

St. John's College, Palayamkottai

Department of Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Developmental Zoology, Ecology, Animal Physiology and Evolution
Course Code	GAZO21
Class	I year (December 2014 to April 2015)
Semester	Even
Staff Name	Dr. D. Paramanatha Swami Doss
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 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 the sequential changes from cellular grade of organization to organ grade of organization in the development of multicellular organisms.
- To study the interaction and the interdependence among environmental factors and living organisms.
- To understand the functional significance of various organs and organ systems of animals.
- To discern the evolutionary significance of the animals, origin of species, effects of mutation.

Syllabus

MSU/2012-15/UG-Colleges/Part-III (B.Sc. Zoology) Semester-II/Allied - II

DEVELOPMENTAL ZOOLOGY, ECOLOGY, ANIMAL PHYSIOLOGY AND EVOLUTION

UNIT I: Early development in Man: Structure of sperm and ovum; Fertilization – Cleavage, Morula, Blastocyst, Implantation and gastrulation – Fate map. Placenta in mammals – types and functions. Test tube babies – Twins – Amniocentesis.

Nuclear Transplantation in *Acetabularia*.

UNIT II: Abiotic factors: Biological effects of Temperature and Light; Biotic factors: Symbiosis, Commensalism, Mutualism, Parasitism, Prey-predator Relationship.

Adaptations: Desert adaptations.

Community: Ecosystem – Structure and dynamics of a pond.

UNIT III: Nutrition: Food constituents – Carbohydrates, Proteins and Fats.

Digestion: Role of enzymes in carbohydrate, protein and fat digestion.

Absorption: Absorption of digested food.

Metabolism: Carbohydrate metabolism: Glycogenesis, Glycogenolysis, Glycolysis.

Respiration: Transport and exchange of oxygen and carbon dioxide. Haemoglobin.

UNIT IV: Excretion: Structure of Nephron – Urine formation – Dialysis Nervous Co-ordination: Structure and types of neurons – Nerve impulse, conduction of nerve impulse through neuron and synapse.

Reproduction: Structure of human testis and ovary, Graffian follicle, Menstrual cycle and its hormonal control.

UNIT V: Theories of Evolution: Darwinism, Mutation theory of De Vries.

Adaptive radiation in birds.

Mimicry and Colouration.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 03.12.2014
1-L1	UNIT I: Introduction about the Developmental Zoology.
2-L2	Early development in Man: Structure of sperm and ovum.
3- L3	Fertilization – Events of fertilization.
4-L4	Cleavage – formation of 2 cell stage, 4 cell stage, 8 cell stage and so on.
5-L5	Morula – structure formation blastocoel, division micromeres and macromeres.
6-L6	Implantation – structure of uterus, endometrium, days after fertilization etc.
7-L7	Gastrulation – Formation of endoderm, formation of mesoderm and formation of ectoderm.
8- P1	Zoology Association Meeting
9- L8	Structure of gastrula – Neural plate, notochord, archenteron, dorsal lip of blastopore.
10- L9	Fate map – predetermined organ forming areas.
11-L10	Placenta in mammals – Characteristics – Functions.
12-L11	Placenta – Classification – based of foetal membrane – based on the distribution of villi. Classification – based on nature of contact – based on the types of tissue involved.

13-L12	Test tube baby – procedure – Fruity and Gift method.
14-L13	Twins – importance of twins study – Identical, Siamese, Fraternal twins.
15-L14	Amniocentesis – Procedure - Allotting portion for Internal Test-I
	Internal Test I begins
16-L15	Nuclear Transplantation in <i>Acetabularia</i> – the importance of nucleus by different experiments.
17-IT-1	Internal Test-I (19.01.2015)
18-L16	Unit II: Introduction about Ecology, Abiotic and biotic factors
19-L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Temperature – ranges – thermal stratification – biological effects and adaptations.
21- L19	Light – source – spectrum – light on water – biological effects.
22- P2	College level meeting/Cell function
23-L20	Animal relationships – Symbiosis with examples, Commensalism with examples.
24-L21	Mutualism with examples, parasitism with examples.
25-L22	Prey – predation relationship –types of parasites - parasitic adaptations.
26-L23	Desert adaptations – Characteristics of desert – adaptations – water conservation, water getting, tolerance of heat and protection.
27-L24	Ecosystem – abiotic and biotic factors of a pond ecosystem.
28-L25	Food chain – Food web – Energy flow – Pyramids – Ecological succession
29-L26	UNIT III: Introduction about animal physiology.
30-L27	Nutrition: Food constituents – Carbohydrates, Proteins and Lipids.
31-L28	Digestion: Role of enzymes in carbohydrate digestion.
32-L29	Role of enzymes in protein and lipid digestion.
33-L30	Absorption: Structure of Intestinal Villi - Absorption of carbohydrates, proteins and lipids.
34- P3	Department Seminar
35-L31	Metabolism: Glycogenesis, Glycogenolysis.
36-L32	Glycolysis – steps – the role of enzymes.
	Internal Test II begins
37- L33	Respiration: Transport and exchange of oxygen and carbon dioxide - Chloride shift.
38- IT-II	Internal Test-II (16.02.2015)
39-L34	Haemoglobin – Structure and importance.
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Excretion: Structure of Nephron - Allotting portion for Internal Test-II
42- L37	Urine formation – ultrafiltration, reabsorption and secretion – Dialysis.
43- L38	Structure of neurons – types of neurons – nerve impulse.
44- P4	College level meeting/ function
45-L39	Conduction of nerve impulse through neuron and synapse.
46-L40	Structure of human testis and ovary – Graafian follicle
47-L41	Menstrual cycle – Hormonal control of menstrual cycle.
48-L42	Unit V: Introduction about evolution
49-L43	Theories of Darwin.
50-L44	Allotting portion for Internal Test-III

	Internal Test III begins
51 L45	Mutation theory of De Vries.
52- L46	Adaptive radiation in birds.
53-IT-III	Internal Test-III (16.03.2015)
54-L47	Mimicry and colouration – types of colouration – colouration and evolution.
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 “Developmental Zoology, Ecology, Animal Physiology and Evolution”
CO1	Understand the structure of morula and blastocyst.
CO2	Understand the significance of nucleus through nuclear transplantation experiment.
CO3	Describe the role of enzymes in the process of digestion.
CO4	Understand the cellular respiration.
CO5	Able to know the origin and conduction of nerve impulse through synapse.
CO6	Able to explain the structure of testis and ovary.
Experimental Learning	
EL1	Study the types of placenta with the help of museum specimens.
EL2	Construct the model pond ecosystem and to study the interaction of abiotic and biotic factors.
EL3	Study the concept of batesian mimicry by comparing the Common cuckoo and shikra

- # 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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	IMMUNOLOGY & MICROBIOLOGY
Course Code	SMZO62
Class	III year (2014-2015)
Semester	Even
Staff Name	Dr.Jansi Rani
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- To study the immune system and their role of our body..
- To study about Salient features of antigen- antibody reaction.
- To discuss about Humoral immune response - primary & secondary response
- To study the History & Scope of microbiology
- To learned about Industrial microbiology : production of Antibiotic penicillin.

Syllabus

UNIT I

History and Scope of Immunology.

Immunity-Type of Immunity - Innate & acquired, passive & active.

Lymphoid organs –primary & secondary (Thymus, Bone marrow, Bursa of fabricius , Spleen, Tonsil, Lymph node, Peyer"s patches) – Structure and Functions.

(15L)

UNIT II

Immunoglobulin-Structure, Function, Biological properties of Ig classes. Interaction of Antigen and antibody.

Salient features of antigen- antibody reaction. Types of antigen-antibody reaction – Agglutination, Precipitation, Opsonization, Cytolysis.

(15L)

UNIT III

Immune response-Lymphocyte as unit of immune system, stem cells - Structure and lineage, T cells, B cells & Macrophages.

Humoral immune response - primary & secondary responses - B cell activation. Cell - Mediated immune response - Type of T cells & functions.

Tumour immunology.

(15L)

UNIT IV

Introduction : History & Scope of microbiology. General structure of microbes (Bacteria, virus).

Bacterial growth : Culture media & selective media; Continuous & batch culture techniques, growth curve.

(14L)

UNIT V

Food microbiology :Food poisoning ; Food spoilage & preservation.

Industrial microbiology : production of Antibiotic penicillin.

Soil microbiology : Role of soil microbes in N₂ fixation.

Medical microbiology : Diseases caused by bacteria in different systems of man as given below :

Dermal – Streptococcal inflammation : - Tuberculosis;

Gastro-intestinal-dysentery:Reproductive – Gonorrhoea.

Viral diseases with reference to causative organisms, symptoms, impact on the host & control measures, AIDS, Rabies, Chicken pox, Measles, Influenza & polio.

(16L)

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 07.12.2017
1-L1	History and Scope of Immunology.
2-L2	Immunity-Type of Immunity
3-L3	Immunity-Innate & acquired
4-L4	Immunity-passive & active.
5-L5	Lymphoid organs –primary
6-L6	Lymphoid organs – secondary
7-L7	Structure and Functions–Thymus
8- P1	Zoology Association activities
9- L8	Structure and Functions - Bone marrow
10- L9	Structure and Functions - Bursa of fabricius
11-L10	Structure and Functions - Spleen
12-L11	Structure and Functions - Tonsil
13-L12	Structure and Functions - Lymph node
14-L13	Structure and Functions - Peyer's patches)
15-L14	Immunoglobulin-Structure
16-L15	Immunoglobulin- Function
17- L16	Biological properties of Ig classes
18- L17	Interaction of Antigen
19- L18	Interaction of antibody.
20- L19	Salient features of antigen-
21- L20	Antibody reaction. - Allotting portion for Internal Test-I
	Internal Test I begins
22- L21	Types of antigen
23- IT-1	Internal Test-I
24- L22	Antibody reaction
25- L23	Agglutination, Precipitation
26- L24	Opsonization, Cytolysis.- Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Immune response
28- L26	Lymphocyte as unit of immune system
29- L27	Stem cells
30- P2	College level meeting/Cell function
31-L28	Structure and lineage - T cells
32-L29	Structure and lineage - B cells & Macrophages.
33-L30	Humoral immune response
34- L31	Primary & secondary responses
35- L32	B cell activation.
36- L33	Cell - Mediated immune response.

37- L34	Type of T cells
38- L35	Functions of T cells
39- L36	Tumour immunology.
40- L37	Introduction : Microbiology
41- L38	History of microbiology
42-P3	Department Seminar
43- L39	Scope of microbiology
44- L40	General structure of microbes -Bacteria
45- L41	General structure of microbes -Virus.
46- L42	Bacterial growth : Culture media
47- L43	Bacterial growth :Selective media - Allotting portion for Internal Test-II
	Internal Test II begins
48- L44	Continuous & batch culture techniques
49-IT-II	Internal Test-II
50-L45	Bacterial growth :Growth curve
51- L46	Food microbiology - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Food poisoning
53- L48	Food spoilage & preservation.
54- L49	Industrial microbiology
55- L50	Production of Antibiotic penicillin
56- L51	Soil microbiology
57- L52	Role of soil microbes in N ₂ fixation
58- L53	Medical microbiology
59-P4	College level meeting/ function
60- L54	Diseases caused by bacteria in different systems of man - Dermal
61- L55	Diseases caused by bacteria in different systems of man – Streptococcal inflammation
62- L56	Diseases caused by bacteria in different systems of man - Tuberculosis
63- L57	Gastro-intestinal-dysentery:
64- L58	Reproductive – Gonorrhoea- Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Viral diseases with reference to causative organisms, symptoms,
66- L60	Impact on the host & control measures, AIDS , Rabies, Chicken pox, Measles, Influenza & polio.
67-IT-III	Internal Test-III
68- L61	Revision of I & II units
69- L62	Revision of III & IV units
70- L63	Revision of Unit V - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
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 “<IMMUNOLOGY & MICROBIOLOGY>”
CO1	The students will be able to identify the cellular and molecular basis of immune responsiveness.
CO2	The students will be able to describe the roles of the immune system in both maintaining health and contributing to disease.
CO3	The students will be able to describe immunological response and how it is triggered and regulated.
CO4	The students will be able to demonstrate a capacity for problem-solving about immune responsiveness.
CO5	The students will be able to transfer knowledge of immunology into clinical decision-making through case studies presented in class.
CO6	Understand the rationale in medium formulation & design for microbial fermentation, sterilization of medium and air
CO7	Discuss Microbial contamination/product spoilage and antimicrobial preservation of pharmaceutical formulations during production and in products
CO8	Understand various plant microbes interactions especially rhizosphere, phyllosphere and mycorrhizae and their applications especially the biofertilizers and their production techniques
CO9	Discuss the biosynthesis and the degradation pathways involved.
Experimental Learning	
EL1	Knowledge of the structure and function of the major organ systems, including the molecular, biochemical and cellular mechanisms for maintaining homeostasis
EL2	Knowledge of the pathogenesis of diseases, interventions for effective treatment, and mechanisms of health maintenance to prevent disease
EL3	A commitment to lifelong learning and independently seeking new knowledge and skills in their own recognized areas of learning deficit
EL4	Demonstrate a knowledge and understanding of microbiological assays of growth promoting and growth inhibiting substances.
Integrated Activity	
IA1	Provide students with in-depth training on the conduct and management of research from inception to completion using a wide range of techniques.
IA2	Enable students to acquire expertise in the use and application of the methods of data collection and analysis.

- # 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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Developmental Biology
Course Code	GMZO21
Class	I year (December 2014 to April 2017)
Semester	Even
Staff Name	Dr. D. Paramanatha Swami Doss
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To understand the sequential changes from cellular grade of organization to organ grade of organization in the development of multicellular organisms.

Syllabus

MSU/2012-13/UG-Colleges/Part-III (B.Sc. Zoology) Semester-II/Core-3

DEVELOPMENTAL ZOOLOGY

Unit I: Definition and scope of developmental zoology – Gametogenesis – Spermatogenesis – Oogenesis – Vitellogenesis – Structure of sperm and egg of chick – Fertilization: Pre and post fertilization events – significances; Parthenogenesis

Unit II: Cleavage in chick – Fate map of chick – Gastrulation in Chick. Manipulations of reproduction in Human: Infertility (male and female) – I vitro Fertilization – Test tube babies – Amniocentosis.

Unit III: Organogenesis: Development of Brain and Heart in Chick

Organizer: Primary and Secondary Organizers.

Morphogenetic fields and gradient hypothesis.

Unit IV: Hormonal control of Amphibian metamorphosis.

Extra – embryonic membranes in Chick – Developmental, Types and Physiology.

Placenta in Mammals – Types and Physiology.

Unit V: Nuclear Transplantation in Acetabularia – Regeneration in Planaria.

Birth control: Contraceptive devices: Surgical method – Hormonal method – Physical barriers – IUCD.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 03.12.2014
1-L1	Unit I: General introduction about the Developmental Zoology.
2-L2	The programme of development – Historical thoughts – Concepts – Theories and Scope of Developmental Biology.
3- L3	Gametogenesis – Origin of primordial germ cells – transport of germ cells.
4-L4	Spermatogenesis – Phases of formation of spermatid, events of spermiogenesis.
5-L5	Oogenesis – Multiplication, Growth and Maturation phases.
6-L6	Hormonal control of oogenesis – Polar bodies.
7-L7	Structure of sperm and egg of chick.
8- P1	Zoology Association Meeting
9- L8	Fertilization – Significance – Pre and Post fertilization events – Physiological changes.
10- L9	Fertilization – Physical, chemical, cytological factors involved in fertilization – Activation.
11-L10	Parthenogenesis – Types of natural parthenogenesis – Artificial parthenogenesis – Significance.
12-L11	Unit II: Introduction about cleavage and gastrulation
13-L12	Cleavage – Salient features – Structure of morula – Blastula – types.
14-L13	Cleavage laws – Meridional and Vertical planes of Cleavage – Factors affecting cleavage.
15-L14	Allotting portion for Internal Test-I
	Internal Test I begins
16-L15	Patterns of Cleavage – Types of holoblastic cleavage – Types of meroblastic cleavage.
17-IT-1	Internal Test-I (19.01.2015)
18-L16	Fate map of chick – Presumptive organ forming areas.
19-L17	Gastrulation - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Events in gastrulation – formation of endoderm – formation of primitive streak and mesoderm – Structure of gastrula.
21- L19	Manipulations of reproduction in Human: Infertility (male and female) – types and causes of infertility.
22- P2	College level meeting/Cell function
23-L20	Invitro Fertilization – IVF in Human – IVF in farm animals – Methods – Advantages of IVF.
24-L21	Test tube baby, Procedure, Methods (Gift method and Fruity method) – Advantages.

25-L22	Aminocentesis – Procedure and importance.
26-L23	Unit III: Derivatives of germinal layers.
27-L24	Development of Brain in Chick – Development of neural tube – Differentiation of brain and Flexures.
28-L25	Development of Heart – Formation of endocardial tube – Formation of S shaped heart – Differentiation.
29-L26	Organizer – properties of organizer, structure of organizer, primary and secondary organizer, neural and chain of induction, competence and mechanism.
30-L27	Morphogenetic fields – Characteristics.
31-L28	Gradient theory – types of gradient, experimental evidences, factors affecting gradients, mechanism of gradient system.
32-L29	Revision and Group Discussion.
33-L30	Unit IV: Introduction
34- P3	Department Seminar
35-L31	Hormonal control of Amphibian metamorphosis, interaction of thyroxine and tissues.
36-L32	Foetal Membranes Allotting portion for Internal Test-II
	Internal Test II begins
37- L33	Types of foetal membranes, development of chorion, amnion, yolk sac and allantois. Physiology of foetal membranes.
38- IT-II	Internal Test-II (16.02.2015)
39-L34	Placenta in mammals – Characteristics – Functions.
40-L35	Placenta – Classification – based of foetal membrane - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Placenta – Classification based on the distribution of villi. Classification – based on nature of contact – based on the types of tissue involved.
42- L37	Development of placenta – histotrophic nutrition, implantation, trophospongia etc.
43- L38	Revision and Group Discussion.
44- P4	College level meeting/ function
45-L39	Unit V: Introduction about infertility.
46-L40	Nuclear Transplantation in <i>Acetabularia</i> – the importance of nucleus by different experiments.
47-L41	Regeneration – Laws of regeneration, types of regeneration and events in regeneration.
48-L42	Birth control – Necessity, types of contraceptive devices, tubectomy and vasectomy.
49-L43	Hormonal control of birth control – contraceptive pills, injection, implants, patch and vaginal ring.
50-L44	Class test Allotting portion for Internal Test-III
	Internal Test III begins
51 L45	Intrauterine contraceptive devices – non-hormonal copper containing IUD and hormonal Progestogen releasing IUD.
52- L46	Revision and Group Discussion.
53-IT-III	Internal Test-III (16.03.2015)
54-L47	Revision and Group Discussion.
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 “Developmental Biology”
CO1	Able to understand the critical steps in fertilization.
CO2	Realize the mechanism of acrosomal reaction and understands its function.
CO3	Able to describe the stages and cellular mechanisms (ingression, invagination, convergent extension) of gastrulation.
CO4	Aware the basic concept of organizer theory.
CO5	Able to describe the gift and fruity methods of test tube baby formation.
CO6	Learn how the heart and brain development from germ layer.
CO7	Gain knowledge about the developmental process, types and physiology of foetal membrane.
CO8	Understand the process of regeneration.
CO9	Aware about the various contraceptive devices.
Experimental Learning	
EL1	Study the classification of placenta by using museum specimens.
EL2	Learn the various developmental stages of chick embryo through live chick blastoderm.
Integrated Activity	
IA1	

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

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St. John's College, Palayamkottai

Department of Zoology

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	B.Sc Zoology
Course Name	Environment Studies
Course Code	GEVS11
Class	I year (2014-2015)
Semester	Odd
Staff Name	Dr.D.V.Sheeba Rajakumari
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; $5 \times 4 = 20$; 4Hrs /unit)	

Course Objectives

- Creating the awareness about environmental problems among people.
- Imparting basic knowledge about the environment and its allied problems.
- Developing an attitude of concern for the environment.
- Motivating public to participate in environment protection and environment improvement.
- Acquiring skills to help the concerned individuals in identifying and solving environmental problems.
- Striving to attain harmony with Nature.

Syllabus

ENVIRONMENTAL STUDIES

UNIT I:

Definition, scope and importance Natural resources and associated problems:

- a) Forest resources: Use and over-exploitation, deforestation, timber extraction, dams and their effects on forests and tribal people.
- b) Water resources: Use and over-utilization of surface and ground water, floods, drought, dams-benefits and problems, water conservation and watershed management.
- c) Mineral resources- Use and exploitation, environmental effects.

- d) Food resources: World food problems, changes, effects of modern agriculture, fertilizer, pesticide problems.
- e) Energy resources: Growing energy needs, renewable and non renewable energy sources, alternate energy sources.
- f) Land resources: Land as a resource, land degradation, man-induced landslides, soil erosion and desertification.

UNIT II: ECOSYSTEMS

- a) Forest Ecosystem
- b) Grassland Ecosystem
- c) Desert ecosystem
- d) Aquatic Ecosystem (Ponds, rivers, oceans, estuaries) Energy flow in the ecosystem Ecological succession Food Chains, Food Webs and Ecological Pyramids.

UNIT III: BIODIVERSITY AND ITS CONSERVATION

Introduction - Definition: Genetic, species and ecosystem diversity. Biogeographical classification of India- Values of Biodiversity- Biodiversity at global, national and local levels- India as mega-diversity nation- Hot-Spots of biodiversity Threats to biodiversity - Endangered and endemic species of India- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT IV: ENVIRONMENTAL POLLUTION

Definition - Causes, effects and control measures of:-

- a) Air Pollution
- b) Water Pollution
- c) Soil Pollution
- d) Marine Pollution
- e) Noise Pollution
- f) Thermal Pollution
- g) Solid Waste Management
- h) Disaster Management: Floods, earthquake, cyclone and landslides.

UNIT V: SOCIAL ISSUES AND THE ENVIRONMENT

Climatic change, global warming, acid rain, ozone depletion. Wasteland reclamation Consumerism and Waste products, use and through plastics -Environment Protection Act -Air (Prevention and Control of Pollution) Act- Water (Prevention and Control of Pollution) Act- Wildlife Protection Act- Forest Conservation Act- Population Explosion - family Welfare programme- Human Rights

REFERENCES:

1. G S Vijayalakshmi, A.G. Murugesan and N. Sukumaran. 2006. Basics of Environmental Science, Manonmaniam Sundaranar University Publications, Tirunelveli , pp.160.
2. Agarwal. K.C. 2001. Environmental Biology. Nidi Publications Limited, Bikaner.
3. A K De. 1999. Environmental Chemistry, Wiley Eastern Limited, India.
4. Jadhav.H. and Bhosale, V.M.1995. Environmental Protection and Laws, Himalaya Publishing House, Delhi. pp284.
5. Odum, E.P.1971. Fundamentals of Ecology, W.B.Saunders Co., USA.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on (18-06-2014)
1-L1	Definition, scope and importance Natural resources and associated problems
2-L2	a) Forest resources: Use and over-exploitation, deforestation, timber extraction, dams and their effects on forests and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought
3- P1	Zoology Association
4-L3	c) Mineral resources- Use and exploitation, environmental effects d) Food resources: World food problems, changes, effects of modern agriculture, fertilizer, pesticide problems
5-L4	e) Energy resources: Growing energy needs, renewable and non renewable energy sources, alternate energy sources. f) Land resources: Land as a resource, land degradation, man-induced landslide, soil erosion and desertification
	Allotting portion for Internal Test-I
	Internal Test I begins(30-07-2014)
6-IT-I	Internal Test-I
7-L5	Ecosystems -a) Forest Ecosystem b) Grassland Ecosystem c) Desert ecosystem d) Aquatic Ecosystem (Ponds, rivers, oceans, estuaries) Energy flow in the ecosystem Ecological succession Food Chains, Food Webs and Ecological Pyramids
	Allotting portion for Internal Test-I
8-L6	Biodiversity and its conservation - Introduction - Definition: Genetic, species and ecosystem diversity. Biogeographically classification of India- Values of Biodiversity
9-L7	Biodiversity at global, national and local levels- India as mega-diversity nation- Hot-Spots of biodiversity Threats to biodiversity
10-P2	College level meeting/Cell function
11-L8	Endangered and endemic species of India- Conservation of biodiversity: In-situ

	and Ex-situ conservation of biodiversity
12-L9	Environmental Pollution - Definition - Causes, effects and control measures of
13-P3	Department Seminar
14-L10	a)Air Pollution b)Water Pollution c)Soil Pollution
15-L11	d)Marine Pollution- e)Noise Pollution f)Thermal Pollution
16-L12	Solid Waste Management- Disaster Management: Floods, earthquake, cyclone and landslides
	Allotting portion for Internal Test-II
	Internal Test II begins(18-08-2014)
17-IT-1	Internal Test-II
18-L13	Social issues and the environment
	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
19-L14	Climatic change, global warming
20- P2	College level meeting/ function
21-L15	Acid rain, ozone depletion. Wasteland reclamation
22-L16	Consumerism and Waste products, use and through plastics- Environment Protection Act
23- L17	Air (Prevention and Control of Pollution) Act- Water (Prevention and Control of Pollution) Act
	Allotting portion for Internal Test-III
	Internal Test III begins(15-09-2014)
24- IT-III	Internal Test-III
25-L18	Wildlife Protection Act- Forest Conservation Act- Population Explosion - family Welfare programme- Human Rights
	Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
26-MT	Model Test(24-10-2014)
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 “<ENVIRONMENTAL STUDIES>”
CO1	Students will understand the interactions of environmental components
CO2	They will understand and interpret the lithosphere, atmosphere, hydrosphere and biosphere.
CO3	Motivate public to participate in environment protection and environment improvement.
CO4	Acquire skills to identifying and solving environmental problems.
CO5	They will understand and interpret the interrelationships between

	landforms, weather, water and ecosystems.
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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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	NME – Public Health And Hygeine
Course Code	GNO4A
Class	II year (2014-2015)
Semester	Even
Staff Name	P. Augustus Robince
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem	
Internal Test-3 Hrs	
Model Test-3 Hrs	
Dept. Meetings-2 Hrs	
College Meetings-2 Hrs	
Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To create awareness about the health status of the students.
- To understand causes for various health problems.
- To promote awareness about food safety.
- To understand the importance of Physical and Mental Health.

