry properties
8- P1	**Welcoming of First year and Inauguration of Physics Association**

9- L8	Motion under central force-General feature
10- L9	Differential equation for the orbit and classification of orbits
11-L10	Kepler problem-Scattering in a central force field
	Rutherford scattering
13-L12	Mechanics of a rigid body-Displacement of a rigid body
14-L13	Orthogonal transformation
15-L14	Infinitesimal rotation-coriolis effect
16-L15	Kinematics of a rigid body
17- L16	Kinetic energy of a rigid body-Euler's equation of motion
18- L17	Torque free motion-Spinning top.
19- L18	Oscillatary motion: Theory of small oscillations-Periodic motion
20- L19	Frequencies of vibration and normal modes-Linear tri atomic molecules
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins(31.07.17)
22- L21	Hamilton's equation from variational principle
23- IT-1	**Internal Test-I**
24- L22	Principle of least action-application
25- L23	Legendre transformations
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Lagrange and Poisson brackets
28- L26	Equation of motion and conservation theorms in Poisson brackets.
29- L27	Hamilton-Jacobi method-application to harmonic oscillator
30- P2	**College level meeting/Cell function**
31-L28	Hamilton's Characteristic function-separation of variables
32-L29	Action angle variables-kepler problem in action angle variable.
33-L30	Linear,nonlinear systems-Integration of linear equation
34- L31	Quadrature method-Integration of nonlinear second order equation
35- L32	Pendulum equation
36- L33	Phase curve of simple harmonic oscillator
37- L34	Phase portrait of the pendulum
38-L35	Bifurcation in Logistic map-atttractors
39- L36	Universality of chaos
40- L37	Routes to chaos
41- L38	Quasi periodicity-Intermittency
42-P3	**Department Seminar**
43- L39	Crises
44- L40	Postuates of special theory of relativity
45- L41	Lorentz transformation equation
46- L42	Variation of masss with velocity
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins(30.08.17)
48- L44	Evaluation of inverse LT by convolution theorem
49-IT-II	**Internal Test-II**
50-L45	Equivalence of mass and energy
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Relativistic Lagrangian and Hamiltonian

53- L48	Kinematic effects of Lorentz transformation
54- L49	Minkowski's splace
55- L50	Four vectors
56- L51	Covariant four dimensional formulation of the law of mechanics
57- L52	Covariance of Maxwellfield equations under Lorentz transformation.
58- L53	Phase plane analysis of dynamical systems
59-P4	**College level meeting/ function**
60- L54	Canonical transformations
61- L55	Lyapunov exponent and chaos
62- L56	Period doubling
63- L57	Moments and products of inertia
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins(03.10.17)
65- L59	Eulerian angles
66- L60	Revision
67-IT-III	**Internal Test-III**
68- L61	Revision
69- L62	Revision
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test(17.10.17)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 6.11.2017

Course Outcomes

Learning Outcomes	**COs** of the course **"Classical Mechanics"**
CO1	Derivate the D'Alembert's principle
CO2	Classification of orbits and and differential equation
CO3	Discuss the kepler problem
CO4	To study the Rutherford scattering
CO5	Design the bifuration in logistic map
CO6	Derive the phase curve of simple hormonic oscillator
CO7	To learn the Maxwell equation
CO8	Explain the lorenz transformation
CO9	Explore the integration of nonlinear second order equation.
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2017-2018)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Mathematical physics I
Course Code	PPHM12
Class	I year (2017-2018)
Semester	Odd
Staff Name	E.Christy Jerin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To acquire the knowledge about the vector analysis.
- To identify the eigen value /eigen vector of the matrix. .
- To study the differentiation and integration of matrices.
- To derive the polynomials.
- To calculate the laplace integral transform.
- To explain the convolution theorm.
- To calculate the Fourier integral transform.

Mathematical physics I

UNIT I

Gauss divergence theorem. Deduction from Gauss divergence theorem. Green’s theorem. Green’s theorem in a plane. Classification of vector fields

UNIT II

Eigen values,Eigen vectors . Charecteristic equation of matrix. Cayley Hamilton theorem. Some Important theorems of eigen value and eigen vectors Diagonalisation of matrices Differentiation and integration of matrices. Power of matrices. Exponential of a matrix Matrices in physics

UNIT III

Bessel differential equation Bessel ‘s function of I kind Generating function Recurrence relations Laguarre’s differential equation. Laguerie polynomial. Generating function Recurrence relations

UNIT IV

Introduction Fourier’s transform(FT) Properities of FT-FT of a derivative Fourier sin and cosine transforms of derivatives FT of function of function of two or three variables Finite FT Simple applications of FT

UNIT V

Laplace Transform(LT) Properties of LT LT of derivation of a function L T of periodic functions Properties of inverse LT LT of derivation of a function L T of periodic functions Properties of inverse LT Convolution theorem Evaluation of inverse LT by convolution theorem Application of LT

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 16.06.2017
1-L1	Gauss divergence theorem.
2-L2	Deduction from Gauss divergence theorem.
3- L3	Green’s theorem.
4-L4	Green’s theorem in a plane.
5-L5	Classification of vector fields
6-L6	Eigen values,Eigen vectors.
7-L7	Charecteristic equation of matrix.
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Cayley Hamilton theorem.
10- L9	Some Important theorems of eigen value and eigen vectors
11-L10	Some important theorems of eigen value and eigen vectors.
	Diagonalisation of matrices
13-L12	Differentiation and integration of matrices.
14-L13	Power of matrices.
15-L14	Exponential of a matrix
16-L15	Matrices in physics
17- L16	Bessel differential equation
18- L17	Bessel ‘s function of I kind
19- L18	Generating function
20- L19	Recurrence relations
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins(31.07.17)
22- L21	Recurrence Relations.
23- IT-1	**Internal Test-I**
24- L22	Laguarre’s differential equation.

25- L23	
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Laguerie polynomial.
28- L26	Generating function
29- L27	Recurrence relations
30- P2	**College level meeting/Cell function**
31-L28	Recurrence relations
32-L29	Recurrence relations.
33-L30	Introduction
34- L31	Fourier's transform(FT)
35- L32	Properities of FT-FT of a derivative
36- L33	Fourier sin and cosine transforms of derivatives
37- L34	FT of function of function of two or three variables
38-L35	Finite FT
39- L36	Simple applications of FT
40- L37	Laplace Transform(LT)
41- L38	Properties of LT
42-P3	**Department Seminar**
43- L39	LT of derivation of a function
44- L40	L T of periodic functions
45- L41	Properties of inverse LT
46- L42	Convolution theorem
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins(30.08.17)
48- L44	Evaluation of inverse LT by convolution theorem
49-IT-II	**Internal Test-II**
50-L45	Application of Lt
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Laplace Transform(LT)
53- L48	Properties of LT
54- L49	LT of a function of a function
55- L50	LT of periodic functions
56- L51	Properties of inverse LT
57- L52	Convolution theorem
58- L53	Evaluation of inverse LT by convolution theorem
59-P4	**College level meeting/ function**
60- L54	Application of LT
61- L55	Eigen values: Eigen Vector
62- L56	Characteristic equation of matrix
63- L57	Cayley Hamilton theorem
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins(03.10.17)
65- L59	Some important theorem
66- L60	Diagonalisation of matrices
67-IT-III	**Internal Test-III**
68- L61	Differentiation and integration of matrices

69- L62	Power of matrices
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test(17.10.17)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 6.11.2017

Course Outcomes

Learning Outcomes	**COs** of the course **" Mathematical physics I"**
CO1	Explain the classification of vector field.
CO2	Determine the eigen value and eigen vector of the characteristic equation of matrix.
CO3	Design the recurrence relation.
CO4	Determine the fourier transform for a given function
CO5	Explain about the convolution theorem.
CO6	Explain the properities of fourier transform.
CO7	Application of matrix in physics.
CO8	Application of laplace transform.
CO9	Application of fourier transform.

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2017-2018)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Electromagnetic theory
Course Code	KPHM32
Class	II year (2017-2018)
Semester	Odd
Staff Name	E. Christy jerin
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To expose the students to the ideas of fundamental laws.
- To identify formulate and solve fields and electromagnetic wave propagation.
- To study the importance of the Boundary conditions.
- To derive the Reflection and transmission of the Electromagnetic wave.
- To calculate the electric and magnetic dipole radiation.
- To acquire the knowledge of Electromagnetic wave propagation.

Syllabus

Electromagnetic theory

UNIT I

Coulomb’s Law-Derivation Gauss law in differential and Integral form. Gauss law in differential and Integral form. Poisson’s equation and Laplace’s equation. Work done to move a point charge. Energy of a point charge and continuous charge distribution. Electric field in dielectric materials. Induced dipoles and polarizability. Connection between polarizability and susceptibility.

UNIT II

Lorentz force law. Biot-Savart law and ampere law - Magnetic vector potential- Expansion of vector potential - Effect of a magnetic field on atomic orbits- Bound current and its physical interpretations- Ampere's law in magnetic material- Dia , para , Ferro Magnetism. Magnetic susceptibility and permeability in linear and non linear media

UNIT III

Electrodynamics Electromagnetic induction- Faraday law- Maxwell's equation differential and integral form. Boundary conditions on field vectors D,E,B and H Scalar and vector potential. Gauge transformations. Lorentz and coulomb gauge. Pointing vector and pointing theorem. Maxwell's stress tensor. Conservation of momentum.

UNIT IV

The wave equation for A and B-Mono chromatic plane waves Reflection and transmission at normal Incidence Reflection and transmission at oblique Incidence. EM waves in conductor wave guide. The coaxial transmission line.

UNIT V

Retarded Potential. Lenard – wiechart potential. Electric dipole radiation. Magnetic dipole radiation. And derivation. Larmour formula definition. And derivation. Abraham Lorentz formula for the radiation reaction. Physical origin of radiation reaction

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 16.06.2017
1-L1	Coulomb's Law-Derivation.
2-L2	Gauss law in differential and Integral form.
3- L3	Gauss law in differential and Integral form.
4-L4	Poisson's equation and Laplace's equation.
5-L5	Work done to move a point charge.
6-L6	Energy of a point charge and continuous charge distribution.
7-L7	Energy of a point charge and continuous charge distribution.
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Electric field in dielectric materials.
10- L9	Induced dipoles and polarizability.
11-L10	Connection between polarizability and susceptibility.
12-L11	Connection between polarizability and susceptibility.
13-L12	Lorentz force law.
14-L13	Biot-Savart law
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (30.07.2017)
16-L15	Magnetic vector potential.
17-IT-1	**Internal Test-I**

18-L16	Effect of a magnetic field on atomic orbits.
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Dia , para , Ferro Magnetism.
21- L19	Magnetic susceptibility and permeability.
22- P2	**College level meeting/Cell function**
23-L20	Maxwell's equation differential and integral form.
24-L21	Maxwell's equation differential and integral form.
25-L22	Boundary conditions on field vectors
26-L23	D,E,B and H
27-L24	Scalar and vector potential.
28-L25	Gauge transformations.
29-L26	Lorentz and coulomb gauge.
30-L27	Pointing vector and pointing theorem.
31-L28	Maxwell's stress tensor.
32-L29	Conservation of momentum.
33-L30	Mono chromatic plane waves
34- P3	**Department Seminar**
35-L31	Reflection and transmission at normal Incidence.
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (30.08.2017)
37- L33	Reflection and transmission at oblique Incidence.
38- IT-II	**Internal Test-II**
39-L34	EM waves in conductor wave guide.
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	The coaxial transmission line.
42- L37	Retarded Potential.
43- L38	Lenard – wiechart potential.
44- P4	**College level meeting/ function**
45-L39	Electric dipole radiation.
46-L40	Magnetic dipole radiation.
47-L41	And derivation.
48-L42	Larmour formula definition.
49-L43	And derivation.
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (03.10.2017)
51 L45	Abraham Lorentz formula for the radiation reaction.
52- L46	Physical origin of radiation reaction.
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (19.10.2017)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**

60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 06.11.2017

Course Outcomes

Learning Outcomes	**COs** of the course **"Electromagnetic theory"**
CO1	Explain the fundamental laws governing electromagnetic fields.
CO2	Determine the electromagnetic force exerted on charged particles, current elements, working priniciple of various electric and EMT conversion devices are based on this force.
CO3	Design maxwell's equation and Boundary condition.
CO4	Deduce the Reflection and Transmission wave equation
CO5	Derive the Pointing Theorem.
CO6	Design Larmour formula.
CO7	Reduce the gauge transformation .
CO8	Calculate magnetic vector potential
CO9	To derive the basic laws.

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2017-2018)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Statistical Mechanics
Course Code	KPHM33
Class	II year (2017-2018)
Semester	Odd
Staff Name	C.Stella Rani
Credits	4
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To introduce the basic concepts of statistical mechanics
- To import the knowledge of Maxwell – Boltzmann distribution
- To describe the quantum mechanical view of the statistics
- To explain the Black body radiation
- To determines the thermal properties of Bose – Einstein statistics

Syllabus

Statistical Mechanics

L T P C

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-EnsemblesMicrocanonical 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 probabilityGeneral statistical distribution law-Classical Maxwell-Boltzmann distribution law-Evaluation of constants in the Maxwell Boltzmann distribution law-Maxwell's law of distribution of velocitiesprinciple 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 solidsDebye theory of specific heat of solids-Criticism of Debye's theory-Ideal Bose Einstein GasEnergy 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,PragatiPrakasan,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 PalashB.PalNarosa First reprint 2009

3.Statistical Mechanics by Kerson Huang 4.Statistical Mechnics by Sears and Salinger.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2017
1-L1	Phase Space
2-L2	Phase-space diagram of an oscillator
3- L3	Volume in phase space
4-L4	Ensembles Microcanonical ensemble
5-L5	Canonical ensemble
6-L6	Grand canonical ensemble
7-L7	Density of distribution in phase space
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Liouvilles theorem
10- L9	Postulate of equal a priori probability
11-L10	Statistical,mechanical and thermal equilibriums
12-L11	Connection between statistical and thermodynamical quantities.
13-L12	Microstates and macro states
14-L13	Stirling's approximation
15-L14	**Allotting portion for Internal Test-I**

	Internal Test I begins (31.07.2017)
16-L15	Thermodynamic probabilityGeneral statistical distribution law
17-IT-1	**Internal Test-I**
18-L16	Boltzmann distribution law
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Evaluation of constants in the Maxwell Boltzmann distribution law
21- L19	Maxwell's law of distribution of velocitiesprinciple of equipartition of energy
22- P2	**College level meeting/Cell function**
23-L20	Boltzmann entropy relation
24-L21	Probability of magnetic moment distribution of independent atoms.
25-L22	Postulatory foundations of quantum mechanics
26-L23	Transition from classical statistical mechanics to quantum statistical mechanics
27-L24	Indistinguishability and quantum statistics
28-L25	Exchange symmetry of wave functions
29-L26	Bose-Einstein Statistics
30-L27	Fermi-Dirac statistics
31-L28	Maxwell-Boltzmann statistics
32-L29	Results of three statistics,Thermodynamic interpretation of the parameters α & β
33-L30	Black body radiation and the Planck radiation law.
34- P3	**Department Seminar**
35-L31	Specific heat of solids
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (30.08.2017)
37- L33	Dulong and Petit law
38- IT-II	**Internal Test-II**
39-L34	Einstein theory of specific heat of solids
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Debye theory of specific heat of solids
42- L37	Criticism of Debye's theory
43- L38	Ideal Bose Einstein Gas, Energy and pressure of the Gas degeneracy
44- P4	**College level meeting/ function**
45-L39	Bose-Einstein Condensation ,Thermal properties of Bose Einstein Gas-
46-L40	Ideal Fermi Dirac gas,Energy and pressure of the Gas
47-L41	Thermodynamics functions of degenerate Fermi-Dirac gas-Electron Gas.
48-L42	Phase transition,Phase transitions of first and second kind
49-L43	critical exponent,Yang and Lee theory
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (03.10.2017)
51 L45	Phase transitions of second kind: the Ising model-Braggs-Williams approximation,One dimensional Ising model
52- L46	
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (19.10.2017)**

57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 06.11.2017

Course Outcomes

Learning Outcomes	**COs** of the course **"Statistical Mechanics"**
CO1	Derive the density of states
CO2	Determine the Maxwell Boltzmann distribution velocities
CO3	Define Microstates and macro states
CO4	Application to the Black body distribution
CO5	Analogy between statistical and thermo dynamical quantities
CO6	Determine the specific heat of solids
CO7	Difference between three statistics
CO8	Finding the condensation of Bose - Einstein
CO9	Knowledge about Electron gas
Experimental Learning	
EL1	Phase transitions of first and second kind
Integrated Activity	
IA1	Yang and Lee theory
IA2	Stirling's approximation

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2017-2018)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Quantum Mechanics-I
Course Code	PPHM31
Class	II year (2017-2018)
Semester	Odd
Staff Name	Dr. J. Ruby Jemima
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- This course imparts knowledge about wave functions and schrodinger equations and matrix mechanics.
- Heisenberg uncertainty 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.