Syllabus

Unit – I Physical, mental, social - positive health - Quality of life Index. Nutrition and health - food hygiene - Food toxicants. Population explosion in India - Birth control measures.

Unit –II Environment and health - water -Sources of water - Uses of water water borne diseases – Cholera - Ascariasis Standards of Housing - Ventilation

Unit – III Excreta disposal - Importance - Methods of excreta disposal. . Sanitary health measures during fares and festivals. First aid with reference to accident.

Unit – IV Communicable disease - Viral diseases - , AIDS, Rabies. Bacterial diseases - Tuberculosis, Typhoid. Protozoan diseases - amoebiasis, Helminth diseases - Filariasis,

Unit – V Health situation in India - Health problems - Primary health care in India - PHC - National Programmes - national AIDS control - National Malaria Eradication programme - National Tuberculosis

Course Calendar

Hour allotment	Class Schedule
E	Even Semester Begin on 03.12.2014
1-L1	Unit –I Physical,
2-L2	Mental Health.
3- L3	social Health.
4-L4	positive health.
5-L5	Quality of life Index.
6-L6	Nutrition and health.
7-L7	food hygiene.
8- P1	Welcoming of First year and Inauguration of Mathematics Association
9- L8	Food toxicants.
10- L9	Population explosion in India.
11-L10	Birth control measures.
12-L11	Unit –II Environment and health.
13-L12	Water.
14-L13	Sources of water.

15-L14	____ - Allotting portion for Internal Test-I
	Internal Test I begins on 19.01.2015
16-L15	Uses of water.
17-IT-1	Internal Test-I
18-L16	water borne diseases – Cholera .
19-L17	____ - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Ascariasis.
21- L19	Standards of Housing - Ventilation
22- P2	College level meeting/Cell function
23-L20	Unit – III Excreta disposal .
24-L21	Importance.
25-L22	Methods of excreta disposal.
26-L23	Sanitary health measures during fares and festivals.
27-L24	First aid with reference to accident.
28-L25	Unit – IV Communicable disease.
29-L26	Viral diseases - AIDS, Rabies.
30-L27	Bacterial diseases - Tuberculosis, Typhoid.
31-L28	Protozoan diseases – amoebiasis.
32-L29	Helminth diseases – Filariasis.
33-L30	Unit – V Health situation in India.
34- P3	Department Seminar
35-L31	Health problems.
36-L32	____ - Allotting portion for Internal Test-II
	Internal Test II begins on 16.02.2015
37- L33	Primary health care in India.

38- IT-II	Internal Test-II
39-L34	PHC - National Programmes.
40-L35	_____ - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	National AIDS control.
42- L37	National Malaria Eradication programme.
43- L38	National Tuberculosis.
44- P4	College level meeting/ function
45-L39	Review of topics once again: Unit – I Physical, mental, social - positive health - Quality of life Index.
46-L40	Nutrition and health - food hygiene - Food toxicants. Population explosion in India - Birth control measures.
47-L41	Unit –II Environment and health - water -Sources of water - Uses of water water borne diseases – Cholera - Ascariasis Standards of Housing - Ventilation
48-L42	Unit – III Excreta disposal - Importance - Methods of excreta disposal. . Sanitary health measures during fares and festivals. First aid with reference to accident.
49-L43	Unit – IV Communicable disease - Viral diseases - , AIDS, Rabies.
50-L44	_____ - Allotting portion for Internal Test-III
	Internal Test III begins on 16.03.2015
51 L45	Bacterial diseases - Tuberculosis, Typhoid. Protozoan diseases - amoebiasis, Helminth diseases – Filariasis.
52- L46	Unit – V Health situation in India - Health problems - Primary health care in India – PHC.
53-IT-III	Internal Test-III
54-L47	National Programmes - national AIDS control - National Malaria Eradication programme - National Tuberculosis.
55-L48	_____ - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
56- MT	Model Test on 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 NME – Public Health And Hygiene.
CO1	Knows the importance of hygiene and sanitation
CO2	Defines a negative effect of microorganisms on hygiene
CO3	Knows the properties of a healthy and clean water.
CO4	Understands the importance of personal hygiene.
CO5	Provide and maintain personal hygiene knows what to be followed.
CO6	Knows the negative effects of hard water.
CO7	Identifies control methods of Pest
CO8	Understands the Importance of Vaccination
CO9	How to control Vector borne Diseases
Experimental Learning	
EL1	Observation of larval stage of Mosquito
EL2	Find out the places where the House fly emerges
EL3	Identification of available Mosquito species.
EL4	Improving hygiene in homes.
Integrated Activity	
IA1	Collection and Identification of different species of Mosquitos

IA2	Maintaining good hygiene in Villages.
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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 Zoology

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Nutrition and Dietetics
Course Code	BZOP61
Class	I year (2014-2015)
Semester	1
Staff Name	Dr.(Mrs)E Ezhilmathi Sophia,.
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; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To study role of different food constitutions.
- To gain knowledge of balanced diet
- To study therapeutic diet.

Syllabus

Unit I

- ❖ Macronutrients and their function – Carbohydrates – Fats- Proteins – Water.
- ❖ Micronutrients and their function- Vitamins and minerals.
- ❖ Nutritive value of the foodstuff – Cereals – Pulses – Vegetables – Fruits – Milk – Egg – meat - fish.

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Unit II

- ❖ Parboiling of rice –process of parboiling and uses of parboiled rice.
- ❖ Germination of cereals – process of germination and uses of sprouts
- ❖ Metabolism of food stuffs – protein ,carbohydrate and lipid.
- ❖ Food choice and preparation methods.
- ❖ Effect of cooking on protein, carbohydrate and fat.
- ❖ Menu planning – meal pattern-vegetarian and non-vegetarian.

Unit III

- ❖ Role of fibres in nutrition
- ❖ Determination of energy content of food – Bomb calorimeter.

❖ BMR – Determination of DMR –using direct calorimeter and Benedict – Roth basal metabolic apparatus – Factors affecting BMR.

Unit IV

❖ Balanced diet – Nutritional requirements of different age groups – Pre schoolers – Schoolers – Adolescents – Pregnant and lactating women.

❖ Nutritional diseases – Causes and prevention and dietary management of malnutrition, under nutrition and obesity.

❖ Common nutritional deficiencies in India – Kwashiorkor – Marasmus – Anaemia – Goitre.

Unit V

❖ Importance of diet in diseases – Detection, causative factors.

❖ Therapeutic diet and its importance, diet planning

❖ Symptoms, causes, prevention and dietary management for diabetes mellitus, ulcer, renal diseases, hepatitis, hypertension, atherosclerosis, gastro-intestinal disorders, constipation.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2014
1-L1	Macronutrients and their function
2-L2	Carbohydrates
3- L3	Fats- Proteins – Water.
4-L4	Micronutrients and their function- Vitamins and minerals.
5-L5	Nutritive value of the foodstuff
6-L6	Cereals – Pulses
7-L7	Vegetables
8- P1	Welcoming of First year and Inauguration of Zoology Association
9- L8	Fruits – Milk – Egg –meat - fish.
10- L9	Parboiling of rice –process of parboiling and uses of parboiled rice.
11-L10	Germination of cereals – process of germination and uses of sprouts
12-L11	Metabolism of food stuffs – protein ,carbohydrate and lipid.
13-L12	Food choice and preparation methods.
14-L13	Effect of cooking on protein, carbohydrate and fat.
15-L14	Allotting portion for Internal Test-I
	Internal Test I begins 30.07.2014
16-L15	Menu planning – meal pattern-vegetarian and non-vegetarian.
17-IT-1	Internal Test-I
18-L16	Role of fibres in nutrition
19-L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Determination of energy content of food – Bomb calorimeter.
21- L19	BMR
22- P2	College level meeting/Cell function
23-L20	Determination of DMR –using direct calorimeter and Benedict
24-L21	Roth basal
25-L22	metabolic apparatus – Factors affecting BMR

26-L23	Balanced diet – Nutritional requirements of different age groups – Pre scholars
27-L24	Schoolers – Adolescents – Pregnant and lactating women.
28-L25	Nutritional diseases
29-L26	Causes and prevention and dietary management of malnutrition, under nutrition and obesity.
30-L27	Common nutritional deficiencies in India –
31-L28	Kwashiorkor
32-L29	Marasmus
33-L30	Anaemia Goitre.
34- P3	Department Seminar
35-L31	Importance of diet in diseases
36-L32	Allotting portion for Internal Test-II
	Internal Test II begins 18.08.2014
37- L33	Detection, causative factors.
38- IT-II	Internal Test-II
39-L34	Therapeutic diet and its importance, diet planning
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Symptoms, causes, prevention and dietary management for diabetes mellitus,
42- L37	ulcer,
43- L38	renal
44- P4	College level meeting/ function
45-L39	diseases,
46-L40	hepatitis
47-L41	hypertension,
48-L42	atherosclerosis,
49-L43	gastro-intestinal disorders, constipation
50-L44	Allotting portion for Internal Test-III
	Internal Test III begins 15.09.2014
51 L45	Revision
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 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 “<Nutrition and Dietetics >”
CO1	Follow balanced diet.
CO2	Practices therapeutic diet.
CO3	Determines the energy value.

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 ZOOLOGY

COURSE ACADEMIC PLAN(2015-2016)

(Prepared by staff member handling the course)

Programme Name	B.Sc Zoology
Course Name	Personality Development
Course Code	GCSB5B
Class	III year (2015-2016)
Semester	Odd
Staff Name	Dr.Jansi 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 enable the students to groom their personality and prove themselves as good Samaritans of the Society.
- To know the applications of concepts, Theories or issues in human development.
- To know the Qualities of effective leadership
- To aware ideas to tackle the problem of human stress
- To learn about types of interview

Syllabus

PERSONALITY DEVELOPMENT

Unit I Personality

Meaning, definition -determinants of personality- major traits-theories of personality development

Unit 2 Personality concepts

Personality concepts -self image; self esteem, self- monitoring -advantages and disadvantages of self monitoring, perception- meaning, process of perception; factors influencing perception, Errors in perception- attitudes -types of attitudes and factors influencing attitudes

Unit 3 Leadership

Definition of leadership - leadership style - theories of leadership- qualities of an effective leadership

Unit 4 Skills

Meaning and types of skills; communication - definition and importance and process of communication; methods of communication- barriers in communication and technologies of effective communication

Unit 5 Interview

meaning and types of interview- planning for an interview- types of questions in interview- employer's expectations from a candidate.

Reference

1. Personality development - books of MS University Publications

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on (18-06-2015)
1-L1	Personality
2-L2	meaning
3- L3	meaning
4-L4	definition
5-L5	definition
6-L6	determinants of personality
7-L7	determinants of personality
8- P1	Zoology Association
9- L8	major traits
10- L9	major traits
11-L10	major traits-theories of personality development
12-L11	Personality concepts
13-L12	Personality concepts -self image
14-L13	self esteem, self- monitoring
15-L14	advantages and disadvantages of self monitoring
	Allotting portion for Internal Test-I
	Internal Test I begins(20-07-2015)
16-L15	perception
17-IT-1	Internal Test-I
18-L16	meaning, process of perception
19-L17	factors influencing perception Errors in perception
	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	attitudes
21- L19	types of attitudes

22- P2	College level meeting/Cell function
23-L20	factors influencing attitudes
24-L21	Leadership
25-L22	definition of leadership
26-L23	definition of leadership
27-L24	definition of leadership
28-L25	leadership style
29-L26	leadership style
30-L27	theories of leadership
31-L28	theories of leadership
32-L29	qualities of an effective leadership
33-L30	Skills
34- P3	Department Seminar
35-L31	meaning
36-L32	types of skills
	Allotting portion for Internal Test-II
	Internal Test II begins(31-08-2015)
37- L33	communication
38- IT-II	Internal Test-II
39-L34	definition
40-L35	importance and process of communication
	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	importance and process of communication
42- L37	methods of communication
43- L38	barriers in communication
44- P4	College level meeting/ function
45-L39	technologies of effective communication
46-L40	technologies of effective communication
47-L41	Interview
48-L42	meaning and types of interview
49-L43	meaning and types of interview
50-L44	planning for an interview
	Allotting portion for Internal Test-III
	Internal Test III begins(05-10-2015)
51 L45	planning for an interview
52- L46	types of questions in interview
53-IT-III	Internal Test-III
54-L47	employer's expectations from a candidate
55-L48	employer's expectations from a candidate
	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 “<PERSONALITY DEVELOPMENT >”
CO1	enable the students to groom their personality and prove themselves as good Samaritans of the Society
CO2	known the applications of concepts, Theories or issues in human development
CO3	known the qualities of effective leadership
CO4	aware ideas to tackle the problem of human stress
CO5	Get ideas about the types of interview

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 Zoology

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Poultry Science
Course Code	B32B5F
Class	I year (2014-2015)
Semester	I
Staff Name	Dr.(Mrs)E EzhilmathiSophia,.
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; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To study strategies to layer & broiler operations
- To detail feed formulation.
- To Study the diseases of poultry guidance's for raccination

Syllabus

UNIT I

Poultry industry in India – a brief introduction.Choosing a commercial laying stock - sexing in one day old chicks.Poultry housing – general principles of building poultry house. Deep litter system - Droppings pit – feeders, waterers – nest boxes.Laying cages –Californiaian cages – management of cage birds.

UNIT II

Poultry manure – Volume, composition and values.Nutritional content of eggs.Management of chicks, growers, layers and broilers.Lighting for chicks, growers, layers and broilers. Summer and winter management.Debeaking - Forced moulting

UNIT III

Poultry nutrition: Protein and amino acid requirements for chicks, growers, layers and broilers – Symptoms of excessive dietary levels and deficiency.Carbohydrates and fat requirements for chicks, growers, layers and broilers – Symptoms of excessive dietary levels and deficiency. Fibre requirement for poultry feeds.

Requirements of vitamins and inorganic minerals for chicks, growers and layers – deficiency symptoms.

UNIT IV

Importance of feed additives in a poultry feed. Preparation of supplementary feed for poultry – South Indian feed ingredients in relation to M.E. level, protein level, amino acid level, minerals (Ca & P) and fiber content.

UNIT V

Poultry diseases - Causes, symptoms, transmission, treatment, prevention and control of the following diseases: Viral diseases- Ranikhet disease, Fowl pox, Infectious bronchitis and Gumboro disease. Bacterial disease- Fowl typhoid, Paratyphoid, Pullorum, Fowl Cholera, Coryza and Mycoplasmosis. Fungal diseases- Aspergillosis and Aflatoxicosis. Parasitic disease- Coccidiosis. Nematode infections. Tape worm infections. External parasites of chicks - Ticks, mites and lice.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2014
1-L1	Poultry industry in India
2-L2	Brief introduction. Choosing a commercial laying stock
3- L3	sexing in one day old chicks. Poultry housing –
4-L4	Deep litter system - Droppings pit
5-L5	feeders, waterers
6-L6	nest boxes. Laying cages
7-L7	Californian cages – management of cage birds
8- P1	Welcoming of First year and Inauguration of Zoology Association
9- L8	General principles of building poultry house.
10- L9	Poultry manure
11-L10	Volume, composition and values. Nutritional content of eggs. Management of chicks,
12-L11	growers, layers and broilers. Lighting for chicks, growers, layers and broilers. Summer and winter management. Debeaking - Forced moulting
13-L12	Poultry nutrition: Protein and amino acid requirements for chicks, growers, layers
14-L13	broilers – Symptoms of excessive dietary levels and deficiency. Carbohydrates and fat requirements for chicks, growers, layers and broilers
15-L14	Allotting portion for Internal Test-I
	Internal Test I begins 30.07.2014
16-L15	Symptoms of excessive dietary levels and deficiency. Fibre requirement for poultry feeds.
17-IT-1	Internal Test-I
18-L16	Requirements of vitamins and inorganic minerals for chicks, growers and layers
19-L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	deficiency symptoms
21- L19	Importance of feed additives in a poultry feed. Preparation of supplementary feed for poultry

22- P2	College level meeting/Cell function
23-L20	South Indian feed ingredients in relation to
24-L21	M.E. level, protein level,
25-L22	amino acid level, minerals (Ca & P) and fiber content
26-L23	Poultry diseases
27-L24	Causes,
28-L25	symptoms,
29-L26	transmission,
30-L27	treatment, prevention and control of the following diseases
31-L28	Viral diseases-
32-L29	Ranikhet disease,
33-L30	Fowl pox, Infectious bronchitis
34- P3	Department Seminar
35-L31	Gumboro disease.
36-L32	Allotting portion for Internal Test-II
	Internal Test II begins 18.08.2014
37- L33	Bacterial disease-
38- IT-II	Internal Test-II
39-L34	Fowl typhoid,
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Paratyphoid,
42- L37	Pullorum, Fowl
43- L38	Cholera,
44- P4	College level meeting/ function
45-L39	Coryza
46-L40	Mycoplasmosis.
47-L41	Fungal diseases
48-L42	Aspergillosis
49-L43	Aflatoxicosis.
50-L44	Allotting portion for Internal Test-III
	Internal Test III begins 15.09.2014
51 L45	Parasitic disease
52- L46	Coccidiosis.
53-IT-III	Internal Test-III
54-L47	Nematode infections. Tape worm infections. External
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 “<Poultry Science >”
CO1	Understand feed formula
CO2	Learn the strategies to increases profit
CO3	Understand the cause and contest of poultry disease
CO4	Gain knowledge of Indian poultry industry.
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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	ANIMAL BIOTECHNOLOGY
Course Code	BSZB52
Class	III year (2012-2015)
Semester	Odd
Staff Name	Dr.M.RAJAKUMARI
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To elucidate the Basic concepts of Genetic Engineering
- To know the Gene cloning
- To realize the cell culture initiation preparation
- To study the Techniques, advantages, applications and limitations Animal (Somatic) cell fusion.
- To know about Introduction and importance of transgenesis

Syllabus

Unit – I

Origin, History, Scope and importance biotechnology Basic concepts of Genetic Engineering, Restriction enzymes and modification systems.

Cloning Vectors : Bacterial plasmid vector (pBR322, plasmid); Bacteriophage vector (Lambda 0and M13) Plant Viral Vector Animal Viral Vector (SV40).

Unit – II

Gene Cloning : DNA library, Integration of DNA fragments into the vector, Introduction of recombinant gene into the host cells – Prokaryotic cells (Transformation, Liposome mediated gene transfer, Electrophoration, Particle bombardment gun);

Screening (Selection) of recombinants – (Direct selection, Insertion selection and Blue – White selection)

Hybridization technique – Blotting techniques (Southern, Northern, Western)

Unit – III

Animal Cell and Tissue Culture : Introduction and history

Cell types : Cell types selection; Requirements for animal cell culture – Substrate, liquid media and gases;

Cell culture techniques : cell culture initiation preparation, sterilization of substrates, media, Isolation of explants – disaggregation of explants; subculture and prevention of contamination.

Cell lines : Evolution of cell lines and their maintenance; large scale culture of cell lines monolayer culture.

Unit – IV

Organ culture : Techniques, advantages, applications and limitations Animal (Somatic) cell fusion.

Hybridoma Technology and monoclonal antibody production

Stem cell culture : Embryonic stem cell culture, Methods to produce differentiated cells, application of stem cells, their maintenance their characteristics and Human embryonic stem cell research

DNA sequencing: Molecular markers and their applications (RFLP, RAPD) Animal bioreactors and Artificial skin.

Unit – V

Transgenic Animal Technology: Introduction and importance of transgenesis. Dolly, Applications of transgenic animals. Gene knockout

Bioethics : Bio safety and Patenting of Biotech products

Genomics : Introduction, Genomic Sequencing projects, Types of genomics and methods of gene sequencing.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2014
1-L1	History, Scope and importance biotechnology
2-L2	Basic concepts of Genetic Engineering
3- L3	Restriction enzymes and modification systems.
4-L4	Cloning Vectors
5-L5	Bacterial plasmid vector (pBR322, plasmid)
6-L6	Bacteriophage vector (Lambda 0and M13)
7-L7	Plant Viral Vector
8- P1	Welcoming of First year and Inauguration of Zoology Association
9- L8	Plant V Animal Viral Vector (SV40).
10- L9	DNA library
11-L10	Integration of DNA fragments into the vector
12-L11	Introduction of recombinant gene into the host cells
13-L12	Prokaryotic cells
14-L13	Transformation, Liposome mediated gene transfer
15-L14	Electrophoration - Allotting portion for Internal Test-I
	Internal Test I begins
16-L15	Particle bombardment gun
17-IT-1	Internal Test-I
18-L16	Screening (Selection) of recombinants
19-L17	Direct selection, Insertion selection and Blue – White selection - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Hybridization technique – Blotting techniques (Southern, Northern, Western)
21- L19	Animal Cell and Tissue Culture : Introduction and history
22- P2	College level meeting/Cell function
23-L20	Cell types selection
24-L21	Requirements for animal cell culture
25-L22	Substrate, liquid media and gases
26-L23	Cell culture initiation preparation
27-L24	sterilization of substrates, media
28-L25	Isolation of explants – disaggregation of explants; subculture and prevention of contamination.
29-L26	Evolution of cell lines and their maintenance
30-L27	large scale culture of cell lines, monolayer culture.
31-L28	Organ culture : Techniques, advantages, applications and limitations
32-L29	Animal (Somatic) cell fusion.
33-L30	Hybridoma Technology
34- P3	Department Seminar
35-L31	Monoclonal antibody production
36-L32	Embryonicstem cell culture - Allotting portion for Internal Test-II
	Internal Test II begins
37- L33	Methods to produce differentiated cells
38- IT-II	Internal Test-II
39-L34	Application of stem cells

40-L35	Stem cell - their maintenance their characteristics - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Human embryonic stem cell research
42- L37	DNA sequencing
43- L38	Molecular makers and their applications (RFLP, RAPD)
44- P4	College level meeting/ function
45-L39	Animal bioreactors and Artificial skin.
46-L40	Introduction and importance of transgenesis
47-L41	Applications of transgenic animals
48-L42	Dolly, Gene knockout
49-L43	Bio safety
50-L44	Patenting of Biotech products - Allotting portion for Internal Test-III
	Internal Test III begins
51 L45	Genomics : Introduction
52- L46	Genomic Sequencing projects
53-IT-III	Internal Test-III
54-L47	Types of genomics
55-L48	Methods of gene sequencing - 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 “ANIMAL BIOTECHNOLOGY”
CO1	Be able to describe the structure of animal genes and genomes.
CO2	Be able to describe how genes are expressed and what regulatory mechanisms contribute to control of gene expression.
CO3	Be able to describe basic principles and techniques in genetic manipulation and genetic engineering.
CO4	Be able to describe gene transfer technologies for animals and animal cell lines.
CO5	Be able to describe techniques and problems both technical and ethical in animal cloning
CO6	Be able to describe the contribution 'functional genomics' is making and is likely to make in animal biotechnology now and in the future.
Experimental Learning	
EL1	Gene expression and regulation.
EL2	Basic principles and techniques of recombinant DNA technology
EL3	Gene transfer methods for mammalian cells and animal transgenics
EL4	Animal germ cells, development and animal cloning
Integrated Activity	
IA1	Conduct seminar on “GENEETIC ENGINEERING”
IA2	Prepare a documentary in “ANIMAL CLONING”

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 ZOOLOGY

COURSE ACADEMIC PLAN(2014-2015)

(Prepared by staff member handling the course)

Programme Name	B.Sc Zoology
Course Name	Value based education
Course Code	GVBE21
Class	I year (2014-2015)
Semester	Even
Staff Name	Dr.D.V. Sheeba Rajakumari
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

- To enable the students to understand the social realities
- To know the value of human rights
- to inculcate an essential value system towards building a healthy society.
- to get knowledge about the mass media

Syllabus

Value Based Education

Unit I:

Social Justice Definition – need – parameters of social justice – factors responsible for social injustice – caste and gender – contributions of social reformers.

Unit II:

Human Rights and Marginalized People Concept of Human Rights – Principles of human rights – human rights and Indian constitution – Rights of Women and children – violence against women – Rights of marginalized People – like women, children, dalits, minorities, physically challenged etc

Unit III:

Social Issues and Communal Harmony Social issues – causes and magnitude - alcoholism, drug addiction, poverty, unemployment etc – communal harmony –concept – religion and its place in public in public domain – separation of religion from politics – secularism role of civil society

Unit IV:

Media Education and Globalized World Scenario Mass media –functions – characteristics –need and purpose of media literacy – effects and influence - - youth and

children – media power – socio cultural and political consequences mass mediated culture - consumeristic culture – Globalization – new media- prospects and challenges

Unit V:

Values and Ethics Personal values – family values – social values – cultural values – Professional values – and overall ethics – duties and responsibilities

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on (03-12-2014)
1-L1	Definition – need – parameters of social justice
2-L2	factors responsible for social injustice
3- P1	Zoology Association
4-L3	caste and gender
5-L4	contributions of social reformers
	Allotting portion for Internal Test-I
	Internal Test I begins (19-01-2015)
6-IT-I	Internal Test-I
7-L5	Concept of Human Rights – Principles of human rights
	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
8-L6	human rights and Indian constitution – Rights of Women and children
9-L7	violence against women
10-P2	College level meeting/Cell function
11-L8	Rights of marginalized People – like women, children, dalits, minorities, physically challenged etc
12-L9	Social issues – causes and magnitude - alcoholism, drug addiction
13-P3	Department Seminar
14-L10	poverty, unemployment etc
15-L11	communal harmony –concept –religion and its place in public in public domain
16-L12	separation of religion from politics –secularism role of civil society
	Allotting portion for Internal Test-II
	Internal Test II begins (16-02-2015)
17-IT-1	Internal Test-II
18-L13	Mass media –functions –characteristics
	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
19-L14	need and purpose of media literacy – effects and influence
20- P2	College level meeting/ function
21-L15	youth and children – media power – socio cultural and political consequences mass mediated culture
22-L16	consumerist culture – Globalization – new media- prospects and challenges
23- L17	Personal values – family values – social values – cultural values
	Allotting portion for Internal Test-III
	Internal Test III begins (16-03-2015)

24- IT-III	Internal Test-III
25-L18	Professional values – and overall ethics – duties and responsibilities Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
26-MT	Model Test (16-04-2015)
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 “<VALUE BASE EDUCATION >”
CO1	Value based education makes purity of heart
CO2	It helps to takes the whole society to the top
CO3	It creates awareness about human rights
CO4	It makes sincerity
CO5	It brings communal harmony in public

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Animal Diversity II - Chordata
Course Code	GMZO12
Class	I year (2014-2015)
Semester	Odd
Staff Name	P. Augustus Robince
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem	
Internal Test-3 Hrs	
Model Test-3 Hrs	
Dept. Meetings-2 Hrs	
College Meetings-2 Hrs	
Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To exemplify the intermediary position of Prochordates between Invertebrates and Vertebrates.
- To study the structure, functional organization.
- To study the adaptations and the economic importance of lower and higher chordates.

Syllabus

Unit I: Introduction to Chordata: General Characters (Diagnostic characters and additional Characters) and Classification up to classes with the name of the examples. Prochordata : General Characters and Classification up to orders with the names of the examples. Type Study: Ascidian – External features – Digestive and Reproductive system External features and Biological significance of the following (a) Amphioxus (b) Balanoglossus Agnatha: Petromyzon - External morphology; Ammocoetes Larva.

Unit II: Pisces: General Characters and Classification up to sub-classes with the names of the examples. Type Study: Scoliodon (Shark) - External characters - Placoid scales - Digestive System - Respiratory system - Receptor Organs - Urinogenital System. General topics: (i) Accessory respiratory organs in fishes (ii) Migration of fishes.

Unit III: Amphibia: General Characters and Classification upto orders with the names of the examples. External features and Biological significance of the following Examples: (a) Rhachophorus (b) Ambystoma (c) Axolotl Larva. General topic: Parental care in Amphibia Reptilia: General Characters and Classification up to orders with the names of the examples. External features and Biological significance of the following Examples: (a) Chelone mydas (b) Chamaeleon (c) Draco (d) Cobra General Topics: (i) Identification of poisonous and non-poisonous snakes of South India (ii) Venom apparatus - Biting mechanism- venom - First aid for snake bite - Antivenom.

Unit IV: Aves: General characters and classification up to subclasses with the names of the examples. Type study: Columba livia (Pigeon) - External characters - Flight muscles - Digestive system - Respiratory system - Urinogenital system General topics: (i) Migration of Birds (ii) Flight adaptations in Birds

Unit V: Mammalia: General Characters and Clasification up to subclasses with the names of the examples. 498 Type study: Rabbit - External morphology - Digestive system – Respiratory system - Heart - Structure of Brain - Urinogenital system. General topics: (i) Egg laying mammals (ii) Adaptations of aquatic mammals

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2014
1-L1	Unit I: Introduction to Chordata.
2-L2	General Characters (Diagnostic characters and additional Characters) .
3- L3	Classification up to classes with the name of the examples.

4-L4	Prochordata : General Characters.
5-L5	Classification up to orders with the names of the examples.
6-L6	Type Study: Ascidian – External features – Digestive Reproductive sysytem (b) Balanoglossus .
7-L7	External features and Biological significance of the following (a) Amphioxus.
8- P1	Welcoming of First year and Inauguration of Mathematics Association
9- L8	Agnatha: Petromyzon - External morphology; Ammocoetes Larva.
10- L9	Unit II: Pisces: General Characters .
11-L10	Classification up to sub-classes with the names of the examples.
12-L11	Type Study: Scoliodon (Shark) - External characters .
13-L12	Placoid scales - Digestive System - Respiratory system .
14-L13	Receptor Organs - Urinogenital System.
15-L14	____ - Allotting portion for Internal Test-I
	Internal Test I begins on 30.07.2014
16-L15	General topics: (i) Accessory respiratory organs in fishes (ii) Migration of fishes.
17-IT-1	Internal Test-I
18-L16	Unit III: Amphibia: General Characters .
19-L17	____ - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Classification upto orders with the names of the examples.
21- L19	External features and Biological significance of the following Examples: (a) Rhachophorus (b) Ambystoma (c) Axolotl Larva.
22- P2	College level meeting/Cell function
23-L20	General topic: Parental care in Amphibia Reptilia.
24-L21	General Characters and Classification up to orders with the names of the examples.
25-L22	External features and Biological significance of the following Examples: (a) Chelone

	mydas (b) Chamaeleon .
26-L23	(c) Draco (d) Cobra .
27-L24	General Topics: (i) Identification of poisonous and non-poisonous snakes of South India .
28-L25	(ii) Venom apparatus - Biting mechanism- venom - First aid for snake bite – Antivenom.
29-L26	Unit IV: Aves: General characters .
30-L27	classification up to subclasses with the names of the examples.
31-L28	Type study: Columba livia (Pigeon) - External characters .
32-L29	Flight muscles .
33-L30	Digestive system .
34- P3	Department Seminar
35-L31	Respiratory system .
36-L32	_____ - Allotting portion for Internal Test-II
	Internal Test II begins on 18.08.2014
37- L33	Urinogenital system .
38- IT-II	Internal Test-II
39-L34	General topics: (i) Migration of Birds .
40-L35	_____ - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	(ii) Flight adaptations in Birds.
42- L37	Unit V: Mammalia: General Characters .
43- L38	Clasification up to subclasses with the names of the examples.
44- P4	College level meeting/ function
45-L39	. 498 Type study: Rabbit - External morphology .
46-L40	Digestive system .

47-L41	Respiratory system .
48-L42	Heart - Structure of Brain .
49-L43	Urinogenital system.
50-L44	____ - Allotting portion for Internal Test-III
	Internal Test III begins on 15.09.2014
51 L45	General topics: (i) Egg laying mammals .
52- L46	(ii) Adaptations of aquatic mammals.
53-IT-III	Internal Test-III
54-L47	Unit Review.
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 “Animal Diversity II - Chordata”
CO1	Observation of the diversity in chordates and their classification.
CO2	Analysis of the significant adaptive features in all classes of Chordata.
CO3	Understand physiological and anatomical peculiarities through

	type study.
CO4	Appreciate transitional stages and their significance in evolution.
CO5	Understand what transformations are necessary to survive in different adaptive zones.
CO6	Create a positive attitude towards conservation of biodiversity.
CO7	Obtain overview of economically important vertebrates.
CO8	Differentiate chordates and Invertebrates
CO9	How birds differ from other Chardates
Experimental Learning	
EL1	To collect and categories different chordates specimens.
EL2	Observation of external features of specimens of chordates.
EL3	Identification of venomous snakes.
EL4	Identification of fishes.
Integrated Activity	
IA1	Identification of fishes in ponds
IA2	Identification of commercial fishes.

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Animal Physiology and Biochemistry
Course Code	B3ZB51
Class	III year (2014-2015)
Semester	Odd
Staff Name	Dr. P. Elimathisophia
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem	
Internal Test-3 Hrs	
Model Test-3 Hrs	
Dept. Meetings-2 Hrs	
College Meetings-2 Hrs	
Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- Carving an integrated approach to chemistry.
- Related to the functional significance of the various organs .
- Organ systems of animals.

Syllabus

. UNIT I ∅ Introduction – Animal physiology and Biochemistry ∅ Carbohydrates – Classification – Structure and functions of glucose, fructose, sucrose and glycogen ∅ Proteins – Classification – Structure and function of albumin and glyco proteins ∅ General structure of amino acids – essential, non essential amino acids. ∅ Lipids – Classification – Structure and functions of lecithin, Cephalin, glycol lipids and cholesterol ∅ Prostaglandins – Introduction – Structure – Classification – Functions

UNIT II ∅ Enzymes – Classification – Nomenclature and Properties – Mechanism of enzyme action. ∅ Digestion – Role of enzymes in carbohydrate, protein and fat digestion in man absorption of digested food materials in man. ∅ Metabolism – Carbohydrates – Glycogenesis – Kreb’s cycle – Electron transport system. ∅ Proteins – Deamination – Transamination – Urea cycle ∅ Lipids – B-oxidation.

UNIT III ∅ Respiration – respiratory pigments – Distribution – Composition – Properties – Functions – Transport and exchange of oxygen and carbon-di-oxide – Anaerobiosis – Respiratory Quotient. ∅ Circulation – Origin and conduction of heart beat – Cardiac rhythm, cardiac cycle – ECG – Blood pressure – Heart diseases. ∅ Excretion – Kinds of excretory products – Nephron – Mechanism of urine formation in man – Composition of urine – Dialysis – Nephritis – Blood urea.

UNIT IV ∅ Muscle physiology – Ultra structure of skeletal muscle – Properties – Mechanism of muscle contraction – Tetanus – Muscle fatigue. ∅ Nerve physiology – Structure and types of neuron. ∅ Nerve impulse – Definition – Conduction of nerve impulse through nerve – Saltatory conduction – Synapse – Synaptic transmission of impulses – Neurotransmitters – Neuromuscular junction. 822

UNIT V ∅ Endocrine system – Pituitary, thyroid, Parathyroid, Adrenal Islets of Langerhans – Testis Ovary. ∅ menstrual cycle – The role of Hormones – Menopause – Pregnancy – Lactation. ∅ Bioluminescence – Definitions – Types – Chemistry – Adaptive significance.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2014
1-L1	UNIT I – Introduction.
2-L2	Animal physiology and Biochemistry .
3- L3	Carbohydrates – Classification .
4-L4	Structure and functions of glucose.
5-L5	fructose, sucrose and glycogen.

6-L6	Proteins – Classification – Structure .
7-L7	and function of albumin and glyco proteins.
8- P1	Welcoming of First year and Inauguration of Mathematics Association
9- L8	General structure of amino acids – essential, non essential amino acids.
10- L9	lipids – Classification.
11-L10	Structure and functions of lecithin, Cephalin.
12-L11	glycol lipids and cholesterol.
13-L12	Prostaglandins – Introduction – Structure – Classification – Function
14-L13	UNIT II Enzymes – Classification.
15-L14	____ - Allotting portion for Internal Test-I
	Internal Test I begins on 30.07.2014
16-L15	Nomenclature and Properties .
17-IT-1	Internal Test-I
18-L16	Mechanism of enzyme action.
19-L17	____ - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Digestion – Role of enzymes in carbohydrate, protein .
21- L19	fat digestion in man absorption of digested food materials in man.
22- P2	College level meeting/Cell function
23-L20	Metabolism – Carbohydrates – Glycogenesis – Kreb’s cycle – Electron transport system.
24-L21	Proteins – Deamination – Transamination – Urea cycle .
25-L22	Lipids – B-oxidation.
26-L23	UNIT III Respiration – respiratory pigments – Distribution – Composition – Properties – Functions – Transport and exchange of oxygen and carbon-di-oxide – Anaerobiosis – Respiratory Quotient.
27-L24	Circulation – Origin and conduction of heart beat – Cardiac rhythm, cardiac cycle – ECG – Blood pressure – Heart diseases.

28-L25	Excretion – Kinds of excretory products – Nephron .
29-L26	Mechanism of urine formation in man – Composition of urine – Dialysis – Nephritis – Blood urea.
30-L27	UNIT IV Muscle physiology – Ultra structure of skeletal muscle – Properties – Mechanism of muscle contraction – Tetanus – Muscle fatigue.
31-L28	Nerve physiology – Structure and types of neuron.
32-L29	Nerve impulse – Definition – Conduction of nerve impulse through nerve.
33-L30	Saltatory conduction – Synapse.
34- P3	Department Seminar
35-L31	Synaptic transmission of impulses – Neurotransmitters – Neuromuscular junction.
36-L32	____ - Allotting portion for Internal Test-II
	Internal Test II begins on 18.08.2014
37- L33	UNIT V Endocrine system – Pituitary.
38- IT-II	Internal Test-II
39-L34	thyroid, Parathyroid.
40-L35	____ - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Adrenal Islets of Langerhans .
42- L37	Testis Ovary.
43- L38	menstrual cycle .
44- P4	College level meeting/ function
45-L39	The role of Hormones .
46-L40	Menopause .
47-L41	Pregnancy .
48-L42	Lactation.
49-L43	Bioluminescence – Definitions.

50-L44	_____ - Allotting portion for Internal Test-III
	Internal Test III begins on 15.09.2014
51 L45	Types .
52- L46	Chemistry.
53-IT-III	Internal Test-III
54-L47	Adaptive significance.
55-L48	_____ - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
56- MT	Model Test begins on 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 “Animal Physiology and Biochemistry”
CO1	Form a perspective of health and biology through the study of physiology.
CO2	Study different systems and their inherent disorders and deficiencies.
CO3	Learn the structure and functions of bio-molecules and their role in metabolism.
CO4	Learn mechanism of enzyme action and other related information.

CO5	Understand the importance of Heart and circulatory system
CO6	Mechanism of Bioluminescence
CO7	Understand the importance of Brain and Nerves
CO8	Learn mechanism of Hormone action
CO9	Understand the Mechanism of Respiration
Experimental Learning	
EL1	Observing fire fly to understand Bioluminescence
EL2	Observation of Lungs of different animals
EL3	Identification of own blood group
EL4	Observing own blood cells
Integrated Activity	
IA1	Preparing Model of Heart
IA2	Observation of Morphology of different animals.

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 Zoology

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	Applied Biotechnology
Course Code	R32B61
Class	I year (2014-2015)
Semester	1
Staff Name	Dr.(Mrs)E Ezhilmathi Sophia,.
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- To understand the concepts and steps of DNA construction
- To study the rule of biotechnology in different areas.

Syllabus

Unit – I

Environmental Biotechnology:

Water pollution: Biotechnological methods for Sewage and Waste water treatment - Primary treatment - Secondary treatment (Anaerobic digestion process and anaerobic filter) - Tertiary treatment (Ion exchange method)**Bioremediation:** Definition -types, Microbial degradation of selected Xeno biotics(Hydrocarbon, Pesticides). Role of genetically engineered micro organisms in bioremediation (Plasmid transfer, Super bug).**Biomining, Bioleaching and Bio fuels:** An overview of the role of microbial technology and biomining, bio leachng and bio fuel.

Unit –II

Agricultural Biotechnology: Basic technology for plant tissue culture (Callus and Explants culture) Production and application of single cell protein **Protoplast Fusion:** Somatic hybridization and micro propagation techniques and their applications. Genetic manipulation of 'nif' gene and 'nod' gene of nitrogen fixation.

Aqua cultue Technology: Application of Biotechnological tools (ELISA & PCR) for disease diagnosis.

Unit – III

Bioprocess / Fermentation Technology: Definition, Products of Commercial

importance from Bio process technology. **Bio reactors:** Principle, Design of conventional and Advanced types (Continuous stirred tank Bioreactors CSTB and Airlift bioreactors)..

Metabolite production: Primary metabolites - Ethanol production – secondary metabolites - Penicillin - Enzyme production - galactosidase.

Biotransformation: Definition, principle and biotransformation of ethanol.

Unit – IV

Enzyme Technology: Enzymes definition, nomenclature and properties. **Enzyme production:** Microbial organisms and enzyme production Commercial production of microbial enzymes - technique - industrial application of microbial enzymes - enzyme immobilization and their application. **Enzyme Biosensor:** Principle and types of biosensor - Applications of biosensor.

Unit – V

Human genome project: Introduction, objectives, principle, mapping methods and major contributions of Human genome project.

Gene therapy: Introduction, types of gene therapy, vectors used in gene therapy (viral vector) and gene therapy for cancer.

DNA applications: DNA probe - methods and mechanism - - DNA finger printing techniques and Application in forensic medicine.

DNA vaccines, Bio-weapons.

Reference books:

1. B.D Singh, —Biotechnology, Kalyani Publishers, No.1 Mahalakshmi street, T.Nagar, Chennai – 600 017.
2. C.Ratledge & B. Kristiansen —Basic Biotechnology| Cambridge University Press.
3. Prof. V. Kumaresan, —Animal Biotechnology|, Saras Publication, 114/35G A.R.P Camp Road, Peraivilai, Kattar P.O., Nagercoil, Kanyakumari -629 002.
4. Dubey R.C —A tex book of Biotechnology| S. Chand & Co., Ltd., New Delhi.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2014
1-L1	Biotechnological methods for Sewage and Waste water treatment
2-L2	Primary treatment
3- L3	Secondary treatment
4-L4	Anaerobic digestion process
5-L5	anaerobic filter
6-L6	Tertiary treatment
7-L7	Ion exchange method
8- P1	Welcoming of First year and Inauguration of Zoology Association
9- L8	Bioremediation:
10- L9	Definition -types, Microbial degradation of selected Xenobiotics(Hydrocarbon, Pesticides
11-L10	Role of genetically engineered micro organisms inbioremediation (Plasmid transfer, Super bug
12-L11	Biomining,
13-L12	Bioleaching and Biofuels:
14-L13	An overview of the role of microbial technology and biominng, bioleachng and biofuel.
15-L14	Basic technology for plant tissue culture (Callus and

16-L15	Explants culture)
17- L16	Production and application of single cell protein Protoplast Fusion:
18- L17	Somatic hybridization
19- L18	micro propagation
20- L19	Techniques and their applications.
21- L20	Allotting portion for Internal Test-I
	Internal Test 30.07.2014
22- L21	Genetic manipulation of 'nif' gene and 'nod' gene of nitrogen fixation
23- IT-1	Internal Test-I
24- L22	Definition, Products of Commercial
25- L23	Importance from Bio process technology. Bioreactors:
26- L24	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Principle, Design of conventional and Advanced
28- L26	types (Continuous stirred tank Bioreactors
29- L27	CSTB and Airlift bioreactors).
30- P2	College level meeting/Cell function
31-L28	Metabolite production: Primary metabolites
32-L29	Ethanol production
33-L30	secondary metabolites
34- L31	Penicillin - Enzyme production
35- L32	galactosidase.
36- L33	Biotransformation: Definition, principle and biotransformation of ethanol
37- L34	Enzyme Technology: Enzymes definition, nomenclature and
38-L35	properties. Enzyme
39- L36	production: Microbial organisms and enzyme production Commercial
40- L37	production of
41- L38	microbial enzymes
42-P3	Department Seminar
43- L39	technique
44- L40	industrial application of microbial enzymes - enzyme 835
45- L41	Immobilization and their application.
46- L42	Enzyme Biosensor: Principle and types of biosensor
47- L43	Allotting portion for Internal Test-II
	Internal Test II begins 18.08.2014
48- L44	Applications of biosensor
49-IT-II	Internal Test-II
50-L45	Applications of biosensor
51- L46	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Applications of biosensor
53- L48	Human genome project: Introduction,
54- L49	objectives, principle, mapping methods
55- L50	major contributions of Human genome project.
56- L51	Gene therapy: Introduction, types of gene therapy, vectors used in gene therapy
57- L52	Vector and gene therapy for cancer.

58- L53	DNA applications: DNA probe
59-P4	College level meeting/ function
60- L54	methods and mechanism
61- L55	DNA finger printing techniques and Application in forensic medicine.
62- L56	DNA vaccines,
63- L57	Bio-weapons.
64- L58	Allotting portion for Internal Test-III
	Internal Test III begins 15.09.2014
65- L59	Revision
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 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 “<Applied Biotechnology >”
CO1	Learn the r DNA contrition
CO2	Gain knowledge and r DNA in agriculture
CO3	Understand gene therapy
CO4	Study the bio-weapons’ bio-chips
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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	Bio Statics and Computer Application.
Course Code	HZOM23.
Class	I year (2014-2015)
Semester	Even
Staff Name	P. Augustus Robince.
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- The objectives of biostatistics are to advance statistical science and its application
- The role of bio statics is an important one in designing studies and analysing data form research problems
- Computer study operate a variety of advanced spread sheet, operating system and word processing function

Syllabus

Unit I

Collection of Data : Primary and Secondary data -Methods of collecting primary data • sources of secondary data. **Sampling and Sample Designs** : Essentials of sampling Methods of sampling -Random sampling methods -Non random sampling methods Merits and Limitations of sampling. Classification and tabulation of data -Diagrammatic and graphic presentation of data.

Unit II

Measures of Central Tendency : Mean- Arithmetic mean -Weighted arithmetic mean • Median -Mode. **Measures of Dispersion** : Quartile deviation --Mean deviation • Standard deviation -Lorenz curve. **Skewness Moments and Kurtosis** : Measure of skewness -Absolute measure of skewness -Relative measure of skewness -Karl Pearson's coefficient of skewness- Rowley's coefficient of skewness. Moments. Measures of kurtosis. **Correlation analysis** : Types of Correlation -Methods of studying correlation Karl Pearson's coefficient of correlation -Regression Analysis -Regression line, Regression equations.

Unit

III

Probability and Expected Value : Concepts of probability -Types of events - Theorems of probability - conditional probability -Bayes' Theorem. **Theoretical Distribution** : Binomial distribution -Poisson distribution - Normal distribution. **Statistical Inference** : Test of hypothesis -procedure of testing hypothesis. **Estimation** : Test of significance for large sample - Test of significance for small samples -Student's t- distribution.

Unit IV:

Chi square test and a Goodness of fit-Yates correction F-Test and Analysis of Variance one way classification and two way classification .Experimental design -Randomized block design -Latin squares -The Sign Test -A rank sum test (The Mann-Whitney U Test).