Syllabus

QUANTUM MECHANICS I

Unit I :

Schrodinger equation and wave function

Introduction – Construction of Schrodinger equation – Solution of time dependent equation – Physical interpretation of – 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.

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 noncommuting operators – Self-ad joint and Hermitian operator – Discrete and continuous eigenvalues.

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.

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.

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

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2017
1-L1	Introduction :Construction of Schrodinger equation
2-L2	Solution of time dependent equation
3- L3	Physical interpretation of chi*chi
4-L4	Conditions on allowed wave functions
5-L5	Box normalization
6-L6	Conservation of probability
7-L7	Expectation value
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Ehrenfest's theorem& Verification of Ehrenfest's theorem
10- L9	Linear harmonic oscillator
11-L10	particle in an infinite square well potential

12-L11	Particle in a magnetic field
13-L12	Classical uncertainty relation
14-L13	Heisenberg uncertainty relation
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (31.07.2017)
16-L15	Implication of uncertainty relation
17-IT-1	**Internal Test-I**
18-L16	Illustration of uncertainty relation
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Gamma-Ray microscope
21- L19	Doppler effect
22- P2	**College level meeting/Cell function**
23-L20	Operators, Eigen values and Eigen functions: Linear operators, commuting and non-commuting operators
24-L21	Self-ad joint and Hermitian operator
25-L22	Discrete and continuous eigen values
26-L23	Bound states
27-L24	Classical probability distribution
28-L25	linear harmonic oscillator
29-L26	Particle in a box
30-L27	Poschl-Teller potentials
31-L28	Quantum pendulum
32-L29	Time dependent harmonic oscillator
33-L30	Rigid rotator
34- P3	**Department Seminar**
35-L31	Linear vector space
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (30.08.2017)
37- L33	Matrix representation of operators and wave functions
38- IT-II	**Internal Test-II**
39-L34	Unitary transformation
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Schrodinger equation and other quantities in matrix form
42- L37	Application of matrix mechanics
43- L38	Dirac’s Bra and Ket notations
44- P4	**College level meeting/ function**
45-L39	Properties of bra and ket vectors
46-L40	Hilbert space
47-L41	Schrodinger picture
48-L42	Heisenberg picture
49-L43	Interaction picture
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (03.10.2017)
51 L45	Density matrix for a single system & Density matrix of an ensemble
52- L46	Time evolution of density operator
53-IT-III	**Internal Test-III**

54-L47	A spin ½ system
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (19.10.2017)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 06.11.2017

Course Outcomes

Learning Outcomes	**COs** of the course **"Quantum Mechanics II"**
CO1	To construct the schrodinger equation
CO2	To derive the solution of time dependent equation
CO3	To discuss the physical interpretation of wave function
CO4	To described the properties of bra and ket vectors
CO5	To know the Box normalization
CO6	Explain the conservation of probability
CO7	To derive the Dirac's Bra and Ket notations
CO8	To discuss the application of matrix mechanics
CO9	To studied the time evolution of density operator

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2017-2018)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Spectroscopy
Course Code	PPHM42
Class	IIyear (2017-2018)
Semester	Odd
Staff Name	J Ruby Jemima
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- This course gives detailed knowledge of about various types of spectroscopy.
- The structure of different chemial compounds can be determined by studying these types.
- To study the simple hormonic oscillator.
- To know the structure determination uing Raman spectrum.
- To gain some knowledge of about Raman spectroscopy.
- To expose the students to the idea of the spectroscopy.
- To know the application of molecular structure.

Syllabus

Spectroscopy

Unit I

Microwave Spectroscopy

Classification of molecules based on moment of inertia – rotational spectra of rigid andnon-rigid diatomic molecules – Isotopic effect – linear polyatomic molecule - symmetric topmolecule – 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.

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.

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 .

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 7.12.2017
1-L1	Classification of molecules based on moment of inertia
2-L2	Rotational spectra of rigid and non-rigid diatomic molecules
3- L3	Isotopic effect
4-L4	Linear polyatomic molecule
5-L5	Symmetric top molecule

6-L6	Chemical analysis
7-L7	Microwave spectrometer
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Vibrating diatomic and poly-21atomic molecules
10- L9	Simple harmonic oscillator
11-L10	Anhormonicity
12-L11	Hydrogen bonding
13-L12	Fermi resonance
14-L13	Rotation vibration spectra of polyatomic molecule
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (31.07.2017)
16-L15	Information from IR spectra
17-IT-1	**Internal Test-I**
18-L16	IR spectrometer
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	FTIR
21- L19	Theory of Raman scattering
22- P2	**College level meeting/Cell function**
23-L20	Rotation vibration Raman spectra
24-L21	Mutual exclusion principle
25-L22	Raman spectrometer
26-L23	Polarization of Raman scattered light
27-L24	Structure determination using Raman spectrum
28-L25	Phase transition
29-L26	Reasonance Raman scattering
30-L27	Magnetic properties of nuclei
31-L28	Relaxation time
32-L29	Chemical shift
33-L30	Application to molecular structure
34- P3	**Department Seminar**
35-L31	Bloch equation
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (30.08.2017)
37- L33	NMR instrumentation
38- IT-II	**Internal Test-II**
39-L34	NMR imaging
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	ESR theory and hyperfine structure ESR spectra of hydrogen atom and anisotropic systems
42- L37	Magnetic properties of nuclei
43- L38	ESR spectrometer
44- P4	**College level meeting/ function**
45-L39	Electron Energy Loss Spectroscopy EELS
46-L40	ESR spectra of free radicals in solution.NQR
47-L41	The Quadrupole nucleus-principle
48-L42	Transitions for axially symmetric systems

49-L43	Transitions for non axially symmetric systems
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (03.10.2017)
51 L45	NQR instrumentation
52- L46	Revision
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (19.10.2017)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.4.2018

Course Outcomes

Learning Outcomes	**COs** of the course **"Spectroscopy"**
CO1	Energy equation for diatomic rotator
CO2	Isotopic effect on energy levels of rotator
CO3	Simple hormonic oscillator and its energy diagram
CO4	Hydrogen Bonding.
CO5	Raman spectrometer
CO6	To know FTIR spectrum.
CO7	To construct the Raman spectrometer.
CO8	To calculate X Ray Photoelectron Spectroscopy XEPS
CO9	To study the ESR spectrometer.
Experimental Learning	
EL1	FTIR Spectrum of some sample nanopowders was analysed

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2017-2018)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	NUMERICAL METHODS AND PROGRAMMING IN C++
Course Code	PPHE21
Class	I year (2017-2018)
Semester	EVEN
Staff Name	G.GOMATHISANKARI
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- The aim is to teach the student various topics in **Numerical Analysis** such as solutions of nonlinear equations in one variable
- Interpolation and approximation, **numerical** differentiation and integration,
- Direct **methods** for solving linear systems
- N**umerical solution** of ordinary differential equations.

Syllabus

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.

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 07.12.2017
1-L1	**Roots of equations and eigen-value problems**

2-L2	Newton-Raphson method. Secant Method
3- L3	Muller's Method - Lin -Bairstow's Method.
4-L4	Linear Algebraic Equations
5-L5	Gauss elimination - Gauss-Jordan
6-L6	Gauss-Jacobi
7-L7	Inverse of a matrix by Gauss Jordan elimination method
8- P1	Physics Assiocation
9- L8	**Curve Fitting / Interpolation** Curve fitting
10- L9	Linear Least square fitting - Nonlinear Fit- Fitting a Polynomial Function, Exponential function
11-L10	Cubic spline fitting – Interpolation
12-L11	Interpolation: Fundamental theorem of finite difference, Finite difference interpolation with equally spaced:
13-L12	Newton's forward and backward difference formulae
14-L13	Unequally spaced: Lagrangian interpolation formula.
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins(22.01.18)
16-L15	**Numerical differentiation and integration** Numerical Differentiation : Methods based on interpolation:
17-IT-1	**Internal Test-I**
18-L16	non uniform & uniform nodal points - Methods based on finite differences: forward & backward difference formulae
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Numerical Integration: Trapezoidal Rule
21- L19	Simpson Rule
22- P2	**College level meeting/Cell function**
23-L20	Monte-Carlo evaluation of integration.
24-L21	Methods based on undetermined coefficients
25-L22	Gauss-Legendre, Gauss - Lagurre
26-L23	Gauss - Hermite integration methods.
27-L24	**Solution to ordinary and partial differential equations**
28-L25	Ordinary Differential Equations
29-L26	Taylor's Series Method- Euler's Method
30-L27	Euler's modified method - Runge -Kutta 2nd and 4th Order Methods
31-L28	Predictor- Corrector Methods
32-L29	Solution to partial differential equations
33-L30	**C++ Programming applications** Programme structure: header files, local
34- P3	**Department Seminar**
35-L31	global and static variables.

36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins(26.02.18)
37- L33	input and output statements
38- IT-II	**Internal Test-II**
39-L34	Euler's Method
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Charging and discharging of a condenser
42- L37	Runge-Kutta methods
43- L38	Radioactive Decay; Newton-Raphson method
44- P4	**College level meeting/ function**
45-L39	Gauss elimination method Solution van der Waals equation;:
46-L40	Currents in Wheatstone's bridge
47-L41	Linear fitting
48-L42	least square method : Cauchy's constant
49-L43	Simpson's and Monte-Carlo methods
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins(01.04.18)
51 L45	Evaluation of (integral) area under the curve
52- L46	Eigenvalues and eigenvectors of symmetry matrices;
53-IT-III	**Internal Test-III**
54-L47	Numerical differentiation: Newton's Law of cooling.
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test(12.04.18)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2018

Course Outcomes

Learning Outcomes	**COs** of the course "Numerical Methods"
CO1	Students will understand basics of numerical analysis
CO2	Students will be able to find roots of polynomial equations using numerical analysis

CO3	Students will be able to conduct numerical integration and differentiation
CO4	Students will be able to use numerical methods to solve theproblem
CO5	Demonstrate an understanding of the fundamental principles of digital computing, including number representation and arithmetic operations
CO6	Develop and implement stable and accurate numerical methods to solve linear systems of equations and find roots of linear and non-linear equations.
CO7	Perform numerical interpolation, curve fitting, integration, and differentiation
CO8	Develop and implement Gauss Elimination method
CO9	To perform Eigen values and Eigen vector
Experimental Learning	
EL1	Study of basic matrix operations
EL2	Solution of Linear equations for Underdetermined and Overdetermined cases.
EL3	Determination of Eigen values and Eigen vectors of a Square matrix.
EL4	Solution of Difference Equations using Euler Method
Integrated Activity	
IA1	Have a strong theretical background of various numerical methods
IA2	Select the appropriate method for given problem

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature

Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2017-2018)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Mathematical physics II
Course Code	PPHM21
Class	I year (2017-2018)
Semester	Even
Staff Name	E .Christy Jerin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To introduce the special type of matrices. .
- To derive Cayley – hamilton theorem.
- To derive Cauchy's theorem.
- To derive Taylor' s theorem.
- To study the Polynomials.
- To import the knowledge of fourier transform.
- To apply then laplace transform into the electrical circuits.

Syllabus

UNIT 1

Matrices

Introduction – special types of matrices Transpose – Conjugate – transposed conjugate Symmetric and antisymmetric matrices Hermitian and skew Hermitian matrices Determinant – Adjoint Orthogonal and unitary matrices Orthogonal and unitary matrices Eigen values and eigen vectors of the matrix Characteristic equation of a matrix – Cayley Hamilton theorem

UNIT II

Complex variables

Analytical functions – Cauchy Riemann Conditions Line integrals – Cauchy's theorem – Cauchy's integral formula Derivatives of analytical functions – Power series Taylor's theorem – Laurent's theorem Calculus of residues Evaluation of definite integrals of cos Θ and sin Θ Certain improper real integers.

UNIT III

Bessel function of first kind. Generating function Recurrence relations. Jn (x) as solution of Bessel differential equation. Expansion of Jn (x) where n is half and odd integer Integral representation Laguerre's differential equation and Laguerre polynomials Generating function Rodrigue's formula Recurrence relations Orthogonal property of lauguerre polynomials Associated laugurre polynomials

UNIT IV

Introduction-Fourier transform Properities of fourier transfom Fourier transform of a derivative Fourier sine and cosine transform of derivatives. Laplace transform (LT) Properities of LT LT of derivative and integral of a function LT of periodic function Inverse of LT Properities of inverse LT Application of LT to electrical circuits

UNIT V

Introduction –numerical integration. Trapezoidal rule Simpson's rule Solution of ordinary differential equations of first order. Euler's method. Modified Euler's method Taylor series method. Runge kutta method Approximate solution of algebraic and transcendental equations Newton raphson method Method of iteration Monte-carlo technique Simpson's rule Solution of ordinary differential equations of first order.