Unit V

Bioinformatics : Information Technology in Biology - Types of sequences used in bioinformatics -Application of Bioinformatics. **Biological Database** : Objectives - Properties of Database -database retrieval system -Symbols used in data base • Nomenclature of DNA sequences Nomenclature of protein sequences -NCBI .SWISS• PROT. **Data Base Similarity Search Tools** : BLAST -FASTA -Application of bioinformatics tools -Homology search tools -Protein functional analysis tools -Sequences analysis tools -Structural analysis tools - Molecular modeling and visualizing tools Polygenetic analysis tools

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2014
1-L1	Unit I Collection of Data : Primary and Secondary data.
2-L2	Methods of collecting primary data.
3- L3	sources of secondary data.
4-L4	Sampling and Sample Designs : Essentials of sampling.
5-L5	Methods of sampling.
6-L6	Random sampling methods.
7-L7	Non random sampling methods.
8- P1	Welcoming of First year and Inauguration of Mathematics Association
9- L8	Merits.
10- L9	Limitations of sampling.
11-L10	Classification of Data.
12-L11	tabulation of data.
13-L12	Diagrammatic Presentation of Data.
14-L13	graphic presentation of data.
15-L14	Unit II Measures of Central Tendency : Mean- Arithmetic mean Weighted.
16-L15	arithmetic mean •Median –Mode.
17- L16	Measures of Dispersion : Quartile deviation .
18- L17	Mean deviation • Standard deviation.
19- L18	Lorenz curve.

20- L19	Skewness Moments and Kurtosis .
21- L20	_____ - Allotting portion for Internal Test-I
	Internal Test I begins on 30.07.2014
22- L21	Measure of skewness.
23- IT-1	Internal Test-I
24- L22	Absolute measure of skewness.
25- L23	Relative measure of skewness.
26- L24	_____ - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Karl Pearson's coefficient of skewness.
28- L26	Rowley's coefficient of skewness.
29- L27	Moments. Measures of kurtosis.
30- P2	College level meeting/Cell function
31-L28	Correlation analysis : Types of Correlation.
32-L29	Methods of studying correlation.
33-L30	Karl Pearson's coefficient of correlation .
34- L31	Regression Analysis .
35- L32	Regression line.
36- L33	Regression equations.
37- L34	Unit III: Probability and Expected value: Concepts of Probability.
38- L35	Types of events.
39- L36	Theorems of Probability.
40- L37	Conditional Probability.
41- L38	Bayes theorem.
42-P3	Department Seminar
43- L39	Theoretical Distribution :Binomial distribution.

44- L40	Poisson distribution - Normal distribution.
45- L41	Statistical Inference :Test of hypothesis procedure of testing hypothesis.
46- L42	Estimation : Test of significance for large sample - Test of significance for small samples -Student's- distribution
47- L43	_____ - Allotting portion for Internal Test-II
	Internal Test II begins on 18.08.2014
48- L44	Unit IV: Chi square test and a Goodness of fit.
49-IT-II	Internal Test-II
50-L45	Yates correction F-Test and Analysis of Variance one way classification.
51- L46	_____ - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	two way classification.
53- L48	Experimental design –Randomized block design -Latin squares –The Sign Test –A rank sum test (The Mann-Whitney U Test).
54- L49	Unit V: Bioinformatics: Information technology in biology.
55- L50	Types of sequences used in bioinformatics .
56- L51	Application of Bioinformatics.
57- L52	Biological Database : Objectives .
58- L53	Nomenclature of DNA sequences .
59-P4	College level meeting/ function
60- L54	Nomenclature of protein sequences
61- L55	NCBI .SWISS• PROT.
62- L56	Data Base Similarity Search Tools : BLAST -FASTA -Application of bioinformatics tools.
63- L57	Homology search tools –Protein functional analysis tools.
64- L58	_____ - Allotting portion for Internal Test-III
	Internal Test III begins on 15.09.2014
65- L59	Sequences analysis tools.

66- L60	Structural analysis tools .
67-IT-III	Internal Test-III
68- L61	Molecular modeling .
69- L62	visualizing tools Polygenetic analysis tools.
70- L63	_____ - Test Paper distribution and result analysis
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71-MT	Model Test begins on 24.10.2014
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73-MT	Model Test
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Course Outcomes

Learning Outcomes	COs of the course “Bio Statics and Computer Application.”
CO1	Define the principal concepts about biostatistics.
CO2	Recognize the definition of statistics, its subject and its relation with the other sciences.
CO3	Collect data relating to variable/variables which will be examined and calculate descriptive statistics from these data.
CO4	Identify convenient sample by using sampling theory.
CO5	Define some concepts about hypothesis testing.
CO6	Apply hypothesis testing to the data through these concepts.
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CO8	Define the principal concepts about computer applications.

CO9	Define the principal concepts about bioinformatics.
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EL1	Perform linear regression model fitting and diagnosis
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EL3	Compare different generation computers
EL4	Relate Smart phones and computers
Integrated Activity	
IA1	Identify the Electronics equipment used in your home.
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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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	Bio Statics and Computer Application.
Course Code	HZOM23.
Class	I year (2014-2015)
Semester	Even
Staff Name	P. Augustus Robince.
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Internal Test-3 Hrs	
Model Test-3 Hrs	
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Remaining 65 Hrs (5 units; $5 \times 13 = 65$; 13Hrs /unit)	

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Unit

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Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2014
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24- L22	Absolute measure of skewness.
25- L23	Relative measure of skewness.
26- L24	_____ - Test Paper distribution and result analysis
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27- L25	Karl Pearson's coefficient of skewness.
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32-L29	Methods of studying correlation.
33-L30	Karl Pearson's coefficient of correlation .
34- L31	Regression Analysis .
35- L32	Regression line.
36- L33	Regression equations.
37- L34	Unit III: Probability and Expected value: Concepts of Probability.
38- L35	Types of events.
39- L36	Theorems of Probability.
40- L37	Conditional Probability.
41- L38	Bayes theorem.
42-P3	Department Seminar
43- L39	Theoretical Distribution :Binomial distribution.

44- L40	Poisson distribution - Normal distribution.
45- L41	Statistical Inference :Test of hypothesis procedure of testing hypothesis.
46- L42	Estimation : Test of significance for large sample - Test of significance for small samples -Student's- distribution
47- L43	_____ - Allotting portion for Internal Test-II
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48- L44	Unit IV: Chi square test and a Goodness of fit.
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55- L50	Types of sequences used in bioinformatics .
56- L51	Application of Bioinformatics.
57- L52	Biological Database : Objectives .
58- L53	Nomenclature of DNA sequences .
59-P4	College level meeting/ function
60- L54	Nomenclature of protein sequences
61- L55	NCBI .SWISS• PROT.
62- L56	Data Base Similarity Search Tools : BLAST -FASTA -Application of bioinformatics tools.
63- L57	Homology search tools –Protein functional analysis tools.
64- L58	_____ - Allotting portion for Internal Test-III
	Internal Test III begins on 15.09.2014
65- L59	Sequences analysis tools.

66- L60	Structural analysis tools .
67-IT-III	Internal Test-III
68- L61	Molecular modeling .
69- L62	visualizing tools Polygenetic analysis tools.
70- L63	_____ - Test Paper distribution and result analysis
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73-MT	Model Test
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Course Outcomes

Learning Outcomes	COs of the course “Bio Statics and Computer Application.”
CO1	Define the principal concepts about biostatistics.
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CO5	Define some concepts about hypothesis testing.
CO6	Apply hypothesis testing to the data through these concepts.
CO7	Arrange the results of the hypothesis testing and make a statistical decision.
CO8	Define the principal concepts about computer applications.

CO9	Define the principal concepts about bioinformatics.
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EL1	Perform linear regression model fitting and diagnosis
EL2	Communicate statistical analysis through written scientific report
EL3	Compare different generation computers
EL4	Relate Smart phones and computers
Integrated Activity	
IA1	Identify the Electronics equipment used in your home.
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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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology (2014-2015)
Course Name	Cell and molecular biology
Course Code	GMZO31
Class	II year
Semester	Odd(June 2014 to November 2014)
Staff Name	D.V.SHEEBA RAJAKUMARI.
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; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To provide with the core principles of molecular biology
- To gain higher level thinking skills
- To learn basic science and its applications

Syllabus

Unit I

Cell types – Prokaryotic & Eukaryotic. Microscopy – detailed study of compound microscope, phase contrast & electron microscope microscopes, Cytological techniques – Fixation & Fixatives – types of stains.

Unit II

Ultrastructure & functions of the following cell organelles: Plasma membrane, mitochondria, Golgi apparatus, endoplasmic reticulum, ribosomes, lysosomes, centriole.

Unit III

Nuclear components: Ultrastructure & functions of nucleus, nuclear membrane, nucleolus, chromosomes & their types, Cancer cell & Carcinogenesis: Definition, types, causes, properties, treatment, Oncogenes.

Unit IV

DNA: DNA as genetic material, Base pairs, constancy of DNA structure & Replication, Hybridization, Cell division – mitosis & mitotic apparatus, Meiosis & Synaptonemal complex.

Unit V

Different types of RNA, transcription, functional Unit of gene, promoter, coding sequences, processing of ribosomal RNA inhibitors of transcription various steps in protein synthesis. Genetic code – Codons. Anticodons, control of gene expression.

Reference Books :

1. Molecular Cell Biology – By Lodish H. Berk A., Zipursky S. Matsudaira P. Baltimore D. and Darnell J. WH Freeman and Co.
2. Cell and Molecular Biology By Derobertis, EDP ISE Publication
3. Molecular Biology of the Cell by Alberts et.al., Garland Publishing inc. New york
4. Cell and Molecular Biology – By Gupta PK Rastogi Publications Meerut, India
5. Cell and Molecular Biology – By Prakash & Lohar MIP Publishers, Chennai

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2014
1-L1	Syllabus discussion,
2-L2	Cell types – prokaryotic and eukaryotic .
3- L3	Microscopy – detailed study of compound microscope.
4-L4	Phase contrast and electronmicroscope , microscopes
5-L5	Cytological techniques –fixation and fixatives
6-L6	Types of stains
7-L7	Ultrastructure and functions of plasmamembrane
8- P1	Welcoming of First year and Inauguration of zoology Association
9- L8	Ultra structure and functions of mitochondria
10- L9	Ultra structure and functions of golgi apparatus
11-L10	Ultra structure and functions of endoplasmic reticulum
12-L11	Ultra structure and functions of ribosomes
13-L12	Ultra structure and functions of lysosomes
14-L13	Ultra structure and functions of centriole
15-L14	Ultra structure and functions of centriole - Allotting portion for Internal Test-I
	Internal Test I begins(30.07.2014)
16-L15	Ultra structure and functions of nucleus
17-IT-1	Internal Test-I
18-L16	Ultra structure and functions of nuclear membrane and nucleolus
19-L17	Ultra structure and functions of nuclear membrane and nucleolus - Test Paper

	distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Chromosomes and their types
21- L19	Cancer cells
22- P2	College level meeting/Cell function
23-L20	Carcinogenesis- definition
24-L21	Types and causes of cancer
25-L22	Properties and treatment of cancer
26-L23	Oncogenes
27-L24	DNA as genetic material
28-L25	Basepairs , constancy of DNA structure
29-L26	DNA replication and hybridization
30-L27	Cell division
31-L28	Mitosis and mitotic apparatus
32-L29	Miosis and synaptonemal complex
33-L30	Different types of RNA
34- P3	Department Seminar
35-L31	Transcription
36-L32	Transcription - Allotting portion for Internal Test-II
	Internal Test II begins(18.08.2014)
37- L33	Functional unit of gene.
38- IT-II	Internal Test-II
39-L34	Promoter
40-L35	Promoter - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Coding sequences
42- L37	Processing of ribosomal RNA
43- L38	Inhibitors of transcription
44- P4	College level meeting/ function
45-L39	Steps in protein synthesis
46-L40	Genetic code
47-L41	Codons
48-L42	Anti codons
49-L43	Control gene expression
50-L44	Control gene expression - Allotting portion for Internal Test-III
	Internal Test III begins(15.09.2014)
51 L45	Revesion
52- L46	Revesion
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(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 “<course name>”
CO1	Exhibit a knowledge base in genetics, cell and molecular biology and anatomy and physiology
CO2	Demonstrate the knowledge of common and advanced laboratory practices in cell and molecular biology.
CO3	Exhibit clear and concise communication of scientific data
CO4	Engage in review of scientific literature in the areas of biomedical sciences
CO5	Critique and professionally present primary literature articles in the general biomedical sciences field.
Experimental Learning	
EL1	To do working models to explain Genetic code
EL2	To do working models to explain Coding sequences
Integrated Activity	
IA1	Prepare chart for Codons
IA2	Prepare chart for Anti Codons

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 Zoology

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	Economic Entomology
Course Code	HZOE22
Class	I year (2014-2015)
Semester	2
Staff Name	Dr.(Mrs)E Ezhilmathi Sophia,.
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; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To study key of insect identification
- To analyse of insects
- To study pest control measure.
- Learn role of insects vector

Syllabus

UNIT I

A general introduction to the study of Entomology with special reference to insect development & metamorphosis. A general knowledge of insect classification with a stress on the economic importance of families & members of the following orders: (Thysanura, Orthoptera, Dytocoptera, Odonata, Thysanoptera, Isoptera, Anapleura, Coleoptera, Lepidoptera, Hemiptera, Diptera & Hymenoptera).

UNIT II

Beneficial insects : A general knowledge of Apiculture, Sericulture & Lac culture.

UNIT III

Helpful insects : Scavengers, Pollinators, Predators & Parasites effecting biological control.

UNIT IV

Principles & methods of Pest control : Physical, Chemical, mechanical, biological &

Legislative methods & recent integrated control methods. Pesticides & their classification. Principles & Application of pesticides – dusting, Praying, aerosol & aerial spraying, Insecticide appliances – dusters & sprayers Information regarding safe use of pesticides & antidotes for pesticide poisoning.

UNIT V

Medical Entomology: Household & disease carrying insects & transmitters, vectors & their control methods.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2014
1-L1	A general introduction to the study of Entomolgy with special reference to insect
2-L2	development & metamorphosis.
3- L3	A general knowledge of insect classification with a stress on the economic importance on families & members of the following orders:
4-L4	Thysanura
5-L5	Orthoptera,
6-L6	Dyctoptera,
7-L7	Odonata,
8- P1	Welcoming of First year and Inauguration of Zoology Association
9- L8	Thysanoptera,
10- L9	Isoptera,
11-L10	Anapleura,
12-L11	Coleoptera,
13-L12	Lepidopters,
14-L13	Hemipters, Diptera & Hymenoptera
15-L14	Allotting portion for Internal Test-I
	Internal Test I begins 30.07.2014
16-L15	Beneficial insects :
17-IT-1	Internal Test-I
18-L16	A general knowledge of Apiculture, Sericulture & Lac culture
19-L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Helpful insects : Scavengers,
21- L19	Pollinators,
22- P2	College level meeting/Cell function
23-L20	Predators
24-L21	Parasites effecting biological control.
25-L22	Principles & methods of Pest control : Physical, Chemical,
26-L23	Legislative methods
27-L24	& recent integrated
28-L25	control methods.
29-L26	Pesticides & their classification.
30-L27	Principles & Application of pesticides
31-L28	dusting,
32-L29	Praying, aerosol & aerial spraying

33-L30	Information regarding safe use of pesticides &
34- P3	Department Seminar
35-L31	antidotes for pesticide poisoning
36-L32	Allotting portion for Internal Test-II
	Internal Test II begins 18.08.2014
37- L33	Insecticide appliances – dusters & sprayers
38- IT-II	Internal Test-II
39-L34	mechanical, biological
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Medical Entomology:
42- L37	Household
43- L38	disease carrying insects
44- P4	College level meeting/ function
45-L39	transmitters
46-L40	vectors
47-L41	their control methods
48-L42	Revision
49-L43	Revision
50-L44	Allotting portion for Internal Test-III
	Internal Test III begins 15.09.2014
51 L45	Revision
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 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 “<Economic Entomology >”
CO1	Learn insect identification practise pest management study the rule of pesticides.
CO2	Learn to dusters & sprayers
CO3	Understand Parasites effecting biological control.
CO4	Learn to the Principles & methods of Pest control : Physical, Chemical,

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 Zoology

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	Genetics
Course Code	KZOM42
Class	I year (2014-2015)
Semester	odd
Staff Name	Dr. (Mrs) E Ezhilmathi Sophia.
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- To study hereditary process.
- To understand the concept of gens.
- To learn gene interactions.

Syllabus

Unit – I

Mendelian Principles: Genetic transmission – concepts and definitions. Mendel's law, Test cross and back cross. Allelic and non allelic interactions. Chromosomes: Prokaryotic chromosomes: eukaryotic chromosomes-diploids and haploids, morphology of the eukaryotic chromosomes, chemical structure of chromosomes, molecular structure of chromosomes, B-chromosomes, holokinetic chromosomes; genetical significance of chromosomes;.

Unit –II

Molecular structure of gene

Molecular structure of gene-simple and split genes, overlapping genes – cistron, recon muton, intron – DNA methylation, genetic code – coding and noncoding sequences DNA:types-replication and repair mechanism: regulation of gene expression – operon concept.

Unit – III

Microbial genetics:

Methods of genetic transfers – transformation, conjugation, transduction and sexduction. Mapping genes by interrupted mating; fine structure analysis of genes. Mapping of the bacterial chromosome, genetic mapping of lambda bacteriophage oncogenes, transposable elements of prokaryotes and eukaryotes, inborn errors of metabolism,

Unit – IV

Population genetics

Mendelian population: gene pool and gene: Requency; Hardy-weinberg law;applications of Hardy-weingbergt law I calculating gene frequencies in a population-calculation of gene frequencies of autosomal genes, calculation of gene frequencies for sex linked genes, factors influencing ailele frequency or deviations from Hardy-weinberg equilibrium selection mutation, meiotic drive and migration pressure;

Unit – V

Human Genetics

Pedigree analysis-aminocentesis human cyto genetics- the normal human karyyotype banding patterns in human chromosomes, abnormal human karyotypes-autosomal abnormalities-down's syndromes, klinefelter's syndrome, Turner's syndrome patau's and Edward's syndromes

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2014
1-L1	Mendelian Principles: Genetic transmission – concepts and definitions.
2-L2	Mendel's law, Test cross and back cross. Allelic and non allelic interactions.
3- L3	Chromosomes: Prokaryotic chromosomes:
4-L4	eukaryotic chromosomes-diploids and haploids, morphology of the eukaryotic chromosomes,
5-L5	chemical structure of chromosomes, molecular structure of chromosomes,
6-L6	B-chromosomes,
7-L7	holokinetic chromosomes; genetical significance of chromosomes;.
8- P1	Welcoming of First year and Inauguration of Zoology Association
9- L8	Molecular structure of gene-simple and split genes, overlapping genes
10- L9	cistron, recon muton, intron
11-L10	DNA methylation,
12-L11	genetic code
13-L12	coding and noncoding
14-L13	sequences DNA:types-replication and repair mechanism: regulation of gene expression
15-L14	operon concept.
16-L15	Methods of genetic transfers – transformation, conjugation, transduction and sexduction.
17- L16	Mapping genes by interrupted mating; fine structure analysis of genes.
18- L17	Mapping of the bacterial chromosome,
19- L18	genetic mapping of lambda bacteriophage oncogenes, transposable elements of prokaiyotes and eukaryotes,
20- L19	inborn errors of metabolism
21- L20	Allotting portion for Internal Test-I
	Internal Test 30.07.2014
22- L21	Mendelian population: gene pool and gene:
23- IT-1	Internal Test-I
24- L22	Requency; Hardy-weinberg
25- L23	law;applications of Hardy-weingbergt law I calculating gene frequencies in a population-calculation of gene frequencies of autosomal genes,

26- L24	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	calculation of gene frequencies for sex linked genes,
28- L26	factors influencing allele frequency or deviations from Hardy-weinberg
29- L27	equilibrium selection mutation, meiotic drive and migration pressure;
30- P2	College level meeting/Cell function
31-L28	calculation of gene frequencies for sex linked genes,
32-L29	factors influencing allele frequency or deviations from Hardy-weinberg
33-L30	equilibrium selection mutation, meiotic drive and migration pressure;
34- L31	Pedigree analysis-aminocentesis human cytogenetics-
35- L32	the normal human karyotype banding patterns in human chromosomes,
36- L33	abnormal human karyotypes-autosomal
37- L34	abnormalities-down's syndromes,
38-L35	klinefelter's syndrome,
39- L36	Turner's syndrome patau's
40- L37	Edward's syndromes
41- L38	Revision
42-P3	Department Seminar
43- L39	Pedigree analysis-aminocentesis human cytogenetics-
44- L40	the normal human karyotype banding patterns in human chromosomes,
45- L41	abnormal human karyotypes-autosomal
46- L42	abnormalities-down's syndromes,
47- L43	Allotting portion for Internal Test-II
	Internal Test II begins 18.08.2014
48- L44	Revision
49-IT-II	Internal Test-II
50-L45	Revision
51- L46	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	calculation of gene frequencies for sex linked genes,
53- L48	factors influencing allele frequency or deviations from Hardy-weinberg
54- L49	equilibrium selection mutation, meiotic drive and migration pressure;
55- L50	Pedigree analysis-aminocentesis human cytogenetics-
56- L51	the normal human karyotype banding patterns in human chromosomes,
57- L52	abnormal human karyotypes-autosomal
58- L53	abnormalities-down's syndromes,
59-P4	klinefelter's syndrome,
60- L54	Turner's syndrome patau's
61- L55	Edward's syndromes
62- L56	Revision
63- L57	Revision
64- L58	Allotting portion for Internal Test-III
	Internal Test III begins 15.09.2014
65- L59	Revision
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
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 “<Genetics >”
CO1	Understand the hereditary transmission.
CO2	Learn the structure and function of genes
CO3	Understand the concept of seed determinations
CO4	Know gene expression.
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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	Microbiology
Course Code	HZOM21
Class	I year (December 2014 to April 2015)
Semester	Even
Staff Name	Dr. Jansi 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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- An education on microbiology will impart extensive knowledge to the students with basic concepts that occur within all microorganisms.
- To know the theoretical and practical aspects of microbial growth.
- To better understand the morphology and physiological characteristics of different groups of microorganisms.
- To enable the students to understand the techniques for bacterial culture.

Syllabus

MSU / 2017-18 / PG –Colleges / M.Sc. (Zoology) / Semester -II / Ppr.no.5 / Core-5

MICROBIOLOGY

Unit I: Historical perspectives in Microbiology – Scope of microbiology – Classification of microorganisms – protozoa – algae – fungi – bacteria (Gram Negative and Gram Positive) and virus –Whittaker's five kingdom concept. Ultra structure of bacteria – capsule, cell wall – Gram negative and Gram positive, Cytoplasmic inclusion.

Unit II: Microbial growth and nutrition – requirements – culture media –Microbiological media, enrichment media, enriched media, transport media, selective media and pure culture techniques – growth curve – kinetics of growth – Batch culture – Synchronous growth –

Measurement of growth and enumeration of cells. Cultivation of microorganisms – Methods of preservation and maintenance of cultures – Role of disinfectants.

Unit III: Dairy, Food and Industrial Microbiology: Microbiology of milk – Pasteurization, Dairy product and fermentation technology. Microbiology of food: Food spoilage – spoilage of meat – bread – food poisoning and food preservation. Industrial production of Penicillin, amino acid and wine.

Unit IV: Microbial diseases and their control: Bacterial diseases, Air borne disease, Diphtheria – Pertusis – Tuberculosis. Food borne and water borne diseases: Cholera, Typhoid, Salmonellosis. Soil borne diseases: Tetanus and Anthrax, sexually transmitted and contact diseases: Gonorrhoea, Syphilis and Leprosy. Viral diseases – Air borne diseases: Measles, Mumps, Chicken pox. Insect borne diseases: Dengue fever, chikungunya. Food and water borne diseases: Polio, Hepatitis – A Direct Contact Diseases: Viral Hepatitis – Hepatitis B, Rabies, AIDS.