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 7.12.2017
1-L1	Matrices: Introduction – special types of matrices
2-L2	Transpose – Conjugate – transposed conjugate
3- L3	Symmetric and antisymmetric matrices
4-L4	Hermitian and skew Hermitian matrices
5-L5	Determinant – Adjoint
6-L6	Orthogonal and unitary matrices
7-L7	Orthogonal and unitary matrices
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Eigen values and eigen vectors of the matrix
10- L9	Characteristic equation of a matrix – Cayley Hamilton theorem

11-L10	Complex variables: Analytical functions – Cauchy Riemann Conditions
12-L11	Line integrals – Cauchy's theorem – Cauchy's integral formula
13-L12	Derivatives of analytical functions – Power series
14-L13	Taylor's theorem – Laurent's theorem
15-L14	Calculus of residues.
16-L15	Evaluation of definite integrals of cos Θ and sin Θ
17- L16	Certain improper real integers.
18- L17	Bessel function of first kind.
19- L18	Generating function.
20- L19	Recurrence relations.
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (22.01.2018)
22- L21	Jn (x) as solution of Bessel differential equation.
23- IT-1	**Internal Test-I**
24- L22	Expansion of Jn (x) where n is half and odd integer.
25- L23	Integral representation
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Laguerre's differential equation and Laguerre polynomials
28- L26	Generating function
29- L27	Rodrigue's formula
30- P2	**College level meeting/Cell function**
31-L28	Recurrence relations.
32-L29	Orthogonal property of lauguerre polynomials.
33-L30	Associated laugurre polynomials.
34- L31	Introduction-Fourier transform.
35- L32	Properities of fourier transfom.
36- L33	Fourier transform of a derivative.
37- L34	Fourier sine and cosine transform of derivatives.
38-L35	Laplace transform (LT)
39- L36	Properities of LT
40- L37	LT of derivative and integral of a function
41- L38	LT of periodic function.
42-P3	**Department Seminar**
43- L39	Inverse of LT
44- L40	Properities of inverse LT
45- L41	Application of LT to electrical circuits
46- L42	Introduction –numerical integration.
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins (26.02.2018)
48- L44	Trapezoidal rule
49-IT-II	**Internal Test-II**
50-L45	Simpson's rule
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Solution of ordinary differential equations of first order.
53- L48	Euler's method.
54- L49	Modified Euler's method

55- L50	Taylor series method.
56- L51	Runge kutta method.
57- L52	Approximate solution of algebraic and transcendental equations.
58- L53	Newton raphson method.
59-P4	**College level meeting/ function**
60- L54	Method of iteration
61- L55	Monte-carlo technique
62- L56	Simpson's rule
63- L57	Solution of ordinary differential equations of first order.
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins (01.04.2018)
65- L59	Modified Euler's method
66- L60	Runge kutta method.
67-IT-III	**Internal Test-III**
68- L61	Approximate solution of algebraic and transcendental equations
69- L62	Monte-carlo technique
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (12.04.2018)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.4.2018

Course Outcomes

Learning Outcomes	**COs** of the course **"Mathematical physics II"**
CO1	Introduction about types of matrices.
CO2	Find the eigen value and eigen vectors of the matrix.
CO3	Derive the Cauchy's integral formula.
CO4	Derive the recurrence relations.
CO5	Study about the laplace transform.
CO6	Find roots of the equation using Newton raphson method.
CO7	Solve the differential equation using Euler's method.
CO8	Solve the numerical integration using sympson's rule.
CO9	Introduction of Monte-carlo method

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2017-2018)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Condensed matter physics
Course Code	PPHM22
Class	I year (2017-2018)
Semester	Even
Staff Name	E.Chrsity Jerin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To study the classification of crystals..
- To analysis of elastic strains.
- To calculate the phonons momentum.
- To derive the Bloch function.
- To acquire the knowledge of superconductivity.

Syllabus

UNIT I

Classification of crystals Two dimensional Brava’s Brava’s lattices in 3 dimensional crystals of inert gases ionic crystals covalent crystals ,metals hydrogen bonds analysis of elastic strains elastic compliance and stiffness constants elastic wave in cubic crystals

UNIT II

Lattice waves properties of Lattice waves vibrational modes of a finite one dimensional lattice of identical atoms diatomic linear lattice quantizaion of lattice vibrations phonons momentum Inelastic scattering by phonons, by long wave length phonons X rays by photons neutrons by phonons

UNIT III

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

Langevin diamagnetism equation quantum theory of diamagnetism Hund rule Paramagnetic susceptibility of conduction electrons Ferromagnetic order Magnons antiferro magnetic order ferromagnetic domains origin of domains.

UNIT V

Macroscopic electric field Local field at an atom Dielectric constant and polarizability Structural phase transitions Ferroelectric crystals Ferroelectric domains Piezoelectricity occurrence of superconductivity Meissner effect thermodynamics of superconducting transition London equation coherence length BCS theory of superconductivity Single particle tunneling DC AND AC Josephson effect

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 07.12.2017
1-L1	Classification of crystals
2-L2	Two dimensional Brava's
3- L3	Brava's lattices in 3 dimensional
4-L4	crystals of inert gases
5-L5	ionic crystals
6-L6	covalent crystals ,metals
7-L7	hydrogen bonds
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	analysis of elastic strains
10- L9	elastic compliance and stiffness constants
11-L10	elastic wave in cubic crystals
12-L11	Lattice waves
13-L12	properties of Lattice waves
14-L13	vibrational modes of a finite one
15-L14	dimensional lattice of identical atoms
16-L15	diatomic linear lattice
17- L16	quantizaion of lattice vibrations
18- L17	phonons momentum
19- L18	Inelastic scattering by phonons, by long wave length phonons
20- L19	X rays by photons
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (22.01.2018)
22- L21	neutrons by phonons
23- IT-1	**Internal Test-I**
24- L22	neutrons by phonons
25- L23	Energy levels in one dimension
26- L24	**____ - Test Paper distribution and result analysis**

	Entering Internal Test-I Marks into University portal
27- L25	free electron gas in three dimensions
28- L26	heat capacity of the electron gas
29- L27	Electrical conductivity and Ohm's law
30- P2	**College level meeting/Cell function**
31-L28	Hall effect
32-L29	thermal conductivity of metals
33-L30	thermal conductivity of metals
34- L31	Bloch functions
35- L32	Kronig-Forder-magnons
36- L33	antiferro magnetic order
37- L34	Ferromagnetic domains
38-L35	Origin of domains
39- L36	Langevin diamagnetism equation
40- L37	quantum theory of diamagnetism
41- L38	quantum theory of paramagnetism
42-P3	**Department Seminar**
43- L39	Hund rule
44- L40	Paramagnetic susceptibility of conduction electrons
45- L41	Ferromagnetic order
46- L42	Magnons
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins (26.02.2018)
48- L44	antiferro magnetic order
49-IT-II	**Internal Test-II**
50-L45	ferromagnetic domains
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	origin of domains.
53- L48	Macroscopic electric field
54- L49	Local field at an atom
55- L50	Dielectric constant and polarizability
56- L51	Structural phase transitions
57- L52	Ferroelectric crystals
58- L53	Ferroelectric domains
59-P4	**College level meeting/ function**
60- L54	Piezoelectricity
61- L55	occurrence of superconductivity
62- L56	Meissner effect
63- L57	thermodynamics of superconducting transition
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins (01.04.2018)
65- L59	London equation
66- L60	coherence length
67-IT-III	**Internal Test-III**
68- L61	BCS theory of superconductivity
69- L62	Single particle tunnelling
70- L63	**Test Paper distribution and result analysis**

	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (12.04.2018)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2018

Course Outcomes

Learning Outcomes	**COs** of the course **“Condensed matter physics”**
CO1	Explain the concept of ionic crystals, covalent crystals.
CO2	Derive the London equation.
CO3	Explain the concept of elastic compliance.
CO4	Calculate the value of phonon momentum.
CO5	Deduce the electrical conductivity.
CO6	Explain Hall effect.
CO7	Design Hund rules.
CO8	Explain the concept of magnons .
CO9	Determine the coherence length

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2017-2018)

(Prepared by staff member handling the course)

Programme Name	M.Sc., Physics
Course Name	Micoprocessor and Microcontroller
Course Code	PPHM23
Class	I year (2017-2018)
Semester	Even
Staff Name	G.GOMATHI SANKARI
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- The objective of this course is to become familiar with the architecture and the instruction set of an Intel microprocessor
- Assembly language programming will be studied as well as the design of various types of digital and analog interfaces
- Understand the architecture of 8085 and 8051

Syllabus

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.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 07.12.2017
1-L1	**Introduction to 8085 Microprocessor** Pin diagram and description
2-L2	Bus System, Control Signals, Status Signals- Clock System
3- L3	Latching of Address Bus
4-L4	Interrupt System - Direct Memory Access- Internal architecture

5-L5	ALU- Registers organization
6-L6	Special purpose Registers and Counters - Flags - Program Status Word.
7-L7	**Programming 8085** Assembly Language Programming
8- P1	**Welcoming of First year and Inauguration of PhysicsAssociation**
9- L8	- Assembler - Instruction Format of 8085-Instruction Set
10- L9	- Instruction Cycle, Machine Cycle and T-Slates
11-L10	- Timing Diagram of Read, Write machine Cycles and some basic Instructions -
12-L11	8 bit and 16 bit addition and subtraction- Loops and Branching
13-L12	Multiplication and Division in 8085-
14-L13	Searching and Sorting - Finding smallest/biggest number in an array Time delay calculation-
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (22.01.2018)
16-L15	Stack and Subroutines - Software Interrupts and ISR-
17-IT-1	**Internal Test-I**
18-L16	Data Transfer Schemes
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	.**Interfacing and peripheral devices** Address Space of 8085- Address space partition- Memory Interfacing
21- L19	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 -
22- P2	**College level meeting/Cell function**
23-L20	Ports- Interfacing chips: Nonprogrammable Port 8212 -
24-L21	- Programmable Peripheral Interface (PPI) 8255 architecture, Control Signals and operating Modes -- Programmable Interval Timer (PIT) 8253 .
25-L22	**Micro Controller 8051** Introduction - Comparison of Microcontroller & Microprocessor -
26-L23	Pin Diagram and description - Block Diagram of 8051 and Internal Architecture -
27-L24	Clocks
28-L25	Registers
29-L26	Flags-Internal Memory, SFR and I/O Ports-
30-L27	External Memory and decoding
31-L28	Instruction Set and Addressing Modes of 8051-
32-L29	Features available in 8051: Timer and Counters, Timer Modes
33-L30	Internal Memory, SFR and I/O Ports -
34- P3	**Department Seminar**
35-L31	Serial Port and Serial Data TransferFlags
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (26.02.2018)
37- L33	**Micro Processor based system design and a Applications** Design considerations -
38- IT-II	**Internal Test-II**
39-L34	Design considerations -
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Sensors and Transducers -
42- L37	Sample and Hold Circuits-
43- L38	Interfacing Keyboard and multiplexed seven segment displays
44- P4	**College level meeting/ function**

45-L39	Interfacing Keyboard and multiplexed seven segment displays
46-L40	DAC and ADC interfacing
47-L41	Square, Rectangular and Ramp Wave Generation -
48-L42	Square, Rectangular and Ramp Wave Generation -
49-L43	Temperature measurement and control -
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (01.04.2018)
51 L45	Digital Clock
52- L46	Stepper Motor Control
53-IT-III	**Internal Test-III**
54-L47	Stepper Motor Control
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test (12.04.2018)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2018

Course Outcomes

Learning Outcomes	**COs** of the course **"Microprocessor and Microcontroller"**
CO1	Design and implement programs on 8086, ARM, PIC.
CO2	Design I/O circuit.
CO3	The program prepares students to successfully compete for employment in Electronics, Manufacturing and Embedded fields
CO4	Design Memory Interfacing circuits
CO5	Design and implement 8051 microcontroller based system
CO6	Describe the architecture and instruction set of ARM microcontroller
CO7	Understand and realize the Interfacing of memory & various I/O devices with 8085 microprocessor
CO8	Understand and classify the instruction set of 8085 microprocessor and distinguish the use of different instructions and apply it in assembly language programming
CO9	Understand the architecture and operation of Programmable Interface Devices and realize the programming & interfacing of it with 8085 microprocessor
Experimental Learning	
EL1	Microprocessor kits and data acquisition cards DC Power Supplies

EL2	Microcontroller Programmer
EL3	Universal Programmer
EL4	Universal IC Tester
Integrated Activity	
IA1	The program prepares students to successfully compete for employment in Electronics, Manufacturing and Embedded fields
IA2	Design and implement 8051 microcontroller based system

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2017-2018)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Quantum Mechanics II
Course Code	KPHM41
Class	II year (2017-2018)
Semester	Even
Staff Name	E.Christy Jerin
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To introduce Pertubation theory
- To derive the dirac equation
- To explain orbital angular momentum
- To explain transition probablity

Syllabus

Quantum Mechanics II

UNIT I

Orbital angular momentum Eigen pairs of L2 and Lz Properties of components of L and L 2 Matrix representation of L2 , Lz and L± spin state of an electron spin orbit coupling Addition of angular momenta

UNIT II

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

UNIT III

Time Dependent Perturbation Theory: Introduction Transition probability constant perturbation Harmonic perturbation adiabatic perturbation sudden approximation Semi classical theory of radiation calculation of Einstein coefficients

UNIT IV

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

UNIT V

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

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 7.12.2018
1-L1	Orbital angular momentum
2-L2	Eigen pairs of L2 and Lz
3- L3	Properties of components of L and L 2
4-L4	Matrix representation of L2 , Lz and L±
5-L5	spin state of an electron
6-L6	spin orbit coupling
7-L7	Addition of angular momenta
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Time Independent Perturbation Theory: Introduction- Theory for non-degenerate case
10- L9	Application to non-degenerate levels
11-L10	Theory for degenerate levels
12-L11	First order Stark effect in Hydrogen atom
13-L12	Time Dependent Perturbation Theory: Introduction
14-L13	Transition probability
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (22.01.2018)
16-L15	constant perturbation
17-IT-1	**Internal Test-I**
18-L16	Harmonic perturbation
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	adiabatic perturbation
21- L19	sudden approximation
22- P2	**College level meeting/Cell function**
23-L20	Semi classical theory of radiation
24-L21	calculation of Einstein coefficients

25-L22	Classical scattering cross section
26-L23	Centre of mass and laboratory co-ordinate systems
27-L24	Scattering amplitude
28-L25	Green's function approach
29-L26	Born approximation
30-L27	Partial wave analysis
31-L28	Scattering form a square well system
32-L29	Scattering form a square well system
33-L30	Klein – Gordon equation
34- P3	**Department Seminar**
35-L31	Klein – Gordon equation
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (26.02.2018)
37- L33	Dirac equation for a free particle
38- IT-II	**Internal Test-II**
39-L34	Dirac equation for a free particle
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Spin of a Dirac particle
42- L37	Spin of a Dirac particle
43- L38	Particle in a potential
44- P4	**College level meeting/ function**
45-L39	Relativistic particle in a box
46-L40	Relativistic hydrogen atom
47-L41	Relativistic hydrogen atom
48-L42	Electron in a field
49-L43	Electron in a field
50-L44	**____ - Allotting portion for Internal Test-III**
	Internal Test III begins (01.04.2018)
51 L45	Electron in a field
52- L46	Electron in a field
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (12.04.2018)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.4.2018

Course Outcomes

Learning Outcomes	**COs** of the course **"Quantum Mechanics II"**
CO1	spin state of an electron
CO2	spin orbit coupling
CO3	Partial wave analysis
CO4	Scattering form a square well system
CO5	Scattering form a square well system
CO6	Relativistic hydrogen atom
CO7	Relativistic hydrogen atom
CO8	Electron in a field
CO9	Klein – Gordon equation

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2017-2018)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Nuclear and Particle Physics
Course Code	KPHM43
Class	IIyear (2017-2018)
Semester	Even
Staff Name	C.Stella Rani
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- .To understand about the nuclear forces in the deutron
- To study the nuclear decays
- To understand the nuclear models
- To learn about the nuclear reactions

Syllabus

Nuclear and Particle Physics

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.

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.

Unit III

Nuclear Model

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.

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.

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.

Books For Study:

7. Nuclear Physics, D. C. Tayal, Himalaya Publications
8. . 2. Elements of Nuclear Physics, M. C. Pandia and R. P. S. YadavKedarnath.

Books For Reference:

1. Concepts of Nuclear Physics, Bernard L Cohen, Tata McGraw-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.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on07.12.2017
1-L1	Ground and excited states of deuteron
2-L2	magnetic dipole and electric quadrupole moments of deuteron
3- L3	n-p scattering at low energies
4-L4	shape independent effective range theory of np scattering
5-L5	pp scattering at low energies
6-L6	exchange forces
7-L7	meson theory of nuclear force.
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Gamow'stheory of alpha decay
10- L9	lineand Continuous spectrum of β decay
11-L10	Fermi theory of beta decay
12-L11	Fermi and Gamow-Teller selection rules
13-L12	parity violation
14-L13	Gamma decay
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (22.01.2018)
16-L15	multipole transitions in nuclei
17-IT-1	**Internal Test-I**
18-L16	selection rules
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	internal conversion
21- L19	nuclear isomerism.
22- P2	**College level meeting/Cell function**
23-L20	Liquid drop model
24-L21	Weizsackers mass formula
25-L22	nuclear stability
26-L23	Bohr Wheeler theory of nuclear fission
27-L24	magic numbers
28-L25	evidence for magic numbers
29-L26	shell model
30-L27	spin orbit coupling
31-L28	angular momenta and parities of nuclear ground states
32-L29	magnetic moments
33-L30	Schmidt line
34- P3	**Department Seminar**
35-L31	collective model.
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (26.02.2018)
37- L33	Types of nuclear reactions

38- IT-II	**Internal Test-II**
39-L34	Q-equation
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	solution of the equation
42- L37	compound nuclear theory
43- L38	reciprocity theorem , nuclear cross section resonance scatteringBreit
44- P4	**College level meeting/ function**
45-L39	Wigner dispersion formula nuclear chain reaction , four factor formula.
46-L40	Classification of elementary particles
47-L41	fundamental interactions conservations laws
48-L42	CPT theorem , SU(3) multiplet
49-L43	meson octet – baryon octet and baryon decouplet
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (01.04.2018)
51 L45	Gellmann-Okubo mass formula, Quark theory.
52- L46	
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (12.04.2018)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2018

Course Outcomes

Learning Outcomes	**COs** of the course **"Nuclear and Particle Physics"**
CO1	
CO2	Magnetic dipole and electric quadrupole moments of deuteron
CO3	Fermi theory of Beta decay
CO4	Fermi and gamow teller selection rules
CO5	Gamma decay
CO6	Multipole transistions in nuclei
CO7	Solution of the equation
CO8	Compound nuclear theory
CO9	Baryon octet and baryon decouplet
Experimental Learning	Gellmann – Okubo mass formula

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

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Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2017-2018)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	RESEARCH METHODOLOGY
Course Code	PPHM34
Class	II year (2017-2018)
Semester	EVEN
Staff Name	G.GOMATHI SANKARI
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- Understand **research** terminology.
- Describe quantitative, qualitative and mixed **methods** approaches to **research**
- Identify the components of a literature review process
- Critically analyze published **research**
- Be aware of the ethical principles of **research**, ethical challenges and approval processes.

Syllabus

Research Methodology

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–

MSU / 2017-18 / PG –Colleges / M.Sc.(Physics) / Semester -III / Ppr.no.17 / Core-17
Physics mode – characters in Physics mode – superscripts and subscripts – Greek letters – mathematical symbols – standard functions – fraction and roots –Ellipsis – accents in Physics mode - Matrices and other arrays in LaTeX - Derivatives, Limits, Sums and Integrals – Lists – tables - Defining your own Control Sequences in LaTeX. **(14 L)**

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 07.12.2017
1-L1	**Introduction to Research:**
2-L2	Objectives of Research – Importance of research
3- L3	research methods and research methodology
4-L4	Types of research – Basic research
5-L5	applied research – Quantitative and Qualitative methods
6-L6	other types of research – explanatory
7-L7	exploratory, comparative – various stages of research
8- P1	**Physics Association**
9- L8	Identification of research topic
10- L9	Literature survey – Reference collection
11-L10	Hypothesis
12-L11	Literature survey revision
13-L12	Various step of research
14-L13	Mode of research – Research design
15-L14	joy in doing research
16-L15	crucial stage of Ph.D., -
17- L16	actual investigation
18- L17	doing good research
19- L18	results and conclusion
20- L19	preparing the oral report
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (22.01.2018)
22- L21	presenting the oral report in scientific seminar
23- IT-1	**Internal Test-I**
24- L22	Research design
25- L23	Common research topic
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Planning the thesis
28- L26	Writing the thesis / assignment
29- L27	General format
30- P2	**College level meeting/Cell function**
31-L28	Page and chapter format

32-L29	Tables and figures
33-L30	Referencing
34- L31	Appendixes
35- L32	Format of pages
36- L33	Introduction - Importing your data –.
37- L34	Designating Worksheet Columns as Error Bars
38-L35	Plotting Data
39- L36	Customizing the Data Plot
40- L37	Customizing the Graph Axes
41- L38	Adding Text to the Graph
42-P3	**Department Seminar**
43- L39	Exploring : Transforming Column Values Data
44- L40	Sorting Worksheet Data
45- L41	Plotting a Range of the Worksheet Data
46- L42	Masking Data in the Graph
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins (26.02.2018)
48- L44	Performing a Linear Fit
49-IT-II	**Internal Test-II**
50-L45	Creating Multiple Layer Graphs
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Working with Excel in Origin
53- L48	Introduction to LaTeX– LaTeX input file
54- L49	TeX and LaTeX, A typical LaTeX input file
55- L50	Characters and control sequences
56- L51	producing ordinary text using LaTeX
57- L52	Section headings in LaTeX
58- L53	changing fonts in text mode
59-P4	**College level meeting/ function**
60- L54	Active characters and special symbols in text
61- L55	Producing Mathematical Formulae using LaTeX–
62- L56	Physics mode – characters in Physics mode–-
63- L57	superscripts and subscripts – Greek letters – mathematical symbols
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins (01.04.2018)
65- L59	standard functions – fraction and roots –Ellipsis – accents in Physics mode
66- L60	Matrices and other arrays in LaTeX - Derivatives, Limits, Sums and Integrals
67-IT-III	**Internal Test-III**
68- L61	Lists – tables
69- L62	Defining your own Control Sequences in LaTeX.tables
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins (12.04.2018)
71-MT	**Model Test**

72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2018

Course Outcomes

Learning Outcomes	**COs** of the course **"Research Methodology"**
CO1	demonstrate knowledge of research processes (reading, evaluating, and developing)
CO2	perform literature reviews using print and online databases
CO3	employ American Psychological Association (APA) formats for citations of print and electronic materials
CO4	identify, explain, compare, and prepare the key elements of a research proposal/report
CO5	define and develop a possible HIED research interest area using specific research designs;
CO6	compare and contrast quantitative and qualitative research paradigms, and explain the use of each in HIED research;
CO7	describe, compare, and contrast descriptive and inferential statistics, and provide examples of their use in HIED research;
CO8	. describe sampling methods, measurement scales and instruments, and appropriate uses of each;
CO9	explain the rationale for research ethics, and the importance of and local processes for Institutional Review Board (IRB) review
Experimental Learning	
EL1	students created a hypothetical counseling program to evaluate based on a generic case study
EL2	Although the students met their learning outcomes with this assignment
EL3	The ultimate goal for the experiential learning was twofold: to provide a real world scenario for students to apply their knowledge of research method
EL4	Two semesters prior to the study, the first author began planning the experiential learning component and approached the community agency to inquire about their interest
Integrated Activity	
IA1	Understanding the context of the research study
IA2	Data collection methods

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study. To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature　　　　　　　　　　　　　　　　　　　　　　　　Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2018-2019)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Classical Mechanics
Course Code	PPHM11
Class	I year (2018-2019)
Semester	Odd
Staff Name	E.Christy Jerin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To expose the students to the idea of the fundamental principle
- To learn the Lagrangian formulations
- To study the rigid body dynamics
- To derive the Hamilton's equations
- To calculate the Principle of least action
- To discuss the postulates of special theory of relativity

Syllabus

Classical Mechanics

UNIT I

Mechanics of a particle and a system of particles Conservation laws-Constraints Generalised coordinates Principle of virtual work-D'Alembert's Principle and Lagrange's equations Applications of Lagrange's equations Hamilton's principle-Lagrange's equation from Hamilton's principle-examples Conservation theorems and symmetry properties Motion under central force-General feature Differential equation for the orbit and classification of orbits Kepler problem-Scattering in a central force field Rutherford scattering

UNIT II

Mechanics of a rigid body-Displacement of a rigid body Orthogonal transformation Infinitesimal rotation-coriolis effect Kinematics of a rigid body Kinetic energy of a rigid body-Euler's equation of motion Torque free motion-Spinning top. Oscillatary motion: Theory of small oscillations-Periodic motion Frequencies of vibration and normal modes-Linear tri atomic molecules

UNIT III

Hamilton's equation from variational principle Principle of least action-applicationLegendre transformations Lagrange and Poisson brackets Equation of motion and conservation theorms in Poisson brackets. Hamilton-Jacobi method-application to harmonic oscillator Hamilton's Characteristic function-separation of variables Action angle variables-kepler problem in action angle variable.

UNIT IV

Linear,nonlinear systems-Integration of linear equation Quadrature method-Integration of nonlinear second order equation Pendulum equation Phase curve of simple harmonic oscillator Phase portrait of the pendulum Bifurcation in Logistic map-atttractors Universality of chaos Routes to chaos Quasi periodicity-Intermittency Crises

UNIT V

Postualtes of special theory of relativity Lorentz transformation equation Variation of masss with velocity Evaluation of inverse LT by convolution theorem Relativistic Lagrangian and Hamiltonian Kinematic effects of Lorentz transformation Minkowski's splace Four vectors Covariant four dimensional formulation of the law of mechanics Covariance of Maxwellfield equations under Lorentz transformation. Phase plane analysis of dynamical systems Canonical transformations Lyapunov exponent and chaos Period doubling Moments and products of inertia Eulerian angles

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2018
1-L1	Mechanics of a particle and a system of particles
2-L2	Conservation laws-Constraints
3- L3	Generalised coordinates
4-L4	Principle of virtual work-D'Alembert's Principle and Lagrange's equations
5-L5	Applications of Lagrange's equations
6-L6	Hamilton's principle-Lagrange's equation from Hamilton's principle-examples
7-L7	Conservation theorems and symmetry properties
8- P1	**Welcoming of First year and Inauguration of Physics Association**

9- L8	Motion under central force-General feature
10- L9	Differential equation for the orbit and classification of orbits
11-L10	Kepler problem-Scattering in a central force field
	Rutherford scattering
13-L12	Mechanics of a rigid body-Displacement of a rigid body
14-L13	Orthogonal transformation
15-L14	Infinitesimal rotation-coriolis effect
16-L15	Kinematics of a rigid body
17- L16	Kinetic energy of a rigid body-Euler's equation of motion
18- L17	Torque free motion-Spinning top.
19- L18	Oscillatary motion: Theory of small oscillations-Periodic motion
20- L19	Frequencies of vibration and normal modes-Linear tri atomic molecules
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (30.07.2018)
22- L21	Hamilton's equation from variational principle
23- IT-1	**Internal Test-I**
24- L22	Principle of least action-application
25- L23	Legendre transformations
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Lagrange and Poisson brackets
28- L26	Equation of motion and conservation theorms in Poisson brackets.
29- L27	Hamilton-Jacobi method-application to harmonic oscillator
30- P2	**College level meeting/Cell function**
31-L28	Hamilton's Characteristic function-separation of variables
32-L29	Action angle variables-kepler problem in action angle variable.
33-L30	Linear,nonlinear systems-Integration of linear equation
34- L31	Quadrature method-Integration of nonlinear second order equation
35- L32	Pendulum equation
36- L33	Phase curve of simple harmonic oscillator
37- L34	Phase portrait of the pendulum
38-L35	Bifurcation in Logistic map-atttractors
39- L36	Universality of chaos
40- L37	Routes to chaos
41- L38	Quasi periodicity-Intermittency
42-P3	**Department Seminar**
43- L39	Crises
44- L40	Postuates of special theory of relativity
45- L41	Lorentz transformation equation
46- L42	Variation of masss with velocity
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins (03.09.2018)
48- L44	Evaluation of inverse LT by convolution theorem
49-IT-II	**Internal Test-II**
50-L45	Equivalence of mass and energy
51- L46	**____ - Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal

52- L47	Relativistic Lagrangian and Hamiltonian
53- L48	Kinematic effects of Lorentz transformation
54- L49	Minkowski's splace
55- L50	Four vectors
56- L51	Covariant four dimensional formulation of the law of mechanics
57- L52	Covariance of Maxwellfield equations under Lorentz transformation.
58- L53	Phase plane analysis of dynamical systems
59-P4	**College level meeting/ function**
60- L54	Canonical transformations
61- L55	Lyapunov exponent and chaos
62- L56	Period doubling
63- L57	Moments and products of inertia
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins (08.10.2018)
65- L59	Eulerian angles
66- L60	Revision
67-IT-III	**Internal Test-III**
68- L61	Revision
69- L62	Revision
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (22.10.2018)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2018

Course Outcomes

Learning Outcomes	**COs** of the course **"Classical Mechanics"**
CO1	Derivate the D'Alembert's principle
CO2	Classification of orbits and and differential equation
CO3	Discuss the kepler problem
CO4	To study the Rutherford scattering
CO5	Design the bifuration in logistic map
CO6	Derive the phase curve of simple hormonic oscillator
CO7	To learn the Maxwell equation
CO8	Explain the lorenz transformation
CO9	Explore the integration of nonlinear second order equation.
IA2	

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature   Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2018-2019)

(Prepared by staff member handling the course)

Programme Name	M.Sc Physics
Course Name	Integrated Electronics
Course Code	PPHM13
Class	I year (2018-2019)
Semester	Odd
Staff Name	Dr. P. Sumithraj Premkumar
Credits	4
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To understand different types of electronic devices and preparation of IC
- To discuss logical families in the digital electronics and study the counters and registers
- To describe the application of operational amplifier in the different field
- To study the various electronics instrumentation through basics of science

MSU/ 2017-18 / PG-Colleges / M.Sc Physics / Semester – I / 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-Integrated Circuits-IC Fabrication Technology - Steps in Fabrication - Integrated Resistors and Capacitors-VLSI Technology.

Unit II

Digital Electronics

Logic Families - DTL, RTL,TTL, ECL, I2L,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.

Text Book:

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.