Unit V: Environmental and Agriculture Microbiology Potable water: Microbial analysis of water, purification of water. Organic compost, Biogas, mechanism of methane formation, Sewage treatment, treatment of industrial effluents. Microbial leaching: Copper and uranium. Biodegradation – Petroleum and xenobiotic. Nutrient cycling (Carbon cycle, phosphorus cycle, Sulphur cycle and nitrogen cycle). Microbial herbicides: Bacterial insecticides - *Pseudomonas* and *Bacillus* as insecticides. Viral insecticides, Entomopathogenic fungi.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 03.12.2018
1-L1	Unit I: General introduction about the world of microbes.
2-L2	Historical perspectives in Microbiology – Contributions of Pioneers - Scope of microbiology.
3- L3	Classification of microorganisms - 3 kingdom classification, 5 kingdom classification, 8 kingdom classification and molecular classification.
4-L4	General characters and classification of protozoa – algae – fungi.
5-L5	Ultra structure of bacteria – Detailed about Cytoplasm, the Cell Envelope, the Cytoplasmic Membrane, the Cell Wall.
6-L6	Cytoplasmic inclusions – ribosomes, glycogen, lipid and pigments
7-L7	Student Seminar – Gram positive and gram negative bacteria.
8- P1	Zoology Association Meeting
9- L8	Revision and Group discussion
10- L9	Unit II: Introduction
11-L10	Microbial growth and nutrition – requirements for microbial culture.
12-L11	Preparation of different kinds of culture media and their features.
13-L12	Microbiological media, enrichment media, enriched media, transport media, selective media.
14-L13	Culture techniques – pure culture and batch culture.
15-L14	Allotting portion for Internal Test-I

	Internal Test I begins
16-L15	Growth curve – Lag, Log, Stationary and Decline phases - kinetics of growth. Synchronous growth – conditions required for bacterial growth.
17- IT1	Internal Test-I (18.01.2019)
18- L16	Measurement of growth and enumeration of cells – viable plate count, by turbidity, by using colony counter etc.
19- L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20- L18	Cultivation of microorganisms - Broth cultures, Agar plates, Stab cultures, Culture collections and Solid plate culture of thermophilic microorganisms
21- L19	Students Seminar - Methods of preservation and maintenance of cultures.
22-P2	College level meeting/Cell function
23- L20	Students Seminar - – Role of disinfectants.
23- IT-1	Unit III: Introduction &
24- L21	Microbiology of milk – Pasteurization.
25- L22	Dairy product and fermentation technology
26-L23	Microbial Food spoilage – spoilage of meat – bread
27-L24	Food poisoning by harmful bacteria and role of beneficial bacteria for food preservation.
28-L25	Students Seminar - Industrial production of Penicillin.
29-L26	Students Seminar – Microbial production of Wine.
30-L27	Students Seminar – Microbial production of Amino acids.
31-L28	Revision
32-L29	Revision and Class test
33-L30	Unit IV: Introduction about the microbes and disease.
34- P3	Department Seminar
35-L31	Bacterial Diseases – Causative agent, Symptoms, Causes and Treatment of Air borne disease - Diphtheria – Pertusis – Tuberculosis
36-L32	Bacterial Diseases – Causative agent, Symptoms, Causes and Treatment of Food borne and water borne diseases: Cholera, Typhoid, Salmonellosis. Allotting portion for Internal Test-II.
	Internal Test II begins
37- L33	Bacterial Diseases – Causative agent, Symptoms, Causes and Treatment of Soil borne diseases: Tetanus and Anthrax.
38- IT-II	Internal Test-II (25.02.2019)
39-L34	Bacterial Diseases – Causative agent, Symptoms, Causes and Treatment of Sexually transmitted and contact diseases: Gonorrhoea, Syphilis and Leprosy.
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Viral diseases - Causative agent, Symptoms, Causes and Treatment of Air borne diseases: Measles, Mumps, Chicken pox.
42-L37	Viral diseases - Causative agent, Symptoms, Causes and Treatment of Insect borne diseases: Dengue fever, Chikungunya.
43- L38	Viral diseases - Causative agent, Symptoms, Causes and Treatment of Food and water borne diseases: Polio, Hepatitis – A
44- P4	College level meeting/ function

45-L39	Student seminar -Direct Conduct Diseases: Viral Hepatitis – Hepatitis B, Rabies, AIDS.
46-L40	Unit V: Environmental and Agriculture Microbiology Potable water: Microbial analysis of water, purification of water.
47-L41	Organic compost, Biogas, mechanism of methane formation, Sewage treatment, treatment of industrial effluents.
48-L42	Microbial leaching: Copper and uranium. Biodegradation – Petroleum and xenobiotic.
49-L43	Nutrient cycling (Carbon cycle, phosphorus cycle)
50-L44	Allotting portion for Internal Test-III
	Internal Test III begins
51 L45	Students Seminar - Sulphur cycle and nitrogen cycle.
52- L46	Microbial herbicides: Bacterial insecticides - <i>Pseudomonas</i> and <i>Bacillus</i> as insecticides.
53-IT-III	Internal Test-III (22.03.2019)
54-L47	Viral insecticides, Entomopathogenic fungi.
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 “Microbiology”
CO1	Acquire an idea about the historical events in microbiology.
CO2	Able to differentiate gram positive and gram negative bacteria.
CO3	Cultivate bacteria with different cultivation technique.
CO4	Understand various specialized techniques such as pasteurization.
CO5	Get an idea regarding microbes and their relation with environment.
CO6	Know the microbial techniques used in milk industry.
CO7	Understand the use of microbes in food industry.
CO8	Learn about various viral disease, their causative agent, mode of infection, epidemiology and treatment.
CO9	Know about various fungal disease, their causative agent, mode of infection, epidemiology and treatment.
Experimental Learning	
EL1	Visit to microbiology lab.
EL2	Hands on training on microbial plating techniques.
EL3	Visit to nearest sewage treatment plant.

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	Research Methodology
Course Code	HZOE41
Class	II year (2014-2015)
Semester	Even
Staff Name	Dr. Jansi Rani
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- Students should know why educational research is undertaken, and the audiences that profit from research studies
- To be able to describe the method of chromatography and its applications
- To study the Principle and working Mechanism of Different types of Microscopes
- To be familiar with the all the techniques used in the field of Biology.

Syllabus

Unit I : Research – Characteristics – types of research – steps in research – objectives of research – research report formatting and typing – laboratory safety – intellectual property rights.

Unit II : Microscopy – Principles – types of light microscopes – bright field – dark field – phase contrast – fluorescence – scanning – micrometry. Electron microscopes and types – atomic force and magnetic force microscopes.

Unit III : Centrifuge – types – principles and applications. pH meter – types – principles and applications. Colorimeter – principles and applications. Cryopreservation and its applications. Freezing and freeze drying microtomes. Cytotechniques.

Unit IV : Chromatography – paper – thin layer – column – gas liquid chromatography – affinity chromatography. Electrophoresis – paper – cellulose acetate – gel – immune electrophoresis. Blotting techniques – southern – northern – western. Radioactive counters – autoradiography – labeling studies.

Unit V : Spectrophotometer - Spectrofluorimeter – ESR – NMR Spectrophotometer – Flame Emission Photometry.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 01.12.2016
1-L1	Unit I : Research.
2-L2	Characteristics.
3- L3	types of research .
4-L4	steps in research.
5-L5	objectives of research.
6-L6	research report formatting.
7-L7	Typing.
8- P1	Welcoming of First year and Inauguration of Mathematics Association
9- L8	laboratory safety.

10- L9	intellectual property rights
11-L10	Unit II : Microscopy.
12-L11	Principles.
13-L12	types of light microscopes.
14-L13	bright field.
15-L14	dark field.
16-L15	phase contrast.
17- L16	fluorescence.
18- L17	scanning.
19- L18	micrometry.
20- L19	Electron microscopes.
21- L20	_____ - Allotting portion for Internal Test-I
	Internal Test I begins on 24.01.2017
22- L21	Types.
23- IT-1	Internal Test-I
24- L22	atomic force and magnetic force microscopes.
25- L23	Unit III : Centrifuge.
26- L24	_____ - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Types.
28- L26	Principles.
29- L27	applications.
30- P2	College level meeting/Cell function
31-L28	pH meter – types.
32-L29	Principles.
33-L30	applications.

34- L31	Colorimeter –principles.
35- L32	applications.
36- L33	Cryopreservation.
37- L34	its applications.
38- L35	Freezing.
39- L36	freeze drying microtomes.
40- L37	Cytotechniques.
41- L38	Unit IV : Chromatography.
42-P3	Department Seminar
43- L39	paper.
44- L40	thin layer .
45- L41	column .
46- L42	gas liquid chromatography.
47- L43	____ - Allotting portion for Internal Test-II
	Internal Test II begins on 24.02.2017
48- L44	affinity chromatography.
49-IT-II	Internal Test-II
50-L45	Electrophoresis.
51- L46	____ - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	paper.
53- L48	cellulose acetate – gel.
54- L49	immune electrophoresis.
55- L50	Blotting techniques.
56- L51	southern – northern – western.
57- L52	Radioactive counters .

58- L53	Autoradiography.
59-P4	College level meeting/ function
60- L54	labeling studies.
61- L55	Unit V : Spectrophotometer.
62- L56	Spectrofluorimeter.
63- L57	ESR.
64- L58	____ - Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	NMR Spectrophotometer.
66- L60	Autoradiography.
67-IT-III	Internal Test-III
68- L61	Radioactive counters .
69- L62	Flame Emission Photometry
70- L63	____ - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
71-MT	Model Testbegins on 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 “Research Methodology”
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CO1	understand some basic concepts of research and its methodologies
CO2	select and define appropriate research problem and parameters
CO3	To be able to describe the method of chromatography and its applications
CO4	The students will be able to describe the working mechanism of Microscopes.
CO5	The students will be able to write Research reports.
CO6	Know and understand the main uses of Radio Labelling
CO7	To be able to use all types of spectrosopes
CO8	Should be aware with Plagiarism
CO9	Familiar with all the instrument available in the Laboratory
Experimental Learning	
EL1	organize and conduct research (advanced project) in a more appropriate manner
EL2	Know the main principles and methods for surveying resource use
EL3	Be able to conduct a threat assessment for a site.
EL4	Use all available instruments in the field of Biology
Integrated Activity	
IA1	write a research report and thesis
IA2	Write a proposal for Research funding

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology (2014-2015)
Course Name	RESEARCH METHODOLOGY
Course Code	HZOE41
Class	II year
Semester	EVEN (December 2014- May 2015)
Staff Name	D.V.SHEEBA RAJAKUMARI.
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 promote , facilitate and influence the best possible standards about research
- To provide the technical and general knowledge necessary for component thesis writing
- The detailed study about research is carried in the present course

Syllabus

Unit I

Research – Characteristics – types of research – steps in research – objectives of research – research report formatting and typing – laboratory safety – intellectual property rights.

Unit II

Microscopy – principles – types of light microscopes – bright field – dark field – phase contrast – fluorescence – scanning – micrometry. Electron microscopes and types – atomic force and magnetic force microscopes.

Unit III

Centrifuge – types – principles and applications. PH meter – types – principles and applications. Colorimeter – principles and applications. Cryopreservation and its applications. Freezing and freeze drying microtomes. Cytotechniques.

Unit IV

Chromatography – paper – thin layer – column – gas liquid chromatography – affinity chromatography. Electrophoresis – paper – cellulose acetate – gel – immuno electrophoresis. Blotting techniques – southern – northern – western. Radioactive counters – autoradiography – labeling studies.

Unit V

Spectrophotometer spectrofluorimeter ESR NMR spectrophotometer – flame emission photometry.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 03.12.2014
1-L1	Syllabus discussion
2-L2	Introduction to Research Methodology
3- L3	Research – Characteristics
4-L4	Types of research
5-L5	Steps in research
6-L6	Objectives of research
7-L7	Research report formatting and typing
8- P1	Welcoming of First year and Inauguration of zoology Association
9- L8	Laboratory safety
10- L9	Intellectual property rights
11-L10	Microscopy
12-L11	Principles – Types of light microscopes
13-L12	Bright field
14-L13	Dark field
15-L14	Phase contrast - Allotting portion for Internal Test-I
	Internal Test I begins(19.01.2015)
16-L15	Fluorescence
17-IT-1	Internal Test-I
18-L16	Scanning – Micrometry
19-L17	Electron microscopes and types - Test Paper distribution and result analysis

	Entering Internal Test-I Marks into University portal
20-L18	Atomic force and Magnetic Force Microscopes.
21- L19	Centrifuge
22- P2	College level meeting/Cell function
23-L20	Types – Principles and Applications
24-L21	PH meter
25-L22	Types – principles and applications.
26-L23	Colorimeter- principles and applications.
27-L24	Cryopreservation and its applications
28-L25	Freezing and freeze drying microtomes. Cytotechniques.
29-L26	Chromatography
30-L27	Paper
31-L28	Thin layer
32-L29	Column
33-L30	Gas liquid chromatography
34- P3	Department Seminar
35-L31	Affinity chromatography
36-L32	Electrophoresis- Allotting portion for Internal Test-II
	Internal Test II begins(16.02.2015)
37- L33	Paper
38- IT-II	Internal Test-II
39-L34	Cellulose acetate
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Gel
42- L37	Immuno electrophoresis.
43- L38	Blotting techniques – southern – northern – western
44- P4	College level meeting/ function
45-L39	Radioactive counters
46-L40	Autoradiography
47-L41	Labeling studies.
48-L42	Spectrophotometer
49-L43	Spectrofluorimeter
50-L44	Allotting portion for Internal Test-III
	Internal Test III begins(16.03.2015)
51 L45	ESR NMR spectrophotometer
52- L46	Flame emission photometry.
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(016.04.2015)
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
CO1	Demonstrate knowledge of research processes
CO2	Perform literature reviews using print and online databases
CO3	Identify, explain, compare, and prepare the key elements of a research proposal/report
CO4	Describe sampling methods, measurement scales and instruments, and appropriate uses of each
CO5	Basics of animal biology and fish taxonomy
CO6	The importance of local processes for Institutional Review Board (IRB) review
Experimental Learning	
EL1	To do publish research articles

- # 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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Phil. Zoology
Course Name	Advances in Animal Bio Technology And Nano technology
Course Code	HZOC12
Class	I year (2014-2015)
Semester	Odd
Staff Name	P. Augustus Robince
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem	
Internal Test-3 Hrs	
Model Test-3 Hrs	
Dept. Meetings-2 Hrs	
College Meetings-2 Hrs	
Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To understand the techniques used in Gene manipulation
- To study the methodology of Gene Transformation
- To study the Genomics and Proteomics
- To understand the Nanotechnology and its uses

Syllabus

Unit I:

Cell dynamics, recombinant DNA technology, Introducing DNA into animal cells: Injection, electroporation, viral vectors Allitic exchange, vector less mode of gene transfer Tissue culture in biomedical and biochemical research; regulatory proteins, blood products vaccines and hormones.

Unit II:

Transgenic animals, fertilization and embryo transfer, foreign gene expressions -- IPM - Mapping and sequencing the Human genome, The human genome project & ethical, legal and social issues. Ethical issues in animal biotechnology – Genetically modified organisms, phylogenetics using mitogenomes.

Unit III:

Utility of Biotechnology and genetic engineering. Genomics and proteomics DNA fingerprinting – diagnostic and forensics -- Gene therapy, probes – monoclonal antibodies • detection to genetic diseases, DNA bar-coding of animals.

Unit IV:

Nanotechnology basics – Introduction to nanoworld, classification of nano materials, application ct nano crystals, nano factories, mechano chemistry, nano biosensors –Optical biosensors -- DNA sensors Quantum dots – application in biotechnology – Is nanotechnology bad or good?

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Unit V:

Nanotechnology in biomedical applications nanomedicines and drug delivery systems, health and environmental impacts of nanotechnology.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2014
1-L1	Unit I: Cell dynamics
2-L2	recombinant DNA technology
3- L3	Introducing DNA into animal cells
4-L4	Injection
5-L5	electrophoration
6-L6	viral vectors Allitic exchange
7-L7	vector less mode of gene transfer Tissue culture in biomedical and biochemical research
8- P1	Welcoming of First year and Inauguration of Mathematics Association
9- L8	regulatory proteins
10- L9	blood products vaccines
11-L10	hormones
12-L11	Unit II:Transgenic animals
13-L12	fertilization
14-L13	embryo transfer
15-L14	_____ - Allotting portion for Internal Test-I
	Internal Test I begins
16-L15	foreign gene expressions -- IPM
17-IT-1	Internal Test-I
18-L16	Mapping the Human Genome
19-L17	_____ - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal

20-L18	sequencing the Human genome
21- L19	The human genome project.
22- P2	College level meeting/Cell function
23-L20	Ethical issues
24-L21	legal issues
25-L22	social issues
26-L23	Ethical issues in animal biotechnology
27-L24	Genetically modified organisms
28-L25	phylogenetics using mitogenomes
29-L26	Unit III: Utility of Biotechnology
30-L27	Utility of genetic engineering
31-L28	Genomics and proteomics
32-L29	DNA fingerprinting
33-L30	diagnostic and forensics
34- P3	Department Seminar
35-L31	Gene therapy
36-L32	_____ - Allotting portion for Internal Test-II
	Internal Test II begins
37- L33	probes - monoclonal antibodies
38- IT-II	Internal Test-II
39-L34	detection to genetic diseases
40-L35	_____ - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	DNA bar-coding of animals
42- L37	Unit IV: Nanotechnology basics - Introduction to nanoworld, classification of nano materials, application of nano crystals,

43- L38	nano factories, mechano chemistry,
44- P4	College level meeting/ function
45-L39	nano biosensors
46-L40	optical biosensors
47-L41	DNA sensors Quantum dots - application in biotechnology
48-L42	Is nanotechnology bad or good?
49-L43	Unit V: Nanotechnology in biomedical applications
50-L44	_____ - Allotting portion for Internal Test-III
	Internal Test III begins
51 L45	nanomedicines
52- L46	drug delivery systems
53-IT-III	Internal Test-III
54-L47	health and environmental impacts of nanotechnology.
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 23.11.2018

Course Outcomes

Learning Outcomes	COs of the course “Advances in Animal Bio Technology And Nano technology”
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CO1	Studied all the techniques used in Gene manipulation
CO2	Familiar in the methodology of Gene Transformation
CO3	Explanation of Genomics and Proteomics
CO4	Understand the Nanotechnology
CO5	Determine the structure of different Nano Particles
CO6	Application of Nano Particles in Biology
CO7	Conclude the merits and demerits of Nano Particles
CO8	Future of Nano particle
CO9	Explain the uses of Nano Particles in Drug delivery
Experimental Learning	
EL1	Collect the material made up of Nanoparticles and Observe
EL2	To do Models of DNA and RNA
EL3	GD merits and demerits of Nano Particles
EL4	Collect information about GM Food
Integrated Activity	
IA1	Prepare a Model for carbon Nano tube
IA2	How Nano particles used in day-to-day life

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Phil Zoology
Course Name	RESEARCH METHODOLOGY
Course Code	HZOC11
Class	M.Phil (2014-2015)
Semester	ODD
Staff Name	Dr.M.Rajakumari
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- Overview of Research and its Methodologies .
- Students should know why educational research is undertaken, and the audiences that profit from research studies
- To be able to describe the method of chromatography and its applications
- Knowledge of the structure and function of the major organ systems, including the molecular, biochemical and cellular mechanisms for maintaining homeostasis
- Provide an introduction to what bioinformatics is and why it is important
- Provide an overview of the application areas of bioinformatics, with a focus on the topics that will be taught in the course

Syllabus

Unit I :

Sources of research data- methods of collection, analysis and interpretation. organization of research paper, web based literature survey, citation index, impact factor, copy right, plagiarism.

Unit II :

High Performance Liquid Chromatography (HPLC) and its applications; SOS PAGE and Gradient Gel Electrophoresis, separation of nucleic acids; Gel Documentation, Isoelectric focussing, Southern, Northern and Western blotting techniques; Polymerase Chain Reaction (PCR), Microscopy- SEM, TEM, Fluorescence.

Unit III :

Immunology: Radio Immuno Assay (RIA), ELISA & Hybridoma technology and their applications: Rapid Immunodiagnostic procedures - Microbiology; Colony Forming Unit (CFU); Evaluation of antimicrobial activity - Kirby- Bauer procedure; Minimal Inhibitory Concentration (MIC): Qualitative analysis of water; Most Probable Number (MPN) index and Membrane filter technique; Cultivation of anaerobic microorganisms: GasPak system and Minimal Inhibitory Concentration (MIC).

Unit IV :

Diversity indices; using of softwares for calculating Biodiversity methods.

Unit V :

Bioinformatics-definition: Biological databases; Sequence comparison; Multiple sequence alignment; Profiles, motifs and feature identification; Phylogenetic data analysis, Bioinformatics in genomes; Bioinformatics software.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2014
1-L1	Primary Data Collection Methods
2-L2	Quantitative Methods
3- L3	Qualitative Methods
4-L4	Secondary Data Collection Methods
5-L5	Data analysis and interpretation
6-L6	Organization of research paper
7-L7	Design and Development of a Process for Web-based Survey Research
8- P1	Welcoming of First year and Inauguration of Zoology Association
9- L8	Citation Indexing
10- L9	Web of Science database
11-L10	Limitations of WoS Data base
12-L11	Indian Citation Index (ICI)
13-L12	The impact factor
14-L13	Tools for Impact analysis
15-L14	Copy right, plagiarism.
16-L15	High Performance Liquid Chromatography (HPLC) and its applications
17- L16	SOS PAGE
18- L17	Gradient Gel Electrophoresis
19- L18	Separation of nucleic acids
20- L19	Gel Documentation
21- L20	Isoclectric focussing - Allotting portion for Internal Test-I
	Internal Test I begins
22- L21	Southern,Northern and Western blotting techniques
23- IT-1	Internal Test-I
24- L22	Polymerase Chain Reaction (PCR)
25- L23	Study of Transmission Electron Microscopy (TEM)
26- L24	Study of Scanning Electron Microscopy (SEM) - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Fluorescence
28- L26	Immunology
29- L27	Radio Immuno Assay (RIA)
30- P2	College level meeting/Cell function
31-L28	ELISA&Hybridoma technology and their applications
32-L29	Rapid Immunodiagnostic procedures
33-L30	Microbiology; Colony Forming Unit (CU)
34- L31	Evaluation of antimicrobial activity
35- L32	Kirby- Bauer procedure
36- L33	Minimal Inhibitory Concentration (MIC)
37- L34	Qualitative analysis of water
38- L35	Most Probable Number (MPN) index and Membrane filter technique
39- L36	Cultivation of anaerobic microorganisms
40- L37	GasPak system
41- L38	Minimal Inhibitory Concentration (MIC).

42-P3	Department Seminar
43- L39	Why quantify biodiversity?
44- L40	How do we measure biodiversity?
45- L41	Alpha diversity, Beta diversity, Gamma diversity,
46- L42	Describing Communities
47- L43	Biodiversity - Allotting portion for Internal Test-II
	Internal Test II begins
48- L44	Species Richness
49-IT-II	Internal Test-II
50-L45	Species diversity
51- L46	Diversity indices - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Simpson Diversity Index
53- L48	Shannon – Weiner Index
54- L49	Evenness
55- L50	What is bioinformatics?
56- L51	Why bioinformatics is necessary?
57- L52	Field of Bioinformatics
58- L53	Bioinformatics key areas
59-P4	College level meeting/ function
60- L54	Structural bioinformatics
61- L55	Basis of sequence alignment
62- L56	Scoring a sequence alignment
63- L57	Protein sequence alignment (DNA alignment)
64- L58	Biological databanks and databases - Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Primary and secondary Database
66- L60	Applications of Bioinformatics
67-IT-III	Internal Test-III
68- L61	Revision of Units I & II
69- L62	Revision of Units III & IV
70- L63	Revision of Unit V - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
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 “<RESEARCH METHODOLOGY>”
CO1	understand some basic concepts of research and its methodologies
CO2	select and define appropriate research problem and parameters
CO3	To be able to describe the method of chromatography and its applications
CO4	The students will be able to identify the cellular and molecular basis of immune responsiveness.
CO5	The students will be able to describe the roles of the immune system in both maintaining health and contributing to disease.
CO6	Know and understand the main principles and practices of collecting data in the field.
CO7	Locate and use the main databases at the NCBI and EBI resources
CO8	Know the difference between databases, tools, repositories and be able to use each one to extract specific information
CO9	Extract data from specific databases using accessions numbers, gene names etc.
Experimental Learning	
EL1	organize and conduct research (advanced project) in a more appropriate manner
EL2	Know the main principles and methods for surveying resource use
EL3	Be able to conduct a threat assessment for a site.
EL4	Use selected tools at NCBI and EBI to run simple analyses on genomic sequences
Integrated Activity	
IA1	write a research report and thesis
IA2	Design a model of Immunoglobulins

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Phil. Zoology
Course Name	SERICULTURE
Course Code	HZOO24
Class	M.Phil(2014-2015
Semester	EVEN
Staff Name	Dr.M.Rajakumari
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- Train the students in identifying the diseases and pests of the mulberry plant.
- It also involves giving students a thorough knowledge about the cultivation of mulberry, maintenance of the farm, seed technology, silkworm rearing and silk reeling.
- Students get to learn about the quality of various things like leaf, seed cocoon, commercial cocoon and fibre so that they can get maximum return when actually practiced.
- We get to learn about the various skills that are necessary for self employment in the mulberry and seed production.
- To develop highly qualified professional manpower in Silk and Sericulture sector
- In Sericulture the basic requirement lies on systematic quality based coaching and training
- To train and provide expert human resource to Silk industry and expected to bring direct benefits to Rural development and sericulture farming community.

Syllabus

Unit I :

Introduction – definition – Scope – State of the art of silk industries in china, Japan and India. Mulberry and Non mulberry silk Industry in India.

Mulberry silkworm races – classification on the basis of the origin and voltinism characteristics features. Seed organization – seed Cocoon production – silkworm egg production – pure, Hybrid.

Non mulberry silkworms – different species – habit and habitats: Food plants (a) Tasar food plants – terminal species – shorea robusta (b) Muga food plants – Listsea polyantha – Guercus sp, (c) Eri food plants – Castor, Tapioca.

Unit II :

Mulberry growth and nutrition. Importance of oil in mulberry cultivation – Sources of nutrients in soil – Role of essential elements in plant growth of Mulberry. Propagation (a) Seedlings – Methods of raising seedlings. (b) Saplings – selection of plants for cutting. (c) grafting. Selection of stock and scion – physiological features – grafting types – stem, root, ind bud techniques. (d) layering, types – techniques. Nursery raising, layout bed size – oil composition.

Mulberry Forms, bush, middlings and low trees, monocrop and mixed crop pattern. Suitable variety for cultivation – measuring. Planting system: Row and pit system – advantages and disadvantages – Intercultivation – Time and type of initial harvests.

Unit III :

Silkworm – Systematic position – Order Lepidoptera – Family Bombycidae, life history of Bolyx mori – morphology of egg, larva, pupa and adult. Morphology and anatomy of the organ systems in silkworm. Digestive system including mouth parts – excretory, respiratory, circulatory, muscular, nervous and reproductive systems – Silk gland structure silk proteins moulting and hormonal control of meta morphosis.

Rearing: Selection of model house, Rearing appliances, Disinfection; Types of disinfection – concentration of disinfectants – Selection of races for rearing Bievoltine and multivoltine their advantages and disadvantages. Incubation – influence of environmental conditions on egg development – black boxing. Chawki rearing: Brushing different types – loose eggs and sheet eggs. Cellular and mass brushing – Selection of leaf for brushing – Time of transportation and storage of leaf for Chawki worms – environmental conditions – leaf requirements – different Chawki rearing methods – Gox rearing – Cellular rearing – bed cleaning with neg – feeding schedule spacing – Symptoms and care during moulting periods. Late age rearing: Spacing – leaf requirements – environmental conditions – feeding and bed cleaning schedules – methods of rearing. Shelf shoot and floor rearing – advantages and disadvantages – Bed cleaning schedules: Mounting: Types of mountings – bamboo – plastic, evolving – rotary – bottle brush – advantages and disadvantages – Spinning environmental conditions for spinning. Harvesting of cocoons: Time of harvest – setting of cocoons – preservation, transportation of cocoons – leaf cocoon ratio – cost of cocoon production.

Unit IV :

/Diseases of Silkworm - Introduction and Classification of different types of Silkworm diseases, Protozoan diseases - pebrine - symptom - and mode of infection - prevention and control. Bacterial disease -- Flacherie- Symptoms -- Causative agents -- factors influencing Flacherie - Sources and mode of infection - prevention and control, viral diseases - grasserie - Symptoms mode of infection- defection, prevention and control Fungal diseases •

Muscardine - Symptoms of different types of fungal diseases -- Causative agents mode of infection -- Prevention and control. Aspergillus diseases symptoms - Causative agents • mode of infection -- prevention and control, General account of disinfection and relative efficiencies of different disinfections. /

/ Disease of mulberry: Classification of diseases of mulberry. Fungal diseases of

Mulberry and their occurrence - Symptoms and control, a) leaf spot, b) leaf rust, c) powdery mildew, d) Leaf blight, e) Root rot bacterial - viral and mycoplasmal diseases of mulberry • control measures.

Root knot nematode diseases of mulberry - its occurrence - Symptoms and control. Mineral deficiency Symptoms mulberry and reclamation, Fungicide formulations and method of applications.

Unit V :

Cocoon marketing - Cocoon markets - Transport of Cocoons -- Composition of cocoon -- Physical characters of Cocoon considered for commercial purposes -- Defective Cocoons.

Silk reeling: Stifling - Storage of Cocoons - Sorting of Cocoon -- Deflossing - Cocoon riddling - Cocoon mixing or blending - Cocoon boiling and brushing - Brushing - Reeling operations -- Reeling Appliances - Re-reeling - finishing - Raw silk Testing - Silk wastes.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 03.12.2014
1-L1	Introduction - Sericulture
2-L2	State of the art of silk industries in China, Japan and India
3- L3	Mulberry and Non Mulberry Silk Industry in India.
4-L4	Mulberry Silkworm races
5-L5	Classification on the basis of the origin and voltinism characteristic features
6-L6	Seed organization
7-L7	seed Cocoon production
8- P1	Zoology Association activities
9- L8	Silkworm egg production -- Pure, hybrid.
10- L9	Non mulberry silkworms -- different species - habit and habitats
11-L10	Food plants (a) Tasar food plants Terminalia species - <i>Shorea robusta</i>
12-L11	(b) Muga food plants - <i>Listsea polyantha</i> - <i>Guercus sp</i>
13-L12	. (c) Eri food plants - Castor, Tapioca.
14-L13	Mulberry growth and nutrition
15-L14	Importance of soil in Mulberry cultivation
16-L15	Sources of nutrients in soil
17- L16	Role of essential elements in plant growth of Mulberry
18- L17	Seedlings - Methods of raising seedlings
19- L18	Saplings - selection of plants for cutting
20- L19	Grafting: Selection of stock and scion physiological features - grafting types-stem. root, ind bud techniques
21- L20	layering: types - techniques. Nursery raising: layout: bed size - soil composition. - Allotting portion for Internal Test-I
	Internal Test I begins

22- L21	Mulberry Forms: bush, middlings and low trees, monocrop and mixed crop pattern
23- IT-1	Internal Test-I
24- L22	Suitable variety for cultivation - manuring
25- L23	Planting system: Row and pit system - advantages and disadvantages
26- L24	Intercultivation - Time and type of initial harvests - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Silk worm -- Systematic position - Order Lepidoptera - Family Bombycidae. Life history of <i>Bombyx mori</i> - morphology of egg, larva, pupa and adult
28- L26	Morphology and anatomy of the organ systems in silkworm
29- L27	Digestive System including mouth parts - excretory, respiratory, circulatory, muscular, nervous and reproductive Systems
30- P2	College level meeting/Cell function
31-L28	Silk gland structure silk proteins. moulting and hormonal control of metamorphosis.
32-L29	Rearing: Selection of site model house, Rearing appliances
33-L30	Disinfection: Types of disinfection - concentration of disinfectants
34- L31	Selection of races for rearing Bivoltine and multivoltine their advantages and disadvantages
35- L32	Incubation - influence of environmental conditions on egg development - black boxing
36- L33	Chawki rearing: Brushing different types-• loose eggs and sheet eggs
37- L34	Late age rearing: Spacing- leaf requirement- environmental conditions -- feeding and cleaning schedules - methods of rearing: Shelf, shoot and floor rearing- advantage and disadvantage
38- L35	Bed cleaning schedules. Mounting: Types of mountages - bamboo - plastic, evolving - rotary- bottle brush- advantages and disadvantages
39- L36	Spinning- environmental conditions for spinning.
40- L37	Harvesting of cocoons; Time of harvest - Sorting of cocoons
41- L38	Preservation. transportation of cocoons - leaf cocoon ratio - cost of cocoon production
42-P3	Department Seminar
43- L39	Introduction and Classification of different types of Silkworm diseases
44- L40	Protozoan diseases - pebrine - symptom - and mode of infection - prevention and control.
45- L41	Bacterial disease -- Flacherie- Symptoms -- Causative agents -- factors influencing Flacherie
46- L42	Sources and mode of infection - prevention and control, viral diseases - grasserie
47- L43	Symptoms mode of infection - Allotting portion for Internal Test-II
	Internal Test II begins
48- L44	Fungal diseases - Muscardine - Symptoms of different types of fungal diseases
49-IT-II	Internal Test-II
50-L45	Causative agents - mode of infection -- prevention and control
51- L46	General account of disinfection and relative efficiencies of different disinfections. - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Disease of mulberry: Classification of diseases of mulberry

53- L48	Fungal diseases of Mulberry and their occurrence
54- L49	Symptoms and control, a) leaf spot, b) leaf rust, c) powdery mildew
55- L50	Symptoms and control, d) Leaf blight, e) Root rot bacterial
56- L51	Viral and mycoplasmal diseases of mulberry control measures.
57- L52	Root knot nematode diseases of mulberry - its occurrence
58- L53	Mineral deficiency Symptoms mulberry and reclamation
59-P4	College level meeting/ function
60- L54	Fungicide formulations and method of applications.
61- L55	Cocoon marketing - Cocoon markets - Transport of Cocoons -- Compositin of cocoon
62- L56	Physical characters of Cocoon considered for commercial purposes
63- L57	Defective Cocoons.
64- L58	Silk reeling: Stifling - Storage of Cocoons - Sorting of Cocoon -- Deflossing - Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Cocoon riddling - Cocoon mixing or blending - Cocoon boiling and brushing - Brushing
66- L60	Reeling operations -- Reeling Appliances - Re-reeling - finishing - Raw silk Testing - Silk wastes.
67-IT-III	Internal Test-III
68- L61	Revision of Unit I & II
69- L62	Revision of Unit III & IV
70- L63	Revision of Unit V - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
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 “<SERICULTURE>”
CO1	Learned about Indian Silk Industry
CO2	Understood the process of Mulberry cultivation
CO3	Watch the life cycle of silkworm stage by stage
CO4	Practice the rearing methods
CO5	Select the rear model
CO6	Learned about silkworm diseases
CO7	Learned about Mulberry plants infections
Experimental Learning	
EL1	To develop an expert manpower to handle the own sericulture units/ entrepreneurship/ Corporate sector units.
EL2	To give scientific knowledge about mulberry cultivation , silkworm rearing techniques to the students.
EL3	To make the student aware about Soil to Silk concept, Sericulture Extension and innovative technology /techniques etc.
EL4	To train the students in compressive Silk production techniques .
Integrated Activity	
IA1	Form a Mulberry Garden
IA2	Prepare a silkworm rearing house

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Developmental Zoology, Ecology, Animal Physiology and Evolution
Course Code	GAZO21
Class	I year (December 2015 to April 2016)
Semester	Even
Staff Name	Dr. D. Paramanatha Swami Doss
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To understand the sequential changes from cellular grade of organization to organ grade of organization in the development of multicellular organisms.
- To study the interaction and the interdependence among environmental factors and living organisms.
- To understand the functional significance of various organs and organ systems of animals.
- To discern the evolutionary significance of the animals, origin of species, effects of mutation.

Syllabus

MSU/2012-15/UG-Colleges/Part-III (B.Sc. Zoology) Semester-II/Allied - II

DEVELOPMENTAL ZOOLOGY, ECOLOGY, ANIMAL PHYSIOLOGY AND EVOLUTION

UNIT I: Early development in Man: Structure of sperm and ovum; Fertilization – Cleavage, Morula, Blastocyst, Implantation and gastrulation – Fate map. Placenta in mammals – types and functions. Test tube babies – Twins – Amniocentesis.

Nuclear Transplantation in *Acetabularia*.

UNIT II: Abiotic factors: Biological effects of Temperature and Light; Biotic factors: Symbiosis, Commensalism, Mutualism, Parasitism, Prey-predator Relationship.

Adaptations: Desert adaptations.

Community: Ecosystem – Structure and dynamics of a pond.

UNIT III: Nutrition: Food constituents – Carbohydrates, Proteins and Fats.

Digestion: Role of enzymes in carbohydrate, protein and fat digestion.

Absorption: Absorption of digested food.

Metabolism: Carbohydrate metabolism: Glycogenesis, Glycogenolysis, Glycolysis.

Respiration: Transport and exchange of oxygen and carbon dioxide. Haemoglobin.

UNIT IV: Excretion: Structure of Nephron – Urine formation – Dialysis Nervous Co-ordination: Structure and types of neurons – Nerve impulse, conduction of nerve impulse through neuron and synapse.

Reproduction: Structure of human testis and ovary, Graffian follicle, Menstrual cycle and its hormonal control.

UNIT V: Theories of Evolution: Darwinism, Mutation theory of De Vries.

Adaptive radiation in birds.

Mimicry and Colouration.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 02.12.2015
1-L1	UNIT I: Introduction about the Developmental Zoology.
2-L2	Early development in Man: Structure of sperm and ovum.
3- L3	Fertilization – Events of fertilization.
4-L4	Cleavage – formation of 2 cell stage, 4 cell stage, 8 cell stage and so on.
5-L5	Morula – structure formation blastocoel, division micromeres and macromeres.
6-L6	Implantation – structure of uterus, endometrium, days after fertilization etc.
7-L7	Gastrulation – Formation of endoderm, formation of mesoderm and formation of ectoderm.
8- P1	Zoology Association Meeting
9- L8	Structure of gastrula – Neural plate, notochord, archenteron, dorsal lip of blastopore.
10- L9	Fate map – predetermined organ forming areas.
11-L10	Placenta in mammals – Characteristics – Functions.
12-L11	Placenta – Classification – based of foetal membrane – based on the distribution of villi. Classification – based on nature of contact – based on the types of tissue involved.

13-L12	Test tube baby – procedure – Fruity and Gift method.
14-L13	Twins – importance of twins study – Identical, Siamese, Fraternal twins.
15-L14	Amniocentesis – Procedure - Allotting portion for Internal Test-I
	Internal Test I begins
16-L15	Nuclear Transplantation in <i>Acetabularia</i> – the importance of nucleus by different experiments.
17-IT-1	Internal Test-I (25.01.2016)
18-L16	Unit II: Introduction about Ecology, Abiotic and biotic factors
19-L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Temperature – ranges – thermal stratification – biological effects and adaptations.
21- L19	Light – source – spectrum – light on water – biological effects.
22- P2	College level meeting/Cell function
23-L20	Animal relationships – Symbiosis with examples, Commensalism with examples.
24-L21	Mutualism with examples, parasitism with examples.
25-L22	Prey – predation relationship –types of parasites - parasitic adaptations.
26-L23	Desert adaptations – Characteristics of desert – adaptations – water conservation, water getting, tolerance of heat and protection.
27-L24	Ecosystem – abiotic and biotic factors of a pond ecosystem.
28-L25	Food chain – Food web – Energy flow – Pyramids – Ecological succession
29-L26	UNIT III: Introduction about animal physiology.
30-L27	Nutrition: Food constituents – Carbohydrates, Proteins and Lipids.
31-L28	Digestion: Role of enzymes in carbohydrate digestion.
32-L29	Role of enzymes in protein and lipid digestion.
33-L30	Absorption: Structure of Intestinal Villi - Absorption of carbohydrates, proteins and lipids.
34- P3	Department Seminar
35-L31	Metabolism: Glycogenesis, Glycogenolysis.
36-L32	Glycolysis – steps – the role of enzymes.
	Internal Test II begins
37- L33	Respiration: Transport and exchange of oxygen and carbon dioxide - Chloride shift.
38- IT-II	Internal Test-II (22.02.2016)
39-L34	Haemoglobin – Structure and importance.
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Excretion: Structure of Nephron - Allotting portion for Internal Test-II
42- L37	Urine formation – ultrafiltration, reabsorption and secretion – Dialysis.
43- L38	Structure of neurons – types of neurons – nerve impulse.
44- P4	College level meeting/ function
45-L39	Conduction of nerve impulse through neuron and synapse.
46-L40	Structure of human testis and ovary – Graafian follicle
47-L41	Menstrual cycle – Hormonal control of menstrual cycle.
48-L42	Unit V: Introduction about evolution
49-L43	Theories of Darwin.
50-L44	Allotting portion for Internal Test-III

	Internal Test III begins
51 L45	Mutation theory of De Vries.
52- L46	Adaptive radiation in birds.
53-IT-III	Internal Test-III (28.03.2016)
54-L47	Mimicry and colouration – types of colouration – colouration and evolution.
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 “Developmental Zoology, Ecology, Animal Physiology and Evolution”
CO1	Able to know the construction of fate map from natural markings.
CO2	Describe the classification and functions of placenta.
CO3	Learn the importance of abiotic and biotic factors in the ecosystem.
CO4	Understand the importance of respiratory pigments.
CO5	Able to explain the structure of testis and ovary.
CO6	Aware about the hormonal control of menstrual cycle.
Experimental Learning	
EL1	Study the types of placenta with the help of museum specimens.
EL2	Construct the model pond ecosystem and to study the interaction of abiotic and biotic factors.
EL3	Study the concept of batesian mimicry by comparing the Common cuckoo and shikra

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Animal Biotechnology
Course Code	GMZO52
Class	III year (June 2015 to November 2015)
Semester	Odd
Staff Name	Dr. D. Paramanatha Swami Doss
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- The course is designed to give a perspective on recent advances in Animal Biotechnology.
- To familiarize the different approaches to generate transgenic animals for various applications.
- To promote knowledge about the blotting techniques.
- To understand the fundamental concepts of animal cell culture, and its importance.

Syllabus

ANIMAL BIOTECHNOLOGY

Unit – I

Origin, History, Scope and importance biotechnology Basic concepts of Genetic Engineering Restriction enzymes and modification systems.

Cloning Vectors: Bacterial plasmid vector (pBR322, Plasmid); Bacteriophage vector (Lambda and M13) Plant Viral Vector Animal Viral Vector (SV40).

Unit – II

Gene Cloning: DNA library, Integration of DNA fragments in to the vector, Introduction of recombinant gene into the host cell – Prokaryotic cells (Transformation, Liposome mediated

gene transfer, Electrophoration, Particle bombardment gun); Screening (Selection) of recombinants – (Direct selection, Insertion selection and Blue – White selection)
Hybridization technique – Blotting techniques (Southern, Northern, Western)

Unit – III

Animal Cell and Tissue Culture: Introduction and history

Cell types: Cell types selection; Requirements for animal cell culture – Substrate, liquid media and gases;

Cell culture techniques: Cell culture initiation preparation sterilization of substrates, media isolation of explants – disaggregation of explants; subculture and prevention of contamination.

Cell lines: Evolution of cell lines and their maintenance; large scale culture of cell lines monolayer culture.

Unit –IV

Organ culture: Techniques, advantages, applications and limitation Animal (somatic) cell fusion.

Hybridoma Technology and monoclonal antibody production stem cell culture: Embryonic stem cell culture, Methods to produce differentiated cells, application of stem cells, their maintenance their characteristics and Human embryonic stem cell research.

DNA Sequencing: Molecular markers and their applications (RFLP, RAPD) Animal bioreactors and Artificial skin.

Unit – V

Transgenic Animal Technology: Introduction and importance of transgenesis Dolly, Application of transgenic animals. Gene knockout - Bioethics: Biosafety and Patenting of Biotech Products - Genomics: Introduction, Genomic Sequencing projects, Types of genomics and methods of gene sequencing.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2015
1-L1	Unit – I: History, Scope and importance biotechnology.
2-L2	Basic concepts of Genetic Engineering.
3- L3	Restriction enzymes – Type 1 and Type 2 Restriction Endonucleases.
4-L4	Modification systems -
5-L5	Structure and importance of Bacterial plasmid vector (pBR322, Plasmid).
6-L6	Cloning vector - Bacteriophage vector (Lambda and M13).
7-L7	Plant Viral Vector Animal Viral Vector (SV40).
8- P1	Welcoming of First year and Inauguration of Zoology Association

9- L8	Visit to Biotechnology lab.
10- L9	Unit – II – General introduction about gene cloning.
11-L10	DNA Library – creating a DNA library – cDNA libraries.
12-L11	Integration of DNA fragments in to the vector – Blind end ligation – Cohesive end ligation – Homopolymer tailing.
13-L12	Introduction of recombinant gene into the host cell – Transformation, Transduction, Transfection, Microinjection, Liposome fusion.
14-L13	Transformation, Liposome mediated gene transfer, Electrophoration, Particle bombardment gun.
15-L14	Allotting portion for Internal Test-I
	Internal Test I begins
16-L15	Screening (Selection) of recombinants – (Direct selection, Insertion selection and Blue – White selection).
17-IT-1	Internal Test-I (20.07.2015)
18-L16	Hybridization technique – Colony hybridization – Plaque Lift method.
19-L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Blotting techniques (Southern, Northern, Western).
21- L19	Unit – III - Animal Cell and Tissue Culture: Introduction and history
22- P2	College level meeting/Cell function
23-L20	Cell types: Cell types selection; Requirements for animal cell culture – Substrate, liquid media and gases.
24-L21	Cell culture initiation preparation sterilization of substrates, media isolation of explants.
25-L22	Disaggregation of explants; subculture and prevention of contamination.
26-L23	Evolution of cell lines and their maintenance.
27-L24	Large scale culture of cell lines monolayer culture.
28-L25	Unit –IV Organ culture: General introduction.
29-L26	Organ culture – Techniques – Plasma clot – Agar gel – Liquid gel – Whole embryo culture.
30-L27	Organ culture - advantages, applications and limitation Animal (somatic) cell fusion.
31-L28	Production of hybridoma – isolation of B-lymphocytes, somatic cell fusion, selection of hybrids etc.
32-L29	Production of monoclonal antibodies – in vivo method – suspended cell culture – immobilized cell reactors – applications.
33-L30	Embryonic stem cell culture, Methods to produce differentiated cells, application of stem cells.
34- P3	Department Seminar
35-L31	Maintenance and characteristics and Human embryonic stem cell.
36-L32	Molecular Markers and their types Allotting portion for Internal Test-II
	Internal Test II begins
37- L33	Restriction Fragments Length Polymorphism (RFLP) – Steps – Applications.
38- IT-II	Internal Test-II (31.08.2015)
39-L34	Random Amplifies Ploymorphic DNA (RAPDs) – Steps – Analysis – Advantages.
40-L35	Revision - Test Paper distribution and result analysis

	Entering Internal Test-II Marks into University portal
41-L36	Animal bioreactors – selection of microorganism –modification – preparation – inoculation – isolation of product.
42- L37	Artificial skin.
43- L38	Unit – V - Transgenic Animal Technology – General introduction
44- P4	College level meeting/ function
45-L39	Introduction and importance of transgenesis - Dolly
46-L40	Application of transgenic animals.
47-L41	Gene knockout – steps and uses.
48-L42	Bioethics – Needs – Ethical implications – Keeping.
49-L43	Biosafety and Patenting of Biotech Products – persistence of antibiotic resistance gene – disease epidemics – inactivation of genes.
50-L44	Genomics: Introduction Allotting portion for Internal Test-III
	Internal Test III begins
51 L45	Genomic Sequencing projects – Complicated genome projects.
52- L46	Human Genome Projects – Goals of HGP – Techniques.
53-IT-III	Internal Test-III (05.10.2015)
54-L47	Types of genomics and methods of gene sequencing.
55-L48	Revision 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 “Animal Biotechnology”
CO1	Understand the scope and importance of animal biotechnology.
CO2	Know about the structure and functions of cloning vectors.
CO3	Describe the applications of recombinant DNA technology.
CO4	Understand the basic principles and techniques in genetic manipulation and genetic engineering.
CO5	Gain knowledge about the techniques and applications of organ culture.
CO6	Describe the production of transgenic Cattle, pigs, sheep etc
CO7	Know the concept of PCR, DNA sequencing and DNA fingerprinting.
CO8	Understand the basic concepts of bioethics and patenting.
CO9	Identify the methods to produce differentiated cells and application of stem cells.
Experimental Learning	
EL1	Visit to biotechnology lab to study PCR and gene sequencing.
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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	IMMUNOLOGY & MICROBIOLOGY
Course Code	SMZO62
Class	III year (2015-2016)
Semester	Even
Staff Name	Dr.Jansi Rani
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- To study the immune system and their role of our body..
- To study about Salient features of antigen- antibody reaction.
- To discuss about Humoral immune response - primary & secondary response
- To study the History & Scope of microbiology
- To learned about Industrial microbiology : production of Antibiotic penicillin.

Syllabus

UNIT I

History and Scope of Immunology.

Immunity-Type of Immunity - Innate & acquired, passive & active.

Lymphoid organs –primary & secondary (Thymus, Bone marrow, Bursa of fabricius , Spleen, Tonsil, Lymph node, Peyer's patches) – Structure and Functions.

(15L)

UNIT II

Immunoglobulin-Structure, Function, Biological properties of Ig classes. Interaction of Antigen and antibody.

Salient features of antigen- antibody reaction. Types of antigen-antibody reaction – Agglutination, Precipitation, Opsonization, Cytolysis.