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

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18-6-2018
1-L1	**Unit I Devices, Applications and Integrated Circuits - Introduction**
2-L2	FET-Types of FET
3- L3	Characteristics and applications of FET,
4-L4	MOSFET
5-L5	SCR
6-L6	DIAC,TRIAC-High frequency device
7-L7	Integrated Circuits
8-L8	IC Fabrication Technology
9-L9	Steps in Fabrication (first and second steps)

10-P1	**Welcoming of First year and Inauguration of Chemistry Association**
11-L10	Steps in Fabrication (remaining steps)
12-L11	Integrated Resistors
13-L12	Integrated Capacitors
14-L13	VLSI Technology **Allotting portion for Internal Test-I**
15-L14	**Unit II : Digital Electronics** Logic Families - DTL, RTL
16-L15	TTL, ECL
17-IT-1	**Internal Test-I (30.07.2018)**
18-L16	CMOS,NMOS and PMOS
19-L17	DTL type AND, OR, gates
	Entering Internal Test-I Marks into University portal
20-L18	DTL type NAND and NOR gates
21-P2	**College level meeting/Cell function**
22-L19	RTL type NAND
23-L20	TTL type NAND
24-L21	CMOS NOR and CMOS NAND
25-L22	Flip Flops: RS-RST-D
26-L23	Flip Flops: JK- JK Master/Slave
27-L24	Asynchronous Counters
28-L25	Synchronous Counters
29-L26	Registers
30-L27	**Unit III OP AMP and Applications** Characteristics and Parameters
31-L28	DC Analysis of IC OP AMP
32-L29	Applications of OP AMP
33-L30	Instrumentation amplifier, II internal test portion allocation
34- P3	**Department Seminar**
35-L31	Sample and Hold System
36-L32	Analog Multiplexer
37-IT-II	**Internal Test-II (03.09.2018)**
38-L33	Integrator
39-L34	Differentiator
40-L35	Design of Analog circuits for the solution of Simultaneous Equations
41-L36	Design of Analog circuits for the solution of Differential Equations
	Entering Internal Test-II Marks into University portal
42-P4	**College level meeting/ function**
43-L37	Filters: First order LOW,HIGH and BAND pass filters
44-L38	Filters: First and Second order LOW,HIGH and BAND pass filters
45-L39	Filters: First and Second order LOW,HIGH and BAND pass filters
46-L40	**Unit IV Timer, VCO, PLL, and Applications -** Timer-555
47-L41	Timer IC-Internal Architecture
48-L42	Timer IC Working **Allotting portion for Internal Test-III**
49-L43	Modes of Operation: Monostable
50-L44	Modes of Operation: Astable
51-IT-III	**Internal Test-III (08.10.2018)**
52-L45	Applications
53-L46	Voltage Control Oscillator
54-L47	IC 566
55-L48	PLL Concept **Entering Internal Test-III Marks into University portal**

56-L49	PLL IC 565
57-L50	Application
58-L51	Frequency multiplexer
59-L52	FSK Modulation and Demodulation
60-L53	**Unit V Electronic Measurement and Control** Sensors and Transducers
61-L54	Measurement and Control
62-L55	Signal Conditioning and Recovery - Impedance Matching
63-L56	Amplification Principle
64-L57	OP Amp based Feedback Amplifier
65-L58	Instrumentation Amplifier
66-L59	Noise and Noise Sources
67-L60	Filtering and Noise Reduction
68-L61	Shielding and Grounding
69-L62	Fourier Transform, **Model Test Announcement**
70-L63	Lock- in Detector/Amplifier
71-L64	Box-Car Integrator or Averager
72-L65	Modulation Techniques
73-MT	**Model Test (22.10.2018)**
74-MT	**Model Test**
75-MT	**Model test paper distribution and previous year university question paper discussion, Feedback of the Course, analysis and report preparation**
	Last Working day on 30.10.2018

Course Outcomes

Learning Outcomes	**COs** of the course **"Integrated Electronics"**
CO1	Explain the principle of integrated circuit and its advancement
CO2	Understand the applications of gates in the various fields
CO3	Know the values of integrated circuit in the development of engineering field
CO4	Operate the electronic instrumentation
Experimental Learning	
EL1	Solve the problems by constructing the circuit using Op-amp
EL2	Design a circuit using various IC
Integrated Activity	
IA1	Construction of new circuits using chips
IA2	Achievements of Electronics in the New era

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# Forslow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature **Staff Signature**

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2018-2019)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Mathematical physics I
Course Code	PPHM21
Class	I year (2018-2019)
Semester	odd
Staff Name	E .Christy Jerin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To acquire the knowledge about the vector analysis.
- To identify the eigen value /eigen vector of the matrix. .
- To study the differentiation and integration of matrices.
- To derive the polynomials.
- To calculate the laplace integral transform.
- To explain the convolution theorm.
- To calculate the Fourier integral transform.

Syllabus

Mathematical physics I

UNIT 1

Matrices

Introduction – special types of matrices Transpose – Conjugate – transposed conjugate Symmetric and antisymmetric matrices Hermitian and skew Hermitian matrices Determinant – Adjoint Orthogonal and unitary matrices Orthogonal and unitary matrices Eigen values and eigen vectors of the matrix Characteristic equation of a matrix – Cayley Hamilton theorem

UNIT II

Complex variables

Analytical functions – Cauchy Riemann Conditions Line integrals – Cauchy's theorem – Cauchy's integral formula Derivatives of analytical functions – Power series Taylor's theorem – Laurent's theorem Calculus of residues Evaluation of definite integrals of cos Θ and sin Θ Certain improper real integers.

UNIT III

Bessel function of first kind.

Generating function Recurrence relations. Jn (x) as solution of Bessel differential equation. Expansion of Jn (x) where n is half and odd integer Integral representation Laguerre's differential equation and Laguerre polynomials Generating function Rodrigue's formula Recurrence relations Orthogonal property of lauguerre polynomials Associated laugurre polynomials

UNIT IV

Fourier transform

Introduction-Fourier transform Properities of fourier transfom Fourier transform of a derivative Fourier sine and cosine transform of derivatives. Laplace transform (LT) Properities of LT LT of derivative and integral of a function LT of periodic function Inverse of LT Properities of inverse LT Application of LT to electrical circuits

UNIT V

Numerical integration

Introduction –numerical integration. Trapezoidal rule Simpson's rule Solution of ordinary differential equations of first order. Euler's method. Modified Euler's method Taylor series method. Runge kutta method Approximate solution of algebraic and transcendental equations Newton raphson method Method of iteration Monte-carlo technique Simpson's rule Solution of ordinary differential equations of first order.

Course Calendar

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2018
1-L1	Matrices: Introduction – special types of matrices
2-L2	Transpose – Conjugate – transposed conjugate
3- L3	Symmetric and antisymmetric matrices

4-L4	Hermitian and skew Hermitian matrices
5-L5	Determinant – Adjoint
6-L6	Orthogonal and unitary matrices
7-L7	Orthogonal and unitary matrices
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Eigen values and eigen vectors of the matrix
10- L9	Characteristic equation of a matrix – Cayley Hamilton theorem
11-L10	Complex variables: Analytical functions – Cauchy Riemann Conditions
12-L11	Line integrals – Cauchy's theorem – Cauchy's integral formula
13-L12	Derivatives of analytical functions – Power series
14-L13	Taylor's theorem – Laurent's theorem
15-L14	Calculus of residues.
16-L15	Evaluation of definite integrals of cos Θ and sin Θ
17- L16	Certain improper real integers.
18- L17	Bessel function of first kind.
19- L18	Generating function.
20- L19	Recurrence relations.
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (30.07.2018)
22- L21	Jn (x) as solution of Bessel differential equation.
23- IT-1	**Internal Test-I**
24- L22	Expansion of Jn (x) where n is half and odd integer.
25- L23	Integral representation
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Laguerre's differential equation and Laguerre polynomials
28- L26	Generating function
29- L27	Rodrigue's formula
30- P2	**College level meeting/Cell function**
31-L28	Recurrence relations.
32-L29	Orthogonal property of lauguerre polynomials.
33-L30	Associated laugurre polynomials.
34- L31	Introduction-Fourier transform.
35- L32	Properities of fourier transfom.
36- L33	Fourier transform of a derivative.
37- L34	Fourier sine and cosine transform of derivatives.
38-L35	Laplace transform (LT)
39- L36	Properities of LT
40- L37	LT of derivative and integral of a function
41- L38	LT of periodic function.
42-P3	**Department Seminar**
43- L39	Inverse of LT
44- L40	Properities of inverse LT
45- L41	Application of LT to electrical circuits
46- L42	Introduction –numerical integration.
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins (03.09.2018)
48- L44	Trapezoidal rule

49-IT-II	**Internal Test-II**
50-L45	Simpson's rule
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	Solution of ordinary differential equations of first order.
53- L48	Euler's method.
54- L49	Modified Euler's method
55- L50	Taylor series method.
56- L51	Runge kutta method.
57- L52	Approximate solution of algebraic and transcendental equations.
58- L53	Newton raphson method.
59-P4	**College level meeting/ function**
60- L54	Method of iteration
61- L55	Monte-carlo technique
62- L56	Simpson's rule
63- L57	Solution of ordinary differential equations of first order.
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins (08.10.2018)
65- L59	Modified Euler's method
66- L60	Runge kutta method.
67-IT-III	**Internal Test-III**
68- L61	Approximate solution of algebraic and transcendental equations
69- L62	Monte-carlo technique
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (22.10.2018)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2018

Course Outcomes

Learning Outcomes	**COs** of the course "**Mathematical physics I"**
CO1	Introduction about types of matrices.
CO2	Find the eigen value and eigen vectors of the matrix.
CO3	Derive the Cauchy's integral formula.
CO4	Derive the recurrence relations.
CO5	Study about the laplace transform.
CO6	Find roots of the equation using Newton raphson method.
CO7	Solve the differential equation using Euler's method.
CO8	Solve the numerical integration using sympson's rule.
CO9	Introduction of Monte-carlo method

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2018-2019)

(Prepared by staff member handling the course)

Programme Name	M.sc Physcics
Course Name	Nonlinear Dynamics
Course Code	PPHE11
Class	I year (2018-2019)
Semester	Odd
Staff Name	G.GOMATHI SANKARI
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- designed to provide an introduction to the theory and basic concepts of Nonlinear Dynamics and Chaos.
- The course concentrates on simple models of dynamical systems, their relevance to natural phenomena.
- The main goal of the course is to introduce and describe nonlinear phenomena in physical systems by only using a minimum background in physics and Physics
- The emphasis is on nonlinear phenomena that may be described by few variables that evolve with time

Syllabus

Nonlinear Dynamics

UNIT I

Nonlinear Dynamics 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.

Hour allotment	**Class Schedule**
	Odd Semester Begin on 18.06.2018
1-L1	**Nonlinearity, linear and nonlinear oscillators**
2-L2	Dynamical systems-linear and nonlinear forces
3- L3	Mathematical implications of nonlinearlty
4-L4	Working definition of nonlinearity-Effects of nonlinearity
5-L5	Linear oscillators and predictability
6-L6	Damped and driven nonlinear oscillators.
7-L7	Revision
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Introduction to **Equilibrium points, bifurcations and chaos**
10- L9	Equilibrium points-General criteria for stability

11-L10	Classification-Some simple bifurcations -Saddle node
12-L11	pitch fork, transcritical bifurcation
13-L12	Hopf bifurcations-Discrete dynamical systems
14-L13	Logistic map
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (30.07.2018)
16-L15	Equilibrium points and their stability
17-IT-1	**Internal Test-I**
18-L16	period doubling phenomenon-chaos.
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Introduction to chaos non linear electronic circuit
21- L19	L inear and nonlinear circuit elements
22- P2	**College level meeting/Cell function**
23-L20	nonlinear circuits-Chua’s diode-Autonomous case
24-L21	Bifurcations and chaos
25-L22	Chaotic dynamics of MLC circuit
26-L23	Solved problem
27-L24	Analogue circuit simulation-Some other useful nonlinear circuit .
28-L25	Colpitt’s oscillator
29-L26	Solved the problem
30-L27	Previous university question discussion
31-L28	**Introduction to Fractals**
32-L29	Self similarity-Properties and examples of fractals-
33-L30	Fractal dimension-Construction and properties of some fractals
34- P3	**Department Seminar**
35-L31	Quiz Competition
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (03.09.2018)
37- L33	Monitoring Mouse activity -.
38- IT-II	**Internal Test-II**
39-L34	File Handling -
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Middle one third cantor set-Koch curve-Sierpinski triangle-
42- L37	
43- L38	Applications of fractals
44- P4	**College level meeting/ function**
45-L39	**Solitons** Linear waves-Linear non dispersive wave propagation-Linear dispersive wave propagation
46-L40	Nonlinear dispersive systems-Korteweg de vries equation- solitary and cnoidal waves-
47-L41	Numerical experiments of Zabusky and Kruskal-birth of solitons—
48-L42	Properties of solitons-

49-L43	applications of solitons.
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (08.10.2018)
51 L45	Solved the problem
52- L46	Revision solitary and cnoidal
53-IT-III	**Internal Test-III**
54-L47	Revision
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (22.10.2018)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2018

Course Outcomes

Learning Outcomes	**COs** of the course **"Nonlinear Dynamics"**
CO1	Students will be able to analyze the behavior of dynamical systems expressed as either a discrete-time mapping or a continuous-time flow
CO2	Students will be able to apply the techniques of nonlinear dynamics to physical processes drawn from a variety of scientific and engineering disciplines
CO3	Students will be able to analyze changes (i.e. bifurcations) to dynamical systems as system parameters are varied.
CO4	Students will be able to independently research topics in nonlinear dynamics and synthesize this work into coherent written and oral presentations.
CO5	Draw bifurcation diagrams and stability diagrams. For two-dimensional systems,.
CO6	The student is able to draw phase portraits and find basins of attraction.
CO7	The student is able to analyze limit cycles and their stability
CO8	The student has basic knowledge of the most important fractals, and their topological and metric properties
CO9	The students will improve their communication skills by solving problems on the blackboard and training in solving nonlinear problems using numerical methods.
Experimental Learning	
EL1	Describing the nonlinear system using a linear model

EL2	Representing the nonlinear system in a series expansion, and obtaining the respective coefficients either by using a regression estimation technique,
EL3	By minimizing a cost functional, by using correlation techniques
EL4	obtaining a graphical representation of the nonlinear term(s), then finding an analytical model for the nonlinearity
Integrated Activity	
IA1	The network must **integrate** the torques to obtain the angular velocities which in turn must be **integrated** for the angles
IA2	Learning these **dynamics** is difficult due to these sequential integrations involving **non-linear** functions of the state variables and the input

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

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St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2018-2019)

(Prepared by staff member handling the course)

Programme Name	M.Sc Physics
Course Name	Research Methodology
Course Code	PPHM24
Class	II year (2018-2019)
Semester	Odd
Staff Name	Dr. P. Sumithraj Premkumar
Credits	4
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To study the concept of Literature survey
- To involve the activities in the research problem
- To motivate research activities in the right directions
- To gain the knowledge graphical and typewriting softwares

MSU / 2017-18 / PG –Colleges / M.Sc.(Physics) / Semester -III / Ppr.no.17 / Core-17

RESEARCH METHODOLOGY

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.

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.

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.

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.