(15L)

UNIT III

Immune response-Lymphocyte as unit of immune system, stem cells - Structure and lineage, T cells, B cells & Macrophages.

Humoral immune response - primary & secondary responses - B cell activation. Cell - Mediated immune response - Type of T cells & functions.

Tumour immunology.

(15L)

UNIT IV

Introduction : History & Scope of microbiology. General structure of microbes (Bacteria, virus).

Bacterial growth : Culture media & selective media; Continuous & batch culture techniques, growth curve.

(14L)

UNIT V

Food microbiology :Food poisoning ; Food spoilage & preservation.

Industrial microbiology : production of Antibiotic penicillin.

Soil microbiology : Role of soil microbes in N₂ fixation.

Medical microbiology : Diseases caused by bacteria in different systems of man as given below :

Dermal – Streptococcal inflammation : - Tuberculosis;

Gastro-intestinal-dysentery:Reproductive – Gonorrhoea.

Viral diseases with reference to causative organisms, symptoms, impact on the host & control measures, AIDS , Rabies, Chicken pox, Measles, Influenza & polio.

(16L)

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 07.12.2017
1-L1	History and Scope of Immunology.
2-L2	Immunity-Type of Immunity
3- L3	Immunity-Innate & acquired
4-L4	Immunity-passive & active.
5-L5	Lymphoid organs –primary
6-L6	Lymphoid organs – secondary

7-L7	Structure and Functions–Thymus
8- P1	Zoology Association activities
9- L8	Structure and Functions - Bone marrow
10- L9	Structure and Functions - Bursa of fabricius
11-L10	Structure and Functions - Spleen
12-L11	Structure and Functions - Tonsil
13-L12	Structure and Functions - Lymph node
14-L13	Structure and Functions - Peyer's patches)
15-L14	Immunoglobulin-Structure
16-L15	Immunoglobulin- Function
17- L16	Biological properties of Ig classes
18- L17	Interaction of Antigen
19- L18	Interaction of antibody.
20- L19	Salient features of antigen-
21- L20	Antibody reaction. - Allotting portion for Internal Test-I
	Internal Test I begins
22- L21	Types of antigen
23- IT-1	Internal Test-I
24- L22	Antibody reaction
25- L23	Agglutination, Precipitation
26- L24	Opsonization, Cytolysis.- Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Immune response
28- L26	Lymphocyte as unit of immune system
29- L27	Stem cells
30- P2	College level meeting/Cell function
31-L28	Structure and lineage - T cells
32-L29	Structure and lineage - B cells & Macrophages.
33-L30	Humoral immune response
34- L31	Primary & secondary responses
35- L32	B cell activation.
36- L33	Cell - Mediated immune response.
37- L34	Type of T cells
38- L35	Functions of T cells
39- L36	Tumour immunology.
40- L37	Introduction : Microbiology
41- L38	History of microbiology
42-P3	Department Seminar
43- L39	Scope of microbiology
44- L40	General structure of microbes -Bacteria
45- L41	General structure of microbes -Virus.
46- L42	Bacterial growth : Culture media
47- L43	Bacterial growth :Selective media - Allotting portion for Internal Test-II
	Internal Test II begins
48- L44	Continuous & batch culture techniques
49-IT-II	Internal Test-II
50-L45	Bacterial growth :Growth curve
51- L46	Food microbiology - Test Paper distribution and result analysis

	Entering Internal Test-II Marks into University portal
52- L47	Food poisoning
53- L48	Food spoilage & preservation.
54- L49	Industrial microbiology
55- L50	Production of Antibiotic penicillin
56- L51	Soil microbiology
57- L52	Role of soil microbes in N ₂ fixation
58- L53	Medical microbiology
59-P4	College level meeting/ function
60- L54	Diseases caused by bacteria in different systems of man - Dermal
61- L55	Diseases caused by bacteria in different systems of man – Streptococcal inflammation
62- L56	Diseases caused by bacteria in different systems of man - Tuberculosis
63- L57	Gastro-intestinal-dysentery:
64- L58	Reproductive – Gonorrhoea- Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Viral diseases with reference to causative organisms, symptoms,
66- L60	Impact on the host & control measures, AIDS , Rabies, Chicken pox, Measles, Influenza & polio.
67-IT-III	Internal Test-III
68- L61	Revision of I & II units
69- L62	Revision of III & IV units
70- L63	Revision of Unit V - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
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 “<IMMUNOLOGY & MICROBIOLOGY>”
CO1	The students will be able to identify the cellular and molecular basis of immune responsiveness.
CO2	The students will be able to describe the roles of the immune system in both maintaining health and contributing to disease.
CO3	The students will be able to describe immunological response and how it is triggered and regulated.
CO4	The students will be able to demonstrate a capacity for problem-solving about immune responsiveness.
CO5	The students will be able to transfer knowledge of immunology into clinical decision-making through case studies presented in class.
CO6	Understand the rationale in medium formulation & design for

	microbial fermentation, sterilization of medium and air
CO7	Discuss Microbial contamination/product spoilage and antimicrobial preservation of pharmaceutical formulations during production and in products
CO8	Understand various plant microbes interactions especially rhizosphere, phyllosphere and mycorrhizae and their applications especially the biofertilizers and their production techniques
CO9	Discuss the biosynthesis and the degradation pathways involved.
Experimental Learning	
EL1	Knowledge of the structure and function of the major organ systems, including the molecular, biochemical and cellular mechanisms for maintaining homeostasis
EL2	Knowledge of the pathogenesis of diseases, interventions for effective treatment, and mechanisms of health maintenance to prevent disease
EL3	A commitment to lifelong learning and independently seeking new knowledge and skills in their own recognized areas of learning deficit
EL4	Demonstrate a knowledge and understanding of microbiological assays of growth promoting and growth inhibiting substances.
Integrated Activity	
IA1	Provide students with in-depth training on the conduct and management of research from inception to completion using a wide range of techniques.
IA2	Enable students to acquire expertise in the use and application of the methods of data collection and analysis.

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 Zoology

COURSE ACADEMIC PLAN (2015-2016)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Poultry Science
Course Code	B32B5F
Class	I year (2015-2016)
Semester	Even
Staff Name	Dr.(Mrs)E EzhilmathiSophia,.
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; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To conservation of resources via the recycling of waste material and the recoveries of more valuable products

Syllabus

UNIT I

Gene Cloning: the basic steps, types of restriction enzymes, Lipases-linkers and adaptors, DNA, transformation, selection of recombinants. Hybridization techniques, chemical synthesis of oligonucleotides. RFLP, PCR and DNA sequencing techniques.

Vectors

UNIT II

Plasmid biology: cloning vector based on pBR322 and bacteriophage. Cloning vector for yeast. Cloning vector for Agrobacterium twnefaciens. Cloning vector for mammalin cells. Simian virus 40 – Gene transfer technology: Particle bombardment, Micro injection techniques.

Poultry manure – Volume, composition and values. Nutritional content of eggs. Management of chicks, growers, layers and broilers. Lighting for chicks, growers, layers and broilers.

Summer and winter management. Debarking – Forced moulting

UNIT III Animal Biotechnology

Cell culture: Organ Culture, whole embryo culture, Embryo transfer- in-vitro fertilization (IVF) technology, Dolly-in vitro fertilization and embryo transfer in human. Transgenic animals. Human gen therapy. Cryobiology.

UNIT IV Microbial Biotechnology

Fermentation: Bioreactor. Microbial products: primary and Secondary Metabolites. Protein Engineering. Bioremediation of Hydrocarbons industrial wastes and heavy metals. Single cell protein Biopolymers, Bio pesticides and Bio fertilizers Xenobiotics, bio-leaching, bio-mining and bio fuels.

UNIT V Medical biotechnology

Drug Development: Production of pharmaceuticals by gentian; engineered cells (hormones, interferon's); microbial transformation for production of important pharmaceuticals (steroids and semi-synthetic antibiotics); drug design and drug targeting. Diagnostic kit development for micro analysis.

UNIT VI Nanobiotechnology

Nanobiotechnology: a brief history of the super small; introduction to nanofabrication, Nanolithography Nanobiotechnology, nanotunes and buckyballs; application of Nanobiotechnology: Drug delivery, drug discovery; health Risks and concerns of Nanobiotechnology.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2015
1-L1	Gene Cloning: the basic steps, types of restriction enzymes,
2-L2	Lipases-linkers and adaptors, Vectors
3- L3	DNA, transformation,
4-L4	selection of recombinants
5-L5	Hybridization techniques,
6-L6	chemical synthesis of
7-L7	Californian cages – management of cage birds
8- P1	Welcoming of First year and Inauguration of Zoology Association
9- L8	ologonucleotides. RFLP, PCR and DNA sequencing techniques.
10- L9	Plasmid biology:
11-L10	cloning vector based on pBR322 and bacteriophage.
12-L11	Cloning vector for yeast. Cloning vector for Agrobacterium twenefaciens. Cloning vector for mammalin cells.
13-L12	Simian virus 40 – Gene transfer technology: Particle bombardment, Micro injection techniques.
14-L13	Poultry manure – Volume, composition and values. Nutritional content of eggs. Management of chicks, growers, layers and broilers. Lighting for chicks,
15-L14	Allotting portion for Internal Test-I
	Internal Test I begins 30.07.2015
16-L15	growers, layers and broilers.

17-IT-1	Internal Test-I
18-L16	Summer and winter management. Debarking – Forced moulting
19-L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Organ Culture
21- L19	Cell culture:
22- P2	College level meeting/Cell function
23-L20	whole embryo culture, Embryo transfer- in-vitro fertilization (IVF) technology,
24-L21	Dolly- in vitro fertilization and embryo transfer in human. Transgenic animals. Human gen therapy.
25-L22	Cryobiology.
26-L23	Fermentation: Bioreactor. Microbial products: primary and Secondary Metabolites.
27-L24	Protein Engineering. Bioremediation of Hydrocarbons industrial wastes and heavy metals.
28-L25	Single cell protein Biopolymers, Bio pesticides and Bio fertilizers Xenobiotics,
29-L26	bio-leaching, bio-mining and bio fuels.
30-L27	Drug Development
31-L28	Production of pharmaceuticals by gentian; engineered cells (hormones, interferon's
32-L29	microbial transformation for production of important pharmaceuticals (steroids and semi-synthetic antibiotics);
33-L30	Nanobiotechnology:
34- P3	Department Seminar
35-L31	brief history of the super small; introduction to nanofabrication,.
36-L32	Allotting portion for Internal Test-II
	Internal Test II begins 18.08.2015
37- L33	Nanolithography Nanobiotechnology,
38- IT-II	Internal Test-II
39-L34	application of
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Nanobiotechnology: Drug delivery, drug discovery;
42- L37	Nanobiotechnology:
43- L38	Drug delivery,
44- P4	College level meeting/ function
45-L39	drug discovery
46-L40	health Risks
47-L41	concerns of Nanobiotechnology
48-L42	health Risks and concerns of Nanobiotechnology
49-L43	nanotunes and
50-L44	Allotting portion for Internal Test-III
	Internal Test III begins 15.09.2015
51 L45	buckyballs;
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 24.10.2015
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 31.10.2015

Course Outcomes

Learning Outcomes	
CO1	Familiarization with biological database
CO2	Principles and procedure on genetic selection of fish
CO3	Biotechnological approach in genetic studies in fishes
CO4	Studies of new techniques of gene manipulation
CO5	Knowledge on biotechnological tools in aquaculture
CO6	Role of genetics in species identification
Experimental Learning	
EL1	To do working models to explain C DNA
Integrated Activity	
IA1	Prepare chart for bio mining
IA2	Prepare chart for bio fuel

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- # 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 Zoology

COURSE ACADEMIC PLAN (2015-2016)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Poultry Science
Course Code	B32B5F
Class	I year (2015-2016)
Semester	Even
Staff Name	Dr.(Mrs)E EzhilmathiSophia,.
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 conservation of resources via the recycling of waste material and the recoveries of more valuable products

Syllabus

UNIT I

Gene Cloning: the basic steps, types of restriction enzymes, Lipases-linkers and adaptors, DNA, transformation, selection of recombinants. Hybridization techniques, chemical synthesis of oligonucleotides. RFLP, PCR and DNA sequencing techniques.

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Summer and winter management. Debarking – Forced moulting

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Cell culture: Organ Culture, whole embryo culture, Embryo transfer- in-vitro fertilization (IVF) technology, Dolly-in vitro fertilization and embryo transfer in human. Transgenic animals. Human gen therapy. Cryobiology.

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Fermentation: Bioreactor. Microbial products: primary and Secondary Metabolites. Protein Engineering. Bioremediation of Hydrocarbons industrial wastes and heavy metals. Single cell protein Biopolymers, Bio pesticides and Bio fertilizers Xenobiotics, bio-leaching, bio-mining and bio fuels.

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Nanobiotechnology: a brief history of the super small; introduction to nanofabrication, Nanolithography Nanobiotechnology, nanotunes and buckyballs; application of Nanobiotechnology: Drug delivery, drug discovery; health Risks and concerns of Nanobiotechnology.

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54-L47	Revision
55-L48	Test Paper distribution and result analysis

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Course Outcomes

Learning Outcomes	
CO1	Familiarization with biological database
CO2	Principles and procedure on genetic selection of fish
CO3	Biotechnological approach in genetic studies in fishes
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Experimental Learning	
EL1	To do working models to explain C DNA
Integrated Activity	
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HOD Signature

Staff Signature

Principal

St. John's College, Palayamkottai

Department of Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Developmental Biology
Course Code	GMZO21
Class	I year (December 2015 to April 2016)
Semester	Even
Staff Name	Dr. D. Paramanatha Swami Doss
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To understand the sequential changes from cellular grade of organization to organ grade of organization in the development of multicellular organisms.

Syllabus

MSU/2012-13/UG-Colleges/Part-III (B.Sc. Zoology) Semester-II/Core-3

DEVELOPMENTAL ZOOLOGY

Unit I: Definition and scope of developmental zoology – Gametogenesis – Spermatogenesis – Oogenesis – Vitellogenesis – Structure of sperm and egg of chick – Fertilization: Pre and post fertilization events – significances; Parthenogenesis

Unit II: Cleavage in chick – Fate map of chick – Gastrulation in Chick. Manipulations of reproduction in Human: Infertility (male and female) – In vitro Fertilization – Test tube babies – Amniocentesis.

Unit III: Organogenesis: Development of Brain and Heart in Chick

Organizer: Primary and Secondary Organizers.

Morphogenetic fields and gradient hypothesis.

Unit IV: Hormonal control of Amphibian metamorphosis.

Extra – embryonic membranes in Chick – Developmental, Types and Physiology.

Placenta in Mammals – Types and Physiology.

Unit V: Nuclear Transplantation in *Acetabularia* – Regeneration in *Planaria*.

Birth control: Contraceptive devices: Surgical method – Hormonal method – Physical barriers – IUCD.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 02.12.2015
1-L1	Unit I: General introduction about the Developmental Zoology.
2-L2	The programme of development – Historical thoughts – Concepts – Theories and Scope of Developmental Biology.
3- L3	Gametogenesis – Origin of primordial germ cells – transport of germ cells.
4-L4	Spermatogenesis – Phases of formation of spermatid, events of spermiogenesis.
5-L5	Oogenesis – Multiplication, Growth and Maturation phases.
6-L6	Hormonal control of oogenesis – Polar bodies.
7-L7	Structure of sperm and egg of chick.
8- P1	Zoology Association Meeting
9- L8	Fertilization – Significance – Pre and Post fertilization events – Physiological changes.
10- L9	Fertilization – Physical, chemical, cytological factors involved in fertilization – Activation.
11-L10	Parthenogenesis – Types of natural parthenogenesis – Artificial parthenogenesis – Significance.
12-L11	Unit II: Introduction about cleavage and gastrulation
13-L12	Cleavage – Salient features – Structure of morula – Blastula – types.
14-L13	Cleavage laws – Meridional and Vertical planes of Cleavage – Factors affecting cleavage.
15-L14	Allotting portion for Internal Test-I
	Internal Test I begins
16-L15	Patterns of Cleavage – Types of holoblastic cleavage – Types of meroblastic cleavage.
17-IT-1	Internal Test-I (25.01.2016)
18-L16	Fate map of chick – Presumptive organ forming areas.
19-L17	Gastrulation - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Events in gastrulation – formation of endoderm – formation of primitive streak and mesoderm – Structure of gastrula.
21- L19	Manipulations of reproduction in Human: Infertility (male and female) – types and causes of infertility.
22- P2	College level meeting/Cell function
23-L20	Invitro Fertilization – IVF in Human – IVF in farm animals – Methods – Advantages of IVF.
24-L21	Test tube baby, Procedure, Methods (Gift method and Fruity method) – Advantages.

25-L22	Aminocentesis – Procedure and importance.
26-L23	Unit III: Derivatives of germinal layers.
27-L24	Development of Brain in Chick – Development of neural tube – Differentiation of brain and Flexures.
28-L25	Development of Heart – Formation of endocardial tube – Formation of S shaped heart – Differentiation.
29-L26	Organizer – properties of organizer, structure of organizer, primary and secondary organizer, neural and chain of induction, competence and mechanism.
30-L27	Morphogenetic fields – Characteristics.
31-L28	Gradient theory – types of gradient, experimental evidences, factors affecting gradients, mechanism of gradient system.
32-L29	Revision and Group Discussion.
33-L30	Unit IV: Introduction
34- P3	Department Seminar
35-L31	Hormonal control of Amphibian metamorphosis, interaction of thyroxine and tissues.
36-L32	Foetal Membranes Allotting portion for Internal Test-II
	Internal Test II begins
37- L33	Types of foetal membranes, development of chorion, amnion, yolk sac and allantois. Physiology of foetal membranes.
38- IT-II	Internal Test-II (22.02.2016)
39-L34	Placenta in mammals – Characteristics – Functions.
40-L35	Placenta – Classification – based of foetal membrane - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Placenta – Classification based on the distribution of villi. Classification – based on nature of contact – based on the types of tissue involved.
42- L37	Development of placenta – histotrophic nutrition, implantation, trophospongia etc.
43- L38	Revision and Group Discussion.
44- P4	College level meeting/ function
45-L39	Unit V: Introduction about infertility.
46-L40	Nuclear Transplantation in <i>Acetabularia</i> – the importance of nucleus by different experiments.
47-L41	Regeneration – Laws of regeneration, types of regeneration and events in regeneration.
48-L42	Birth control – Necessity, types of contraceptive devices, tubectomy and vasectomy.
49-L43	Hormonal control of birth control – contraceptive pills, injection, implants, patch and vaginal ring.
50-L44	Class test Allotting portion for Internal Test-III
	Internal Test III begins
51 L45	Intrauterine contraceptive devices – non-hormonal copper containing IUD and hormonal Progestogen releasing IUD.
52- L46	Revision and Group Discussion.
53-IT-III	Internal Test-III (28.03.2016)
54-L47	Revision and Group Discussion.
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 “Developmental Biology”
CO1	Learn the scope of developmental biology.
CO2	Gain knowledge of developmental biology along with physiology and fundamental processes of fertilization.
CO3	Describe the patterns of cleavage.
CO4	Understand the origin of primordial germ cells in different vertebrates.
CO5	Learn the stages of spermatogenesis and gametogenesis.
CO6	Understand the importance of morphogenetic movements and gradient theory.
CO7	Know about the importance of thyroxine in amphibian metamorphosis.
CO8	Aware about the causes and consequences of infertility.
CO9	Understand the advantages and disadvantages of invitro fertilization.
Experimental Learning	
EL1	Study the classification of placenta by using museum specimens.
EL2	Learn the various developmental stages of chick embryo through live chick blastoderm.
Integrated Activity	
IA1	

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

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HOD Signature

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Department of Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Ecology, toxicology and evolution
Course Code	GMZO22
Class	I year (2015-2016)
Semester	EVEN
Staff Name	D.V.SHEEBA RAJAKUMARI.
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; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To study the interaction and interdependence among environmental factors and living organisms
- To enumerate the ill- effects and the health hazards of toxic agents released to the environment
- To discern the evolutionary significance of animals, theories origin of species and significance

Syllabus

Unit I: Abiotic factors: Biological effects of Temperature and Light

Biotic factor: Mutualism, commensalism and antagonism (antibiosis, parasitism, predation and competition)

Adaptations : Desert adaptations of organisms.

Unit II: Population Ecology: Definition – Density – Natality – Mortality – Age Distribution – Age Pyramids – Population growth – Population fluctuations – Regulation of Population density – Dispersion.

Community Ecology: Definition – Diversity – structure – Community dominance – Community stratification – Periodicity – Community Interdependence – Ecotone – Edge effect – Ecological niche – Concept of community – Ecological succession.

Unit III: Wild life conservation: Definition – Necessity - Causes – Endangered species – Methods of conservation – Sanctuaries – National parks

Remote sensing – its application in agriculture, fisheries, forest management and flood management.

Urbanization – Reasons for urbanization, Urban problems, methods to control urban growth.

Unit IV: Introduction to toxicology – definition – outline classification of toxicants. Toxic agents and mode of action of pesticides, metals, solvents, carcinogens, poisons. Environmental toxicology and public health.

Unit V: Lamarckism, Darwinism, Modern Synthetic theory of evolution.

Course Calendar

Hour allotment	Class Schedule
	EVEN Semester Begin on 2.12.2015
1-L1	Syllabus discussion
2-L2	A biotic factors
3-L3	Biological effect of temperature
4-L4	Biological effect of light
5-L5	Biotic factors –producer and consumers and decomposters
6-L6	Eco system
7-L7	Pond eco system
8- P1	Welcoming of First year and Inauguration of zoology Association
9- L8	Forest eco system
10- L9	Food chain
11-L10	Food web
12-L11	Trophic levels
13-L12	Energyflow
14-L13	Ecological pyramids
15-L14	Allotting portion for Internal Test-I
	Internal Test I begins(25.01.2016)
16-L15	Animal relationship-mutualism, commensalism
17-IT-1	Internal Test-I
18-L16	Antagonism –antibiosis ,parasitism
19-L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Antagonism- predation,competition
21- L19	Population ecology-definition –density
22- P2	College level meeting/Cell function

23-L20	Natality-mortality
24-L21	Age-distribution-age pyramids
25-L22	Population growth-population fluctuation
26-L23	Regulation of population density-animal density
27-L24	Community ecology-definition-community stratification
28-L25	Periodicity-community interdependence
29-L26	Ecotone-edge effects-ecological niche
30-L27	Concept of community –ecological succession
31-L28	Adaptation: desert adaptation
32-L29	Cave adaptation
33-L30	Wild life conservation-definition
34- P3	Department Seminar
35-L31	Endangered species –causes for depletion
36-L32	Allotting portion for Internal Test-II
	Internal Test II begins(22.02.2016)
37- L33	Necessity for conservation
38- IT-II	Internal Test-II
39-L34	Methods of conservation-sanctuaries and national parks
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Remote sensing
42- L37	Urbanization
43- L38	Introduction to toxicology
44- P4	College level meeting/ function
45-L39	Definition ,out line classification of toxicant
46-L40	Toxic agent and mode of action of pesticides,metals
47-L41	Continue-solvents , carcinogens, poisons
48-L42	Environmental toxicology and public health
49-L43	Lamarkism
50-L44	_____ - Allotting portion for Internal Test-III
	Internal Test III begins(28.03.2016)
51 L45	Darwinism
52- L46	Morden synthetic theory of evolution
53-IT-III	Internal Test-III
54-L47	Revision
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Course Outcomes

Learning Outcomes	COs of the course
CO1	Describe the history, introduction and nature of ecosystem
CO2	Explain the biogeocycles and laws
CO3	Describe population and community ecology
CO4	Describe wild life conservation and management
Experimental Learning	
EL1	Prepare model for Population growth
EL2	Prepare model for periodicity
Integrated Activity	
IA1	Prepare chart for Darwinism
IA2	Prepare chart for Antagonism

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

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Department of ZOOLOGY

COURSE ACADEMIC PLAN (2015-2016)

(Prepared by staff member handling the course)

Programme Name	B.Sc Zoology
Course Name	Environmental Studies
Course Code	GEVS11
Class	I year (2015-2016)
Semester	Odd
Staff Name	Dr,D,V, Sheeba Rajakumari
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

- Creating the awareness about environmental problems among people.
- Imparting basic knowledge about the environment and its allied problems.
- Developing an attitude of concern for the environment.
- Motivating public to participate in environment protection and environment improvement.
- Acquiring skills to help the concerned individuals in identifying and solving environmental problems.
- Striving to attain harmony with Nature.

Syllabus

ENVIRONMENTAL STUDIES

UNIT I:

Definition, scope and importance Natural resources and associated problems:

- a) Forest resources: Use and over-exploitation, deforestation, timber extraction, dams and their effects on forests and tribal people.
- b) Water resources: Use and over-utilization of surface and ground water, floods, drought, dams-benefits and problems, water conservation and watershed management.

- c) Mineral resources- Use and exploitation, environmental effects.
- d) Food resources: World food problems, changes, effects of modern agriculture, fertilizer, pesticide problems.
- e) Energy resources: Growing energy needs, renewable and non renewable energy sources, alternate energy sources.
- f) Land resources: Land as a resource, land degradation, man-induced landslides, soil erosion and desertification.

UNIT II: ECOSYSTEMS

- a) Forest Ecosystem
- b) Grassland Ecosystem
- c) Desert ecosystem
- d) Aquatic Ecosystem (Ponds, rivers, oceans, estuaries) Energy flow in the ecosystem Ecological succession Food Chains, Food Webs and Ecological Pyramids.

UNIT III: BIODIVERSITY AND ITS CONSERVATION

Introduction - Definition: Genetic, species and ecosystem diversity. Biogeographical classification of India- Values of Biodiversity- Biodiversity at global, national and local levels- India as mega-diversity nation- Hot-Spots of biodiversity Threats to biodiversity - Endangered and endemic species of India- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT IV: ENVIRONMENTAL POLLUTION

Definition - Causes, effects and control measures of:-

- a) Air Pollution
- b) Water Pollution
- c) Soil Pollution
- d) Marine Pollution
- e) Noise Pollution
- f) Thermal Pollution
- g) Solid Waste Management
- h) Disaster Management: Floods, earthquake, cyclone and landslides.

UNIT V: SOCIAL ISSUES AND THE ENVIRONMENT

Climatic change, global warming, acid rain, ozone depletion. Wasteland reclamation Consumerism and Waste products, use and through plastics -Environment Protection Act -Air (Prevention and Control of Pollution) Act- Water (Prevention and Control of Pollution) Act- Wildlife Protection Act- Forest Conservation Act- Population Explosion - family Welfare programme- Human Rights

REFERENCES:

1. G S Vijayalakshmi, A.G. Murugesan and N. Sukumaran. 2006. Basics of Environmental Science, Manonmaniam Sundaranar University Publications, Tirunelveli , pp.160.
2. Agarwal. K.C. 2001. Environmental Biology. Nidi Publications Limited, Bikaner.
3. A K De. 1999. Environmental Chemistry, Wiley Eastern Limited, India.
4. Jadhav.H. and Bhosale, V.M.1995. Environmental Protection and Laws, Himalaya Publishing House, Delhi. pp284.
5. Odum, E.P.1971. Fundamentals of Ecology, W.B.Saunders Co., USA.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on (18-06-2015)
1-L1	Definition, scope and importance Natural resources and associated problems
2-L2	a) Forest resources: Use and over-exploitation, deforestation, timber extraction, dams and their effects on forests and tribal people. b)Water resources: Use and over-utilization of surface and ground water, floods, drought
3- P1	Zoology Association
4-L3	c)Mineral resources- Use and exploitation, environmental effects. d)Food resources: World food problems, changes, effects of modern agriculture, fertilizer, pesticide problems
5-L4	e)Energy resources: Growing energy needs, renewable and non renewable energy sources, alternate energy sources. f)Land resources: Land as a resource, land degradation, man-induced landslides, oil erosion and desertification
	Allotting portion for Internal Test-I
	Internal Test I begins(20-07-2015)
6-IT-I	Internal Test-I
7-L5	ECOSYSTEMS a) Forest Ecosystem b) Grassland Ecosystem c) Desert ecosystem
	d) Aquatic Ecosystem (Ponds, rivers, oceans, estuaries) Energy flow in the ecosystem Ecological succession Food Chains, Food Webs and Ecological Pyramids
	Allotting portion for Internal Test-I
8-L6	BIODIVERSITY AND ITS CONSERVATION Introduction - Definition: Genetic, species and ecosystem diversity. Biogeographical classification of India- Values of Biodiversity
9-L7	Biodiversity at global, national and local levels- India as mega-diversity nation- Hot-Spots of biodiversity Threats to biodiversity
10-P2	College level meeting/Cell function

11-L8	Endangered and endemic species of India- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity
12-L9	ENVIRONMENTAL POLLUTION Definition - Causes, effects and control measures of
13-P3	Department Seminar
14-L10	a) Air Pollution b) Water Pollution c) Soil Pollution
15-L11	d)Marine Pollution e)Noise Pollution f)Thermal PollutioN
16-L12	Solid Waste Management Disaster Management: Floods, earthquake, cyclone and landslides Allotting portion for Internal Test-II
	Internal Test II begins(31-08-2015)
17-IT-1	Internal Test-II
18-L13	Social Issues And The Environment Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
19-L14	Climatic change, global warming
20- P2	College level meeting/ function
21-L15	acid rain, ozone depletion. Wasteland reclamation
22-L16	Consumerism and Waste products, use and through plastics- Environment Protection Act
23- L17	-Air (Prevention and Control of Pollution) Act- Water (Prevention and Control of Pollution) Act Allotting portion for Internal Test-III
	Internal Test III begins(05-10-2015)
24- IT-III	Internal Test-III
25-L18	Wildlife Protection Act- Forest Conservation Act- Population Explosion - family Welfare programme- Human Rights Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
26-MT	Model Test(16-10-2015)
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 “<ENVIRONMENTAL STUDIES>”
CO1	Students will understand the interactions of environmental components
CO2	They will understand and interpret the lithosphere, atmosphere, hydrosphere and biosphere.
CO3	Motivate public to participate in environment protection and environment improvement.
CO4	Acquire skills to identifying and solving environmental problems.
CO5	They will understand and interpret the interrelationships between landforms, weather, water and ecosystems.

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	NME – Public Health And Hygiene
Course Code	GNO4A
Class	II year (2015-2016)
Semester	Even
Staff Name	P. Augustus Robince
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem	
Internal Test-3 Hrs	
Model Test-3 Hrs	
Dept. Meetings-2 Hrs	
College Meetings-2 Hrs	
Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To create awareness about the health status of the students.
- To understand causes for various health problems.
- To promote awareness about food safety.
- To understand the importance of Physical and Mental Health.

Syllabus

Unit – I Physical, mental, social - positive health - Quality of life Index. Nutrition and health - food hygiene - Food toxicants. Population explosion in India - Birth control measures.

Unit –II Environment and health - water -Sources of water - Uses of water water borne diseases – Cholera - Ascariasis Standards of Housing - Ventilation

Unit – III Excreta disposal - Importance - Methods of excreta disposal. . Sanitary health measures during fares and festivals. First aid with reference to accident.

Unit – IV Communicable disease - Viral diseases - , AIDS, Rabies. Bacterial diseases - Tuberculosis, Typhoid. Protozoan diseases - amoebiasis, Helminth diseases - Filariasis,

Unit – V Health situation in India - Health problems - Primary health care in India - PHC - National Programmes - national AIDS control - National Malaria Eradication programme - National Tuberculosis

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 02.12.2015
1-L1	Unit – I Physical,
2-L2	Mental Health.
3- L3	social Health.
4-L4	positive health.
5-L5	Quality of life Index.
6-L6	Nutrition and health.
7-L7	food hygiene.
8- P1	Welcoming of First year and Inauguration of Mathematics Association
9- L8	Food toxicants.
10- L9	Population explosion in India.
11-L10	Birth control measures.

12-L11	Unit –II Environment and health.
13-L12	Water.
14-L13	Sources of water.
15-L14	____ - Allotting portion for Internal Test-I
	Internal Test I begins on 25.01.2016
16-L15	Uses of water.
17-IT-1	Internal Test-I
18-L16	water borne diseases – Cholera .
19-L17	____ - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Ascariasis.
21- L19	Standards of Housing - Ventilation
22- P2	College level meeting/Cell function
23-L20	Unit – III Excreta disposal .
24-L21	Importance.
25-L22	Methods of excreta disposal.
26-L23	Sanitary health measures during fares and festivals.
27-L24	First aid with reference to accident.
28-L25	Unit – IV Communicable disease.
29-L26	Viral diseases - AIDS, Rabies.
30-L27	Bacterial diseases - Tuberculosis, Typhoid.
31-L28	Protozoan diseases – amoebiasis.
32-L29	Helminth diseases – Filariasis.
33-L30	Unit –V Health situation in India.
34- P3	Department Seminar
35-L31	Health problems.

36-L32	____ - Allotting portion for Internal Test-II
	Internal Test II begins on 22.02.2016
37- L33	Primary health care in India.
38- IT-II	Internal Test-II
39-L34	PHC - National Programmes.
40-L35	____ - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	national AIDS control.
42- L37	National Malaria Eradication programme.
43- L38	National Tuberculosis.
44- P4	College level meeting/ function
45-L39	Review of topics once again: Unit – I Physical, mental, social - positive health - Quality of life Index.
46-L40	Nutrition and health - food hygiene - Food toxicants. Population explosion in India - Birth control measures.
47-L41	Unit –II Environment and health - water -Sources of water - Uses of water water borne diseases – Cholera - Ascariasis Standards of Housing - Ventilation
48-L42	Unit – III Excreta disposal - Importance - Methods of excreta disposal. . Sanitary health measures during fares and festivals. First aid with reference to accident.
49-L43	Unit – IV Communicable disease - Viral diseases - , AIDS, Rabies.
50-L44	____ - Allotting portion for Internal Test-III
	Internal Test III begins on 28.03.2016
51 L45	Bacterial diseases - Tuberculosis, Typhoid. Protozoan diseases - amoebiasis, Helminth diseases – Filariasis.
52- L46	Unit – V Health situation in India - Health problems - Primary health care in India – PHC.
53-IT-III	Internal Test-III
54-L47	National Programmes - national AIDS control - National Malaria Eradication programme - National Tuberculosis.

55-L48	_____ - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
56- MT	Model Test begins on 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 “NME – Public Health And Hygiene”
CO1	Knows the importance of hygiene and sanitation
CO2	Defines a negative effect of microorganisms on hygiene
CO3	Knows the properties of a healthy and clean water.
CO4	Understands the importance of personal hygiene.
CO5	Provide and maintain personal hygiene knows what to be followed.
CO6	Knows the negative effects of hard water.
CO7	Identifies control methods of Pest
CO8	Understands the Importance of Vaccination
CO9	How to control Vector borne Diseases
Experimental Learning	
EL1	Observation of larval stage of Mosquito
EL2	Find out the places where the House fly emerges

EL3	Identification of available Mosquito species.
EL4	Improving hygiene in homes.
Integrated Activity	
IA1	Collection and Identification of different species of Mosquitos
IA2	Maintaining good hygiene in Villages.

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 ZOOLOGY

COURSE ACADEMIC PLAN (2015-2016)

(Prepared by staff member handling the course)

Programme Name	B.Sc Zoology
Course Name	Personality Development
Course Code	GCSB5A
Class	III year (2015-2016)
Semester	Odd
Staff Name	Dr.D.V. Sheeba Rajakumari
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 enable the students to groom their personality and prove themselves as good Samaritans of the Society.
- To know the applications of concepts, Theories or issues in human development.
- To know the Qualities of effective leadership
- To aware ideas to tackle the problem of human stress
- To learn about types of interview

Syllabus

PERSONALITY DEVELOPMENT

Unit I Personality

Meaning, definition -determinants of personality- major traits-theories of personality development

Unit 2 Personality concepts

Personality concepts -self image; self esteem, self- monitoring -advantages and disadvantages of self monitoring, perception- meaning, process of perception; factors influencing perception, Errors in perception- attitudes -types of attitudes and factors influencing attitudes

Unit 3 Leadership

Definition of leadership - leadership style - theories of leadership- qualities of an effective leadership

Unit 4 Skills

Meaning and types of skills; communication - definition and importance and process of communication; methods of communication- barriers in communication and technologies of effective communication

Unit 5 Interview

meaning and types of interview- planning for an interview- types of questions in interview- employer's expectations from a candidate.

Reference

1. Personality development - books of MS University Publications

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on (18-06-2015)
1-L1	Personality
2-L2	meaning
3- L3	meaning
4-L4	definition
5-L5	definition
6-L6	determinants of personality
7-L7	determinants of personality
8- P1	Zoology Association
9- L8	major traits
10- L9	major traits
11-L10	major traits-theories of personality development
12-L11	Personality concepts
13-L12	Personality concepts -self image
14-L13	self esteem, self- monitoring
15-L14	advantages and disadvantages of self monitoring
	Allotting portion for Internal Test-I
	Internal Test I begins(20-07-2015)
16-L15	perception
17-IT-1	Internal Test-I
18-L16	meaning, process of perception
19-L17	factors influencing perception Errors in perception
	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	attitudes
21- L19	types of attitudes
22- P2	College level meeting/Cell function
23-L20	factors influencing attitudes
24-L21	Leadership
25-L22	definition of leadership
26-L23	definition of leadership
27-L24	definition of leadership
28-L25	leadership style

29-L26	leadership style
30-L27	theories of leadership
31-L28	theories of leadership
32-L29	qualities of an effective leadership
33-L30	Skills
34- P3	Department Seminar
35-L31	meaning
36-L32	types of skills
	Allotting portion for Internal Test-II
	Internal Test II begins(31-08-2015)
37- L33	communication
38- IT-II	Internal Test-II
39-L34	definition
40-L35	importance and process of communication
	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	importance and process of communication
42- L37	methods of communication
43- L38	barriers in communication
44- P4	College level meeting/ function
45-L39	technologies of effective communication
46-L40	technologies of effective communication
47-L41	Interview
48-L42	meaning and types of interview
49-L43	meaning and types of interview
50-L44	planning for an interview
	Allotting portion for Internal Test-III
	Internal Test III begins(05-10-2015)
51 L45	planning for an interview
52- L46	types of questions in interview
53-IT-III	Internal Test-III
54-L47	employer's expectations from a candidate
55-L48	employer's expectations from a candidate
	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 “<PERSONALITY DEVELOPMENT >”
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CO1	enable the students to groom their personality and prove themselves as good Samaritans of the Society
CO2	known the applications of concepts, Theories or issues in human development
CO3	known the qualities of effective leadership
CO4	aware ideas to tackle the problem of human stress
CO5	Get ideas about the types of interview

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	ANIMAL DIVERSITY – I INVERTEBRATA
Course Code	GMZO11
Class	I year (2015-2016)
Semester	Odd
Staff Name	Dr.M.RAJAKUMARI
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To elucidate the importance of taxonomy
- To know the methods of nomenclature
- To realize the difference between Protozoa and Metazoa
- To study the structure, functional organizations, adaptations and the economic importance of the lower and higher Invertebrates

Syllabus

Unit – I

Introduction to Principles of taxonomy – Binominal nomenclature.

Protozoa: General characters and classifications up to classes with the examples.

Type Study:- Paramecium: Morphology – Nutrition – Osmoregulation – excretion – Reproduction (Binary fission and Conjugation).

General structure, life cycle, pathogeny and control measures of the following:

(a) Entamoeba histolytica, (b) Plasmodium.

Porifera: General characters and classification upto Classes with the names of the examples.

Type Study:- Leucosolenia – External morphology – Body wall – Reproduction.

General Topic: Canal system in Sponges.

Unit – II

Coelenterata: General characters and classification up to classes with the names of the examples.

Type study:- Obelia – External Characters (structure of the colony) – life history.

General Topics: Corals, Coral reefs and their significance.

Platyhelminthus: General characters and classification up to classes with the names of the examples.

General topic: (i) External morphology and life cycle of fasciola hepatica.
(ii) Parasitic adaptations of platyhelminthes.

Unit – III

Aschelminthes (Nematoda): External morphology, life cycle, Pathogeny, parasitic adaptations and control measures of the following:

- (a) Ascaris lumbricoides (Round worm)
- (b) Dracunculus medinensis (Guinea worm)
- (c) Wuchereria bancrofti (Filarial worm)

Annelida: General characters and classification up to classes with the names of the examples. External characters and biological significance of Earth worm.

General Topic: (i) Metamerism

Unit – IV

Arthropoda: General characters and classification up to classes with the names of the examples.

Type Study:- Penacus: External characters – Appendages – Compound eye – Reproductive system and life cycle.

General Topic: (i) Social life in insects – Ants and honey bees.
(ii) Beneficial insects – Honey bee, Lac insect and silk moth.
(iii) External characters, economic importance and control measures of the pests of agricultural crops (Coconut – Paddy)
(a) Oryctes rhinoceros (b) Leptocorisa acuta

Unit – V

Mollusca: General characters and classification up to classes with the names of the examples.

Type study: Pila globosa: External characters – shell – mantle cavity – Anatomy of Digestive system and Reproductive system.

General Topic: (i) Pearl culture and Pearl Industry in India
(ii) Cephalopods as advanced Molluses.

Echinodermata: General characters and classification up to classes with the names of the examples.

Type Study:- Star fish: External characters – Water vascular system.

General Topic: Larval forms of Echinodermata and their Phulogenetic significance.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2015
1-L1	Introduction to Principals of taxonomy – Binominal nomenclature.
2-L2	Protozoa: General characters and classifications up to classes with the examples.
3-L3	Paramecium: Morphology – Nutrition – Osmoregulation
4-L4	Paramecium: Excretion – Reproduction (Binary fission and Conjugation).
5-L5	Entamoeba histolytica: General structure, life cycle, Pathogeny and control measures
6-L6	Plasmodium.: General structure, life cycle, Pathogeny and control measures
7-L7	Porifera: General characters, classification upto Classes with the names of the examples.
8- P1	Welcoming of First year and Inauguration of Zoology Association
9- L8	Leucosolenia – External morphology - Body wall – Reproduction.
10- L9	Canal system in Sponges.
11-L10	Coelenterata: General characters
12-L11	Coelenterata: Classification up to classes with the names of the examples -
13-L12	Obelia – External Characters (structure of the colony) – life history.
14-L13	Corals
15-L14	Coral reefs and their significance Allotting portion for Internal Test-I
	Internal Test I begins
16-L15	Platyhelminthus: General characters
17-IT-1	Internal Test-I
18-L16	Platyhelminthus: Classification up to classes with the names of the examples.
19-L17	External morphology and life cycle of fasciola hepatica Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Parasitic adaptations of platyhelminthes.
21- L19	Ascaris lumbricoides (Round worm) - External morphology and Life cycle
22- P2	College level meeting/Cell function
23-L20	Ascaris lumbricoides (Round worm) - Pathogeny, Parasitic adaptations and control measures
24-L21	Dracunculus medinensis (Guinea worm) - External morphology and Life cycle
25-L22	Dracunculus medinensis (Guinea worm) - Pathogeny, Parasitic adaptations and control measures
26-L23	Wuchereria bancrofti (Filarial worm) - External morphology
27-L24	Wuchereria bancrofti (Filarial worm) - Life cycle
28-L25	Wuchereria bancrofti (Filarial worm) - Pathogeny, Parasitic adaptations and control measures
29-L26	Annelida: General characters and classification up to classes with the names of the examples. External characters
30-L27	Metamerism in Annelida
31-L28	Biological significance of Earthworm.
32-L29	Arthropoda: General Characters
33-L30	Arthropoda: Classification up to class with the names of the examples.
34- P3	Department Seminar

35-L31	Penaeus: External characters–Appendages–compound eye
36-L32	Penaeus: Reproductive system and Life cycle. - Allotting portion for Internal Test-II
	Internal Test II begins
37- L33	Social life in insects – Honey Bees
38- IT-II	Internal Test-II
39-L34	Beneficial insects – Honey bee
40-L35	Beneficial insects – Lac insects - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Beneficial insects -Silk moth
42- L37	Oryctes rhinoceros - External Characters
43- L38	Oryctes rhinoceros - Economic importance and control measures
44- P4	College level meeting/ function
45-L39	Leptocorisa acuta - External Characters, Economic importance and control measures
46-L40	Mollusca: General characters and classification up to classes with the names of the examples.
47-L41	Pila globosa: External characters – shell – mantle cavity
48-L42	Pila globosa: Anatomy of Digestive system and reproductive system.
49-L43	Pearl culture and Pearl Industry in India.
50-L44	Cephalopods as advanced Molluscs. Allotting portion for Internal Test-III
	Internal Test III begins
51 L45	Echinodermata: General characters
52- L46	Echinodermata: Classification up to classes with the names of the example.
53-IT-III	Internal Test-III
54-L47	Star fish: External Characters – Water vascular system.
55-L48	Larval forms of Echinodermata and their Phylogenetic significance. 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 29.10.2015

Course Outcomes

Learning Outcomes	COs of the course “ANIMAL DIVERSITY I – INVERTEBRATA”
CO1	Provides students with an in-depth knowledge of the diversity in form, structure and habits of invertebrates.
CO2	Learn basics of systematics and understand hierarchy of different categories.
CO3	Learn diagnostic characteristics of different phyla through brief studies of examples.
CO4	Obtain overview of economically important invertebrates
CO5	Classify all the invertebrate phyla up to class.
CO6	To identify the given Mollusca with respect to economic importance
CO7	To describe general characters of Nematelminthes and their parasitic Adaptation
CO8	To explain classification of protozoa and diseases caused by them
CO9	To explain general characters of Arthropoda and metamorphosis in insects
Experimental Learning	
EL1	Training experience in anatomy through simple dissection and mounting.
EL2	Familiarization with conventional organ system in different animals.
EL3	Identify and study preserved specimens of various economically important animals
Integrated Activity	
IA1	Prepare model for organ system of different species.
IA2	To visit a apiculture site

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 ZOOLOGY

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc Zoology
Course Name	Value based education
Course Code	GVBE21
Class	I year (2015-2016)
Semester	Even
Staff Name	Dr. D. V. Sheeba Rajakumari
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

- To enable the students to understand the social realities
- To know the value of human rights
- to inculcate an essential value system towards building a healthy society.
- to get knowledge about the mass media

Syllabus

VALUE BASED EDUCATION

Unit I:

Social Justice Definition – need – parameters of social justice – factors responsible for social injustice – caste and gender – contributions of social reformers.

Unit II :

Human Rights and Marginalized People Concept of Human Rights – Principles of human rights – human rights and Indian constitution – Rights of Women and children – violence against women – Rights of marginalized People – like women, children, dalits, minorities, physically challenged etc

Unit III:

Social Issues and Communal Harmony Social issues – causes and magnitude - alcoholism, drug addiction, poverty, unemployment etc – communal harmony –concept –

religion and its place in public in public domain – separation of religion from politics – secularism role of civil society

Unit IV:

Media Education and Globalized World Scenario Mass media –functions – characteristics –need and purpose of media literacy – effects and influence - - youth and children – media power – socio cultural and political consequences mass mediated culture - - consumeristic culture – Globalization – new media- prospects and challenges

Unit V:

Values and Ethics Personal values – family values – social values – cultural values – Professional values – and overall ethics – duties and responsibilities

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on (02-12-2015)
1-L1	Definition – need – parameters of social justice
2-L2	factors responsible for social injustice
3- P1	Zoology Association
4-L3	caste and gender
5-L4	contributions of social reformers
	Allotting portion for Internal Test-I
	Internal Test I begins (25-01-2016)
6-IT-1	Internal Test-I
7-L5	Concept of Human Rights – Principles of human rights
	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
8-L6	human rights and Indian constitution – Rights of Women and children
9-L7	violence against women
10-P2	College level meeting/Cell function
11-L8	Rights of marginalized People – like women, children, dalits, minorities, physically challenged etc
12-L9	Social issues – causes and magnitude - alcoholism, drug addiction,
13-P3	Department Seminar
14-L10	poverty, unemployment etc
15-L11	communal harmony –concept –religion and its place in public in public domain
16-L12	separation of religion from politics –secularism role of civil society
	Allotting portion for Internal Test-II
	Internal Test II begins(22-02-2016)
17-IT-1	Internal Test-II
18-L13	Mass media –functions –characteristics
	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
19-L14	need and purpose of media literacy – effects and influence
20- P2	College level meeting/ function
21-L15	youth and children – media power – socio cultural and political consequences

	mass mediated culture
22-L16	consumerist culture – Globalization – new media- prospects and challenges
23- L17	Personal values – family values – social values – cultural values Allotting portion for Internal Test-III
	Internal Test III begins(28-03-2016)
24- IT-III	Internal Test-III
25-L18	Professional values – and overall ethics – duties and responsibilities Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
26-MT	Model Test(11-04-2016)
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 “<Value base education >”
CO1	Value based education makes purity of heart
CO2	It helps to takes the whole society to the top
CO3	It creates awareness about human rights
CO4	It makes sincerity
CO5	It brings communal harmony in public

- # 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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Animal Diversity II - Chordata
Course Code	GMZO12
Class	I year (2015-2016)
Semester	Odd
Staff Name	P. Augustus Robince
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem	
Internal Test-3 Hrs	
Model