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– Physics mode – characters in Physics mode – superscripts and subscripts – Greek letters – mathematical symbols – standard functions – fraction and roots –Ellipsis – accents in Physics mode - Matrices and other arrays in LaTeX - Derivatives, Limits, Sums and Integrals – Lists – tables - Defining your own Control Sequences in LaTeX.

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.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18-6-2018
1-L1	**I : Introduction to Research** Objectives of Research
2-L2	Importance of research
3- L3	Research methods
4-L4	Research methodology
5-L5	Types of research – Basic research – applied research
6-L6	Quantitative and Qualitative methods
7-L7	Other types of research – explanatory, exploratory
8-L8	Other types of research – comparative
9-L9	Various stages of research
10-P1	**Welcoming of First year and Inauguration of Chemistry Association**
11-L10	Identification of research topic
12-L11	Literature survey
13-L12	Reference collection
14-L13	Hypothesis **Allotting portion for Internal Test-I**
15-L14	**II : Research Activity** Mode of research – Research design
16-L15	Joy in doing research
17-IT-1	**Internal Test-I (30.07.2018)**
18-L16	crucial stage of Ph.D.,
19-L17	Actual investigation – doing good research
	Entering Internal Test-I Marks into University portal
20-L18	Results and conclusion
21-P2	**College level meeting/Cell function**
22-L19	Preparing the oral report
23-L20	Presenting the oral report in scientific seminar
24-L21	Planning the assignment
25-L22	Defining and limiting the problem
26-L23	Time schedule
27-L24	Preparing the working bibliography
28-L25	Taking notes – outline
29-L26	first draft
30-L27	**III: Writing the thesis** Planning the thesis
31-L28	Writing the thesis
32-L29	Writing the assignment
33-L30	General format of thesis
34- P3	**Department Seminar**
35-L31	General format of thesis
36-L32	Page format

37-IT-II	**Internal Test-II (03.09.2018)**
38-L33	chapter format
39-L34	Tables format
40-L35	Figures format
41-L36	Referencing
	Entering Internal Test-II Marks into University portal
42-P4	**College level meeting/ function**
43-L37	Referencing with examples
44-L38	Appendixes
45-L39	Appendixes with examples
46-L40	**IV: Plotting software: Origin:** Introduction
47-L41	Importing your data
48-L42	Designating Worksheet Columns as Error Bars
49-L43	Plotting Data - Customizing the Data Plot
50-L44	Customizing the Graph Axes
51-IT-III	**Internal Test-III (08.10.2018)**
52-L45	Adding Text to the Graph
53-L46	Exploring Data: Transforming Column Values
54-L47	Sorting Worksheet Data
55-L48	Plotting a Range of the Worksheet Data **Entering Internal Test-III Marks into University portal**
56-L49	Masking Data in the Graph
57-L50	Performing a Linear Fit
58-L51	Creating Multiple Layer Graphs
59-L52	Working with Excel in Origin
60-L53	**V : Typesetting Software : Latex** Introduction to LaTeX – TeX and LaTeX
61-L54	A typical LaTeX input file – Characters and control sequences
62-L55	Producing Simple Documents using LaTeX
63-L56	LaTeX input file – producing ordinary text using LaTeX
64-L57	Section headings in LaTeX – changing fonts in text mode
65-L58	Active characters and special symbols in text
66-L59	Producing Mathematical Formulae using LaTeX– Physics mode
67-L60	characters in Physics mode – superscripts and subscripts
68-L61	Greek letters – mathematical symbols – standard functions – fraction and roots
69-L62	Ellipsis – accents in Physics mode, **Model Test Announcement**
70-L63	Matrices and other arrays in LaTeX
71-L64	Derivatives, Limits, Sums and Integrals – Lists – tables
72-L65	Defining your own Control Sequences in LaTeX.
73-MT	**Model Test (22.10.2018)**
74-MT	**Model Test**
75-MT	**Model test paper distribution and previous year university question paper discussion, Feedback of the Course, analysis and report preparation**
	Last Working day on 31-10-2018

Course Outcomes

Learning Outcomes	**COs** of the course **"Research Methodology"**
CO1	Understand the research and its importance
CO2	Prepare the research thesis/assignments
CO3	Draw the graphs and diagrams using advanced software
CO4	Write the programme for the documents using typewriting software
Experimental learning	
EL1	Demonstration of creating the graphs using origin
EL2	How to present a paper in the seminar?
Integrated Activity	
IA1	Collection of literature on the different topics
IA2	Advancement on the recent softwares

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

Forslow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature **Staff Signature**

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2018-2019)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Quantum Mechanics I
Course Code	PPHM31
Class	I year (2018-2019)
Semester	Odd
Staff Name	J RUBY JEMIMA
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- This course imparts knowledge about wave functions and schrodinger equations and matrix mechanics.
- Heisenberg uncertainty 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.

Syllabus

QUANTUM MECHANICS I

Unit I :
Schrodinger equation and wave function

Introduction – Construction of Schrodinger equation – Solution of time dependent equation – Physical interpretation of – 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.

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 noncommuting operators – Self-ad joint and Hermitian operator – Discrete and continuous eigenvalues.

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.

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.

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

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2018
1-L1	Introduction :Construction of Schrodinger equation
2-L2	Solution of time dependent equation
3- L3	Physical interpretation of chi*chi
4-L4	Conditions on allowed wave functions
5-L5	Box normalization
6-L6	Conservation of probability
7-L7	Expectation value
8- P1	**Welcoming of First year and Inauguration of Association**
9- L8	Ehrenfest's theorem& Verification of Ehrenfest's theorem
10- L9	Linear harmonic oscillator

11-L10	particle in an infinite square well potential
12-L11	Particle in a magnetic field
13-L12	Classical uncertainty relation
14-L13	Heisenberg uncertainty relation
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (30.07.2018)
16-L15	Implication of uncertainty relation
17-IT-1	**Internal Test-I**
18-L16	Illustration of uncertainty relation
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Gamma-Ray microscope
21- L19	Doppler effect
22- P2	**College level meeting/Cell function**
23-L20	Operators, Eigen values and Eigen functions: Linear operators, commuting and non-commuting operators
24-L21	Self-ad joint and Hermitian operator
25-L22	Discrete and continuous eigen values
26-L23	Bound states
27-L24	Classical probability distribution
28-L25	linear harmonic oscillator
29-L26	Particle in a box
30-L27	Poschl-Teller potentials
31-L28	Quantum pendulum
32-L29	Time dependent harmonic oscillator
33-L30	Rigid rotator
34- P3	**Department Seminar**
35-L31	Linear vector space
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (03.9.2018)
37- L33	Matrix representation of operators and wave functions
38- IT-II	**Internal Test-II**
39-L34	Unitary transformation
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Schrodinger equation and other quantities in matrix form
42- L37	Application of matrix mechanics
43- L38	Dirac's Bra and Ket notations
44- P4	**College level meeting/ function**
45-L39	Properties of bra and ket vectors
46-L40	Hilbert space
47-L41	Schrodinger picture
48-L42	Heisenberg picture
49-L43	Interaction picture
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (08.10.2018)
51 L45	Density matrix for a single system & Density matrix of an ensemble
52- L46	Time evolution of density operator

53-IT-III	**Internal Test-III**
54-L47	A spin ½ system
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (22.10.2018)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 31.10.2018

Course Outcomes

Learning Outcomes	**COs** of the course **"Quantum Mechanics I"**
CO1	To construct the schrodinger equation
CO2	To derive the solution of time dependent equation
CO3	To discuss the physical interpretation of wave function
CO4	To described the properties of bra and ket vectors
CO5	To know the Box normalization
CO6	Explain the conservation of probability
CO7	To derive the Dirac's Bra and Ket notations
CO8	To discuss the application of matrix mechanics
CO9	To studied the time evolution of density operator

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2018-2019)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Electromagnetic theory
Course Code	PPHM32
Class	II year (2018-2019)
Semester	Odd
Staff Name	E. Christy jerin
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To expose the students to the ideas of fundamental laws.
- To identify formulate and solve fields and electromagnetic wave propagation.
- To study the importance of the Boundary conditions.
- To derive the Reflection and transmission of the Electromagnetic wave.
- To calculate the electric and magnetic dipole radiation.
- To acquire the knowledge of Electromagnetic wave propagation.

Syllabus

Electromagnetic theory

UNIT I

Coulomb's Law-Derivation Gauss law in differential and Integral form. Gauss law in differential and Integral form. Poisson's equation and Laplace's equation. Work done to move a point charge. Energy of a point charge and continuous charge distribution. Electric field in dielectric materials. Induced dipoles and polarizability. Connection between polarizability and susceptibility.

UNIT II

Lorentz force law. Biot-Savart law and ampere law - Magnetic vector potential- Expansion of vector potential - Effect of a magnetic field on atomic orbits- Bound current and its physical interpretations- Ampere's law in magnetic material- Dia , para , Ferro Magnetism. Magnetic susceptibility and permeability in linear and non linear media

UNIT III

Electrodynamics Electromagnetic induction- Faraday law- Maxwell's equation differential and integral form. Boundary conditions on field vectors D,E,B and H Scalar and vector potential. Gauge transformations. Lorentz and coulomb gauge. Pointing vector and pointing theorem. Maxwell's stress tensor. Conservation of momentum.

UNIT IV

The wave equation for A and B-Mono chromatic plane waves Reflection and transmission at normal Incidence Reflection and transmission at oblique Incidence. EM waves in conductor wave guide. The coaxial transmission line.

UNIT V

Retarded Potential. Lenard – wiechart potential. Electric dipole radiation. Magnetic dipole radiation. And derivation. Larmour formula definition. And derivation. Abraham Lorentz formula for the radiation reaction. Physical origin of radiation reaction

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2018
1-L1	Coulomb's Law-Derivation.
2-L2	Gauss law in differential and Integral form.
3- L3	Gauss law in differential and Integral form.
4-L4	Poisson's equation and Laplace's equation.
5-L5	Work done to move a point charge.
6-L6	Energy of a point charge and continuous charge distribution.
7-L7	Energy of a point charge and continuous charge distribution.
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Electric field in dielectric materials.
10- L9	Induced dipoles and polarizability.
11-L10	Connection between polarizability and susceptibility.
12-L11	Connection between polarizability and susceptibility.
13-L12	Lorentz force law.
14-L13	Biot-Savart law
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (30.07.2018)

16-L15	Magnetic vector potential.
17-IT-1	**Internal Test-I**
18-L16	Effect of a magnetic field on atomic orbits.
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Dia , para , Ferro Magnetism.
21- L19	Magnetic susceptibility and permeability.
22- P2	**College level meeting/Cell function**
23-L20	Maxwell’s equation differential and integral form.
24-L21	Maxwell’s equation differential and integral form.
25-L22	Boundary conditions on field vectors
26-L23	D,E,B and H
27-L24	Scalar and vector potential.
28-L25	Gauge transformations.
29-L26	Lorentz and coulomb gauge.
30-L27	Pointing vector and pointing theorem.
31-L28	Maxwell’s stress tensor.
32-L29	Conservation of momentum.
33-L30	Mono chromatic plane waves
34- P3	**Department Seminar**
35-L31	Reflection and transmission at normal Incidence.
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (03.09.2018)
37- L33	Reflection and transmission at oblique Incidence.
38- IT-II	**Internal Test-II**
39-L34	EM waves in conductor wave guide.
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	The coaxial transmission line.
42- L37	Retarded Potential.
43- L38	Lenard – wiechart potential.
44- P4	**College level meeting/ function**
45-L39	Electric dipole radiation.
46-L40	Magnetic dipole radiation.
47-L41	And derivation.
48-L42	Larmour formula definition.
49-L43	And derivation.
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (08.10.2018)
51 L45	Abraham Lorentz formula for the radiation reaction.
52- L46	Physical origin of radiation reaction.
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (22.10.2018)**
57-MT	**Model Test**
58-MT	**Model Test**

59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.10.2018

Course Outcomes

Learning Outcomes	**COs** of the course **"Electromagnetic theory"**
CO1	Explain the fundamental laws governing electromagnetic fields.
CO2	Determine the electromagnetic force exerted on charged particles, current elements, working priniciple of various electric and EMT conversion devices are based on this force.
CO3	Design maxwell's equation and Boundary condition.
CO4	Deduce the Reflection and Transmission wave equation
CO5	Derive the Pointing Theorem.
CO6	Design Larmour formula.
CO7	Reduce the gauge transformation .
CO8	Calculate magnetic vector potential
CO9	To derive the basic laws.

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2018-2019)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Statistical Mechanics
Course Code	PPHM33
Class	II year (2018-2019)
Semester	Odd
Staff Name	C.Stella Rani
Credits	4
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To introduce the basic concepts of statistical mechanics
- To import the knowledge of Maxwell – Boltzmann distribution
- To describe the quantum mechanical view of the statistics
- To explain the Black body radiation
- To determines the thermal properties of Bose – Einstein statistics

Syllabus

Statistical Mechanics

L T P C

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-EnsemblesMicrocanonical 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 probabilityGeneral statistical distribution law-Classical Maxwell-Boltzmann distribution law-Evaluation of constants in the Maxwell Boltzmann distribution law-Maxwell's law of distribution of velocitiesprinciple 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 solidsDebye theory of specific heat of solids-Criticism of Debye's theory-Ideal Bose Einstein GasEnergy 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,PragatiPrakasan,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 PalashB.PalNarosa First reprint 2009

3.Statistical Mechanics by Kerson Huang 4.Statistical Mechnics by Sears and Salinger.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2018
1-L1	Phase Space
2-L2	Phase-space diagram of an oscillator
3- L3	Volume in phase space
4-L4	Ensembles Microcanonical ensemble
5-L5	Canonical ensemble
6-L6	Grand canonical ensemble
7-L7	Density of distribution in phase space
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Liouvilles theorem
10- L9	Postulate of equal a priori probability
11-L10	Statistical,mechanical and thermal equilibriums
12-L11	Connection between statistical and thermodynamical quantities.
13-L12	Microstates and macro states
14-L13	Stirling's approximation
15-L14	**Allotting portion for Internal Test-I**

	Internal Test I begins (30.07.2018)
16-L15	Thermodynamic probabilityGeneral statistical distribution law
17-IT-1	**Internal Test-I**
18-L16	Boltzmann distribution law
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Evaluation of constants in the Maxwell Boltzmann distribution law
21- L19	Maxwell's law of distribution of velocitiesprinciple of equipartition of energy
22- P2	**College level meeting/Cell function**
23-L20	Boltzmann entropy relation
24-L21	Probability of magnetic moment distribution of independent atoms.
25-L22	Postulatory foundations of quantum mechanics
26-L23	Transition from classical statistical mechanics to quantum statistical mechanics
27-L24	Indistinguishability and quantum statistics
28-L25	Exchange symmetry of wave functions
29-L26	Bose-Einstein Statistics
30-L27	Fermi-Dirac statistics
31-L28	Maxwell-Boltzmann statistics
32-L29	Results of three statistics,Thermodynamic interpretation of the parameters α & β
33-L30	Black body radiation and the Planck radiation law.
34- P3	**Department Seminar**
35-L31	Specific heat of solids
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (03.09.2018)
37- L33	Dulong and Petit law
38- IT-II	**Internal Test-II**
39-L34	Einstein theory of specific heat of solids
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Debye theory of specific heat of solids
42- L37	Criticism of Debye's theory
43- L38	Ideal Bose Einstein Gas, Energy and pressure of the Gas degeneracy
44- P4	**College level meeting/ function**
45-L39	Bose-Einstein Condensation ,Thermal properties of Bose Einstein Gas-
46-L40	Ideal Fermi Dirac gas,Energy and pressure of the Gas
47-L41	Thermodynamics functions of degenerate Fermi-Dirac gas-Electron Gas.
48-L42	Phase transition,Phase transitions of first and second kind
49-L43	critical exponent,Yang and Lee theory
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (08.10.2018)
51 L45	Phase transitions of second kind: the Ising model-Braggs-Williams approximation,One dimensional Ising model
52- L46	
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (22.10.2018)**

57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.11.2018

Course Outcomes

Learning Outcomes	**COs** of the course **"Statistical Mechanics"**
CO1	Derive the density of states
CO2	Determine the Maxwell Boltzmann distribution velocities
CO3	Define Microstates and macro states
CO4	Application to the Black body distribution
CO5	Analogy between statistical and thermo dynamical quantities
CO6	Determine the specific heat of solids
CO7	Difference between three statistics
CO8	Finding the condensation of Bose - Einstein
CO9	Knowledge about Electron gas
Experimental Learning	
EL1	Phase transitions of first and second kind
Integrated Activity	
IA1	Yang and Lee theory
IA2	Stirling's approximation

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2018-2019)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	NUMERICAL METHODS AND PROGRAMMING IN C++
Course Code	PPHE21
Class	I year (2018-2019)
Semester	EVEN
Staff Name	G.GOMATHISANKARI
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- The aim is to teach the student various topics in **Numerical Analysis** such as solutions of nonlinear equations in one variable
- Interpolation and approximation, **numerical** differentiation and integration,
- Direct **methods** for solving linear systems
- N**umerical solution** of ordinary differential equations.

Syllabus

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.

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 03.12.2018
1-L1	**Roots of equations and eigen-value problems**
2-L2	Newton-Raphson method. Secant Method
3- L3	Muller's Method - Lin -Bairstow's Method.
4-L4	Linear Algebraic Equations

5-L5	Gauss elimination - Gauss-Jordan
6-L6	Gauss-Jacobi
7-L7	Inverse of a matrix by Gauss Jordan elimination method
8- P1	Physics Assiocation
9- L8	**Curve Fitting / Interpolation** Curve fitting
10- L9	Linear Least square fitting - Nonlinear Fit- Fitting a Polynomial Function, Exponential function
11-L10	Cubic spline fitting – Interpolation
12-L11	Interpolation: Fundamental theorem of finite difference, Finite difference interpolation with equally spaced:
13-L12	Newton’s forward and backward difference formulae
14-L13	Unequally spaced: Lagrangian interpolation formula.
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (18.01.2019)
16-L15	**Numerical differentiation and integration** Numerical Differentiation : Methods based on interpolation:
17-IT-1	**Internal Test-I**
18-L16	non uniform & uniform nodal points - Methods based on finite differences: forward & backward difference formulae
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Numerical Integration: Trapezoidal Rule
21- L19	Simpson Rule
22- P2	**College level meeting/Cell function**
23-L20	Monte-Carlo evaluation of integration.
24-L21	Methods based on undetermined coefficients
25-L22	Gauss-Legendre, Gauss – Lagurre
26-L23	Gauss - Hermit integration methods.
27-L24	**Solution to ordinary and partial differential equations**
28-L25	Ordinary Differential Equations
29-L26	Taylor’s Series Method- Euler’s Method
30-L27	Euler’s modified method - Runge -Kutta 2nd and 4th Order Methods
31-L28	Predictor- Corrector Methods
32-L29	Solution to partial differential equations
33-L30	**C++ Programming applications** Programme structure: header files, local
34- P3	**Department Seminar**
35-L31	global and static variables.
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (25.02.2019)
37- L33	input and output statements
38- IT-II	**Internal Test-II**
39-L34	Euler’s Method

40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Charging and discharging of a condenser
42- L37	Runge-Kutta methods
43- L38	Radioactive Decay; Newton-Raphson method
44- P4	**College level meeting/ function**
45-L39	Gauss elimination method Solution van der Waals equation;:
46-L40	Currents in Wheatstone's bridge
47-L41	Linear fitting
48-L42	least square method : Cauchy's constant
49-L43	Simpson's and Monte-Carlo methods
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (22.03.2019)
51 L45	Evaluation of (integral) area under the curve
52- L46	Eigenvalues and eigenvectors of symmetry matrices;
53-IT-III	**Internal Test-III**
54-L47	Numerical differentiation: Newton's Law of cooling.
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins (08.04.2019)
56- MT	**Model Test**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2019

Course Outcomes

Learning Outcomes	**COs** of the course **"Numerical Methods"**
CO1	Students will understand basics of numerical analysis
CO2	Students will be able to find roots of polynomial equations using numerical analysis
CO3	Students will be able to conduct numerical integration and differentiation
CO4	Students will be able to use numerical methods to solve theproblem
CO5	Demonstrate an understanding of the fundamental principles of digital computing, including number representation and arithmetic operations
CO6	Develop and implement stable and accurate numerical methods to solve linear systems of equations and find roots of linear and non-linear equations.
CO7	Perform numerical interpolation, curve fitting, integration, and differentiation
CO8	Develop and implement Gauss Elimination method

CO9	To perform Eigen values and Eigen vector
Experimental Learning	
EL1	Study of basic matrix operations
EL2	Solution of Linear equations for Underdetermined and Overdetermined cases.
EL3	Determination of Eigen values and Eigen vectors of a Square matrix.
EL4	Solution of Difference Equations using Euler Method
Integrated Activity	
IA1	Have a strong theretical background of various numerical methods
IA2	Select the appropriate method for given problem

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2018-2019)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Mathematicl Physics-II
Course Code	PPHM21
Class	I year (2018-2019)
Semester	even
Staff Name	C.Stella Rani
Credits	4
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To introduce the special type of matrices. .
- To derive Cayley – hamilton theorem.
- To derive Cauchy's theorem.
- To derive Taylor' s theorem.
- To study the Polynomials.
- To import the knowledge of fourier transform.
- To apply then laplace transform into the electrical circuits.

Syllabus

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 Physics for Engineers and Physicsts, Louis A.Pipes, Lawrence R, Harvill, McGraw-Hill Ltd, 1970 2. Matrices and Tensors in1 Physics- A.W.Joshi, 3rd edition, New Age International Publishers, New Delhi, 1995.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 3.12.2018
1-L1	Functions of complex variable
2-L2	Analytic functions
3- L3	Cauchy -Riemann differential equation
4-L4	Harmonic functions
5-L5	Cauchy's integral theorem
6-L6	Cauchy's integral formula
7-L7	Derivatives of analytic functions
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Residues and their evaluations
10- L9	Cauchy's residue theorem
11-L10	Concept of a group
12-L11	Abelian group
13-L12	Cyclic group
14-L13	Subgroup
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (18.01.2019)
16-L15	Coset
17-IT-1	**Internal Test-I**
18-L16	Classes Conjugate subgroups
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	Isomorphism and homomorphism
21- L19	Reducible and irreducible representations
22- P2	**College level meeting/Cell function**
23-L20	Some important theorems on representations
24-L21	Orthogonality theorem.
25-L22	Introduction , Legendre differential equation and Legendre polynomial
26-L23	Generating functions
27-L24	Recurrence relations
28-L25	Hermite differential equation and Hermite polynomial Generating function
29-L26	Recurrence relations.
30-L27	Solution of heat flow equation (Method of separation of vriables)
31-L28	Linear flow in semi infinite solid : Temperature on one face given as sinusoidal function of time
32-L29	Variable linear flow in an infinite bar
33-L30	two dimentional heat flow
34- P3	**Department Seminar**
35-L31	three dimentional heat flow
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (25.02.2019)
37- L33	Heat flow in circular plate (use of cylindrical co ordinates)
38- IT-II	**Internal Test-II**
39-L34	Equation of motion for the vibrating string
40-L35	**Test Paper distribution and result analysis**

	Entering Internal Test-II Marks into University portal
41-L36	Vibrations of a rectangular membrane
42- L37	Vibrations of a circular membrane
43- L38	Introduction ,Scalar, contravarient and covarient vectors
44- P4	**College level meeting/ function**
45-L39	Tensor of higher ranks Algebraic operations of tensors
46-L40	Symmetric and anti symmetric tensor
47-L41	Fundamental tensor
48-L42	Tensors in dynamic of a particle
49-L43	Tensors in elasticity
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (22.03.2019)
51 L45	Moment of inertia tensor
52- L46	
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (08.04.2019)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2019

Course Outcomes

Learning Outcomes	**COs** of the course **"Mathematical Physics-II"**
CO1	Introduction about types of matrices.
CO2	Find the eigen value and eigen vectors of the matrix.
CO3	Derive the Cauchy's integral formula.
CO4	Derive the recurrence relations.
CO5	Study about the laplace transform.
CO6	Find roots of the equation using Newton raphson method.
CO7	Solve the differential equation using Euler's method.
CO8	Solve the numerical integration using sympson's rule.
CO9	Introduction of Monte-carlo method

# Blended Learning	: using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,
# For Advanced Learner	: use library books, E- books, motivate student to prepare for higher study.
# For slow learner	: special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.
# Extension activity	: Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2018-2019)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Condensed matter physics
Course Code	PPHM22
Class	I year (2018-2019)
Semester	Even
Staff Name	E.Chrsity Jerin
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- To study the classification of crystals..
- To analysis of elastic strains.
- To calculate the phonons momentum.
- To derive the Bloch function.
- To acquire the knowledge of superconductivity.

Syllabus

Condensed matter physics

UNIT I

Classification of crystals Two dimensional Brava's Brava's lattices in 3 dimensional crystals of inert gases ionic crystals covalent crystals ,metals hydrogen bonds analysis of elastic strains elastic compliance and stiffness constants elastic wave in cubic crystals

UNIT II

Lattice waves properties of Lattice waves vibrational modes of a finite one dimensional lattice of identical atoms diatomic linear lattice quantizaion of lattice vibrations phonons momentum Inelastic scattering by phonons, by long wave length phonons X rays by photons neutrons by phonons

UNIT III

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

Langevin diamagnetism equation quantum theory of diamagnetism Hund rule Paramagnetic susceptibility of conduction electrons Ferromagnetic order Magnons antiferro magnetic order ferromagnetic domains origin of domains.

UNIT V

Macroscopic electric field Local field at an atom Dielectric constant and polarizability Structural phase transitions Ferroelectric crystals Ferroelectric domains Piezoelectricity occurrence of superconductivity Meissner effect thermodynamics of superconducting transition London equation coherence length BCS theory of superconductivity Single particle tunneling DC AND AC Josephson effect

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 03.12.2018
1-L1	Classification of crystals
2-L2	Two dimensional Brava's
3- L3	Brava's lattices in 3 dimensional
4-L4	crystals of inert gases
5-L5	ionic crystals
6-L6	covalent crystals ,metals
7-L7	hydrogen bonds
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	analysis of elastic strains
10- L9	elastic compliance and stiffness constants
11-L10	elastic wave in cubic crystals
12-L11	Lattice waves
13-L12	properties of Lattice waves
14-L13	vibrational modes of a finite one
15-L14	dimensional lattice of identical atoms
16-L15	diatomic linear lattice
17- L16	quantizaion of lattice vibrations
18- L17	phonons momentum
19- L18	Inelastic scattering by phonons, by long wave length phonons
20- L19	X rays by photons
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (18.01.2019)
22- L21	neutrons by phonons
23- IT-1	**Internal Test-I**

24- L22	neutrons by phonons
25- L23	Energy levels in one dimension
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	free electron gas in three dimensions
28- L26	heat capacity of the electron gas
29- L27	Electrical conductivity and Ohm's law
30- P2	**College level meeting/Cell function**
31-L28	Hall effect
32-L29	thermal conductivity of metals
33-L30	thermal conductivity of metals
34- L31	Bloch functions
35- L32	Kronig-Forder-magnons
36- L33	antiferro magnetic order
37- L34	Ferromagnetic domains
38-L35	Origin of domains
39- L36	Langevin diamagnetism equation
40- L37	quantum theory of diamagnetism
41- L38	quantum theory of paramagnetism
42-P3	**Department Seminar**
43- L39	Hund rule
44- L40	Paramagnetic susceptibility of conduction electrons
45- L41	Ferromagnetic order
46- L42	Magnons
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins (25.02.2019)
48- L44	antiferro magnetic order
49-IT-II	**Internal Test-II**
50-L45	ferromagnetic domains
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	origin of domains.
53- L48	Macroscopic electric field
54- L49	Local field at an atom
55- L50	Dielectric constant and polarizability
56- L51	Structural phase transitions
57- L52	Ferroelectric crystals
58- L53	Ferroelectric domains
59-P4	**College level meeting/ function**
60- L54	Piezoelectricity
61- L55	occurrence of superconductivity
62- L56	Meissner effect
63- L57	thermodynamics of superconducting transition
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins (22.03.2019)
65- L59	London equation
66- L60	coherence length
67-IT-III	**Internal Test-III**

68- L61	BCS theory of superconductivity
69- L62	Single particle tunnelling
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (08.04.2019)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2019

Course Outcomes

Learning Outcomes	**COs** of the course **"Condensed matter physics"**
CO1	Explain the concept of ionic crystals, covalent crystals.
CO2	Derive the London equation.
CO3	Explain the concept of elastic compliance.
CO4	Calculate the value of phonon momentum.
CO5	Deduce the electrical conductivity.
CO6	Explain Hall effect.
CO7	Design Hund rules.
CO8	Explain the concept of magnons .
CO9	Determine the coherence length

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

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HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2018-2019)

(Prepared by staff member handling the course)

Programme Name	M.Sc., Physics
Course Name	Micoprocessor and Microcontroller
Course Code	PPHM23
Class	I year (2018-2019)
Semester	Even
Staff Name	G.GOMATHI SANKARI
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- The objective of this course is to become familiar with the architecture and the instruction set of an Intel microprocessor
- Assembly language programming will be studied as well as the design of various types of digital and analog interfaces
- Understand the architecture of 8085 and 8051

Syllabus

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.

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 03.12.2018
1-L1	**Introduction to 8085 Microprocessor** Pin diagram and description
2-L2	Bus System, Control Signals, Status Signals- Clock System
3- L3	Latching of Address Bus
4-L4	Interrupt System - Direct Memory Access- Internal architecture

5-L5	ALU- Registers organization
6-L6	Special purpose Registers and Counters - Flags - Program Status Word.
7-L7	**Programming 8085** Assembly Language Programming
8- P1	**Welcoming of First year and Inauguration of PhysicsAssociation**
9- L8	- Assembler - Instruction Format of 8085-Instruction Set
10- L9	- Instruction Cycle, Machine Cycle and T-Slates
11-L10	- Timing Diagram of Read, Write machine Cycles and some basic Instructions -
12-L11	8 bit and 16 bit addition and subtraction- Loops and Branching
13-L12	Multiplication and Division in 8085-
14-L13	Searching and Sorting - Finding smallest/biggest number in an array Time delay calculation-
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (18.01.2019)
16-L15	Stack and Subroutines - Software Interrupts and ISR-
17-IT-1	**Internal Test-I**
18-L16	Data Transfer Schemes
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	.**Interfacing and peripheral devices** Address Space of 8085- Address space partition- Memory Interfacing
21- L19	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 -
22- P2	**College level meeting/Cell function**
23-L20	Ports- Interfacing chips: Nonprogrammable Port 8212 -
24-L21	- Programmable Peripheral Interface (PPI) 8255 architecture, Control Signals and operating Modes -- Programmable Interval Timer (PIT) 8253 .
25-L22	Introduction - Comparison of Microcontroller & Microprocessor -
26-L23	Pin Diagram and description - Block Diagram of 8051 and Internal Architecture -
27-L24	Clocks
28-L25	Registers
29-L26	Flags-Internal Memory, SFR and I/O Ports-
30-L27	External Memory and decoding
31-L28	Instruction Set and Addressing Modes of 8051-
32-L29	Features available in 8051: Timer and Counters, Timer Modes
33-L30	Internal Memory, SFR and I/O Ports -
34- P3	**Department Seminar**
35-L31	Serial Port and Serial Data TransferFlags
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (25.02.2019)
37- L33	**Micro Processor based system design and a Applications** Design considerations -
38- IT-II	**Internal Test-II**
39-L34	Design considerations -
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Sensors and Transducers -
42- L37	Sample and Hold Circuits-
43- L38	Interfacing Keyboard and multiplexed seven segment displays
44- P4	**College level meeting/ function**
45-L39	Interfacing Keyboard and multiplexed seven segment displays

46-L40	DAC and ADC interfacing
47-L41	Square, Rectangular and Ramp Wave Generation -
48-L42	Square, Rectangular and Ramp Wave Generation -
49-L43	Temperature measurement and control -
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (22.03.2019)
51 L45	Digital Clock
52- L46	Stepper Motor Control
53-IT-III	**Internal Test-III**
54-L47	Stepper Motor Control
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
	Model Test begins
56- MT	**Model Test (8.04.2019)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2019

Course Outcomes

Learning Outcomes	**COs** of the course **“Micoprocessor and Microcontroller”**
CO1	Design and implement programs on 8086, ARM, PIC.
CO2	Design I/O circuit.
CO3	The program prepares students to successfully compete for employment in Electronics, Manufacturing and Embedded fields
CO4	Design Memory Interfacing circuits
CO5	Design and implement 8051 microcontroller based system
CO6	Describe the architecture and instruction set of ARM microcontroller
CO7	Understand and realize the Interfacing of memory & various I/O devices with 8085 microprocessor
CO8	Understand and classify the instruction set of 8085 microprocessor and distinguish the use of different instructions and apply it in assembly language programming
CO9	Understand the architecture and operation of Programmable Interface Devices and realize the programming & interfacing of it with 8085 microprocessor
Experimental Learning	
EL1	Microprocessor kits and data acquisition cards DC Power Supplies
EL2	Microcontroller Programmer

EL3	Universal Programmer
EL4	Universal IC Tester
Integrated Activity	
IA1	The program prepares students to successfully compete for employment in Electronics, Manufacturing and Embedded fields
IA2	Design and implement 8051 microcontroller based system

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

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Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John’s College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2018-2019)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Quantum Mechanics II
Course Code	PPHM41
Class	II year (2018-2019)
Semester	Even
Staff Name	E.Christy Jerin
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To introduce Pertubation theory
- To derive the dirac equation
- To explain orbital angular momentum
- To explain transition probablity

Syllabus

Quantum Mechanics II

UNIT I

Orbital angular momentum Eigen pairs of L2 and Lz Properties of components of L and L 2 Matrix representation of L2 , Lz and L± spin state of an electron spin orbit coupling Addition of angular momenta

UNIT II

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

UNIT III

Time Dependent Perturbation Theory: Introduction Transition probability constant perturbation Harmonic perturbation adiabatic perturbation sudden approximation Semi classical theory of radiation calculation of Einstein coefficients

UNIT IV

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

UNIT V

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

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 04.12.2018
1-L1	Orbital angular momentum
2-L2	Eigen pairs of L2 and Lz
3- L3	Properties of components of L and L 2
4-L4	Matrix representation of L2 , Lz and L±
5-L5	spin state of an electron
6-L6	spin orbit coupling
7-L7	Addition of angular momenta
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Time Independent Perturbation Theory: Introduction- Theory for non-degenerate case
10- L9	Application to non-degenerate levels
11-L10	Theory for degenerate levels
12-L11	First order Stark effect in Hydrogen atom
13-L12	Time Dependent Perturbation Theory: Introduction
14-L13	Transition probability
15-L14	**Allotting portion for Internal Test-I**
	Internal Test I begins (18.01.2019)
16-L15	constant perturbation
17-IT-1	**Internal Test-I**
18-L16	Harmonic perturbation
19-L17	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
20-L18	adiabatic perturbation
21- L19	sudden approximation
22- P2	**College level meeting/Cell function**
23-L20	Semi classical theory of radiation
24-L21	calculation of Einstein coefficients

25-L22	Classical scattering cross section
26-L23	Centre of mass and laboratory co-ordinate systems
27-L24	Scattering amplitude
28-L25	Green’s function approach
29-L26	Born approximation
30-L27	Partial wave analysis
31-L28	Scattering form a square well system
32-L29	Scattering form a square well system
33-L30	Klein – Gordon equation
34- P3	**Department Seminar**
35-L31	Klein – Gordon equation
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (25.10.2019)
37- L33	Dirac equation for a free particle
38- IT-II	**Internal Test-II**
39-L34	Dirac equation for a free particle
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Spin of a Dirac particle
42- L37	Spin of a Dirac particle
43- L38	Particle in a potential
44- P4	**College level meeting/ function**
45-L39	Relativistic particle in a box
46-L40	Relativistic hydrogen atom
47-L41	Relativistic hydrogen atom
48-L42	Electron in a field
49-L43	Electron in a field
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (08.04.2019)
51 L45	Electron in a field
52- L46	Electron in a field
53-IT-III	**Internal Test-III**
54-L47	
55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (08.04.2019)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.10.2019

Course Outcomes

Learning Outcomes	**COs** of the course **"Quantum Mechanics II"**
CO1	Time Independent Perturbation Theory: Introduction- Theory for non-degenerate case
CO2	Application to non-degenerate levels
CO3	Theory for degenerate levels
CO4	First order Stark effect in Hydrogen atom
CO5	Born approximation
CO6	Partial wave analysis
CO7	Scattering form a square well system
CO8	Scattering form a square well system
CO9	Klein – Gordon equation

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

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HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2018-2019)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Spectroscopy
Course Code	PPHM42
Class	II year (2018-2019)
Semester	Even
Staff Name	Dr. P. Sumithraj Premkumar
Credits	4
L. Hours /P. Hours	4 / WK
Total 60Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; 5×10=50; 10Hrs /unit)	

Course Objectives

- To gain knowledge about various types of spectroscopy.
- To understand the structure of different chemical compounds by studying these types.
- To learn about the spectroscopy instrumentation and its uses in the research field

Syllabus

MSU / 2017-18 / PG –Colleges / M.Sc.(Physics) / Semester -IV / Ppr.no.21 / Core – 21

Spectroscopy

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.

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.

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 .

Course Calendar

Hour allotment	**Class Schedule**
	Even Semester Begin on 04.12.2018
1-L1	**Unit I Microwave Spectroscopy** Introduction
2-L2	Classification of molecules based on moment of inertia
3- L3	rotational spectra of rigid diatomic molecules
4-L4	rotational spectra of non-rigid diatomic molecules
5-L5	Isotopic effect
6-L6	linear polyatomic molecule
7-L7	linear polyatomic molecule
8- P1	
9- L8	symmetric top molecule
10- L9	chemical analysis
11-L10	microwave spectrometer

12-L11	
13-L12	
14-L13	Vibrating diatomic and poly-diatomic molecules
15-L14	Vibrating diatomic and poly-21atomic molecules
16-L15	Simple harmonic oscillator
17-IT-1	anhormonicity
18-L16	Hydrogen bonding
19-L17	Fermi resonance
20-L18	rotation vibration spectra of polyatomic molecule
21- L19	rotation vibration spectra of polyatomic molecule
22- P2	information from IR spectra
23-L20	**Pongal Day Celebration**
24-L21	IR spectrometer
25-L22	FTIR
26-L23	Revision for internal test
27-L24	**Internal Test-I (18.01.2019)**
28-L25	Theory of Raman scattering
29-L26	rotation vibration Raman spectra
30-L27	rotation vibration Raman spectra
31-L28	mutual exclusion principle
32-L29	Raman spectrometer
33-L30	polarization of Raman scattered light
34- P3	structure determination using Raman spectrum
35-L31	phase transition, resonance Raman scattering
36-L32	**Allotting portion for Internal Test-II**
	Internal Test II begins (25.02.2019)
37- L33	Revision
38- IT-II	**Internal Test-II**
39-L34	
40-L35	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
41-L36	Magnetic properties of nuclei, resonance condition
42- L37	relaxation time – Chemical shift
43- L38	application to molecular structure
44- P4	Bloch equation
45-L39	NMR instrumentation, NMR imaging
46-L40	ESR theory and hyperfine structure ESR spectra of hydrogen atom and anisotropic systems
47-L41	ESR theory and hyperfine structure ESR spectra of hydrogen atom and anisotropic systems
48-L42	crystal defects and biological studies
49-L43	ESR spectrometer
50-L44	**Allotting portion for Internal Test-III**
	Internal Test III begins (22.03.2019)
51 L45	Electron Energy Loss Spectroscopy EELS, Reflection
52- L46	absorption IR spectroscopy RAIRS , Surface Enhanced Raman Scattering SERS
53-IT-III	**Internal Test-III**
54-L47	Inelastic Helium Scattering, X-Ray Photoelectron Spectroscopy XEPS

55-L48	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
56- MT	**Model Test (08.04.2019)**
57-MT	**Model Test**
58-MT	**Model Test**
59- L49	**Model test paper distribution and previous year university question paper discussion**
60-L50	**Feedback of the Course, analysis and report preparation**
	Last Working day on 30.10.2019

Blended Learning : using PPT, video, library resources, ICT techniques, E-learning resources, Google classroom, study tour, etc.,

For Advanced Learner : use library books, E- books, motivate student to prepare for higher study.

For slow learner : special care taken, motivate the advanced learner to support the slow learner to study.To attend the remedial classes.

Extension activity : Motivate student to take classes for school students.

HOD Signature Staff Signature

Principal

St. John's College, Palayamkottai

Department of Physics

COURSE ACADEMIC PLAN (2018-2019)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Physics
Course Name	Nuclear particle physics
Course Code	PPHM43
Class	II year (2018-2019)
Semester	Even
Staff Name	J Ruby Jemima
Credits	5
L. Hours /P. Hours	5 / WK
Total 75 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 65 Hrs (5 units; 5×13=65; 13Hrs /unit)	

Course Objectives

- .To understand about the nuclear forces in the deutron
- To study the nuclear decays
- To understand the nuclear models
- To learn about the nuclear reactions

Syllabus

Nuclear and Particle Physics

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.

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.

Unit III

Nuclear Model

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.

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.

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.

Books For Study:

1. Nuclear Physics, D. C. Tayal, Himalaya Publications
2. . 2. Elements of Nuclear Physics, M. C. Pandia and R. P. S. YadavKedarnath.

Books For Reference:

1. Concepts of Nuclear Physics, Bernard L Cohen, Tata McGraw-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.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 03.12.2018
1-L1	Ground and Excited state of deutron
2-L2	Magntic dipole and electric quadrupole
3- L3	Moments of deutron
4-L4	n-p scattering at low energies
5-L5	Shape independent effective range theory of np scattering
6-L6	p-p scattering at low energies
7-L7	Exchanges forces
8- P1	**Welcoming of First year and Inauguration of Physics Association**
9- L8	Meson theory of nuclear force
10- L9	Gamow's theory of alpha decay
11-L10	Line and continuous spectrum of Beta decay
12-L11	Fermi theory of Beta decay
13-L12	Fermi and gamow teller selection rules
14-L13	Parity violation
15-L14	Gamma decay
16-L15	Multipole transistions in nuclei
17- L16	Selection rules
18- L17	Interval conversion
19- L18	Nuclear isomerism
20- L19	Liquid drop model
21- L20	**Allotting portion for Internal Test-I**
	Internal Test I begins (18.01.2019)
22- L21	Weizsackers mass formular
23- IT-1	**Internal Test-I**
24- L22	Nuclear stability
25- L23	Bohr wheeler theory of nuclear fission
26- L24	**Test Paper distribution and result analysis**
	Entering Internal Test-I Marks into University portal
27- L25	Magic numbers
28- L26	Evidence for magic numbers
29- L27	Shell model
30- P2	**College level meeting/Cell function**
31-L28	Spin orbit coupling
32-L29	Angular momenta and parities of nuclear ground state
33-L30	Magnetic moments
34- L31	Schmidt line
35- L32	Collective model
36- L33	Types of nuclear reactions
37- L34	Q equation
38-L35	Solution of the equation
39- L36	Compound nuclear theory
40- L37	Reciprocity theorem
41- L38	Nuclear cross section

42-P3	**Department Seminar**
43- L39	Resonance scattering
44- L40	Breit-Wigner dispersion formula
45- L41	Nuclear chain reaction
46- L42	Four factor formula
47- L43	**Allotting portion for Internal Test-II**
	Internal Test II begins (25.02.2019)
48- L44	Classification of elementary particles
49-IT-II	**Internal Test-II**
50-L45	Fundamental interactions conservations laws
51- L46	**Test Paper distribution and result analysis**
	Entering Internal Test-II Marks into University portal
52- L47	CPT theorem
53- L48	SU(3) multiplet
54- L49	Meson effect
55- L50	Octet
56- L51	Baryon octet and baryon decouplet
57- L52	Gellmann – Okubo mass formula
58- L53	Quark theory
59-P4	**College level meeting/ function**
60- L54	CPT theorem
61- L55	Octet
62- L56	Q equation
63- L57	Revision
64- L58	**Allotting portion for Internal Test-III**
	Internal Test III begins (22.03.2019)
65- L59	Recall the classification of elementary particles
66- L60	Recall the Gamow's theory of alpha decay
67-IT-III	**Internal Test-III**
68- L61	Recall the Fermi and Gamow Teller selection rule
69- L62	Revision
70- L63	**Test Paper distribution and result analysis**
	Entering Internal Test-III Marks into University portal
71-MT	**Model Test (08.04.2019)**
72-MT	**Model Test**
73-MT	**Model Test**
74-L64	**Model test paper distribution and previous year university question paper discussion**
75-L65	**Feedback of the Course, analysis and report preparation**
	Last Working day on 23.04.2019

Course Outcomes

Learning Outcomes	**COs** of the course **"Nuclear particle physics"**
CO1	Magnetic dipole and electric quadrupole moments of deuteron
CO2	Fermi theory of Beta decay
CO3	Fermi and gamow teller selection rules

CO4	Gamma decay
CO5	Multipole transistions in nuclei
CO6	Solution of the equation
CO7	Compound nuclear theory
CO8	Baryon octet and baryon decouplet
CO9	Gellmann – Okubo mass formula

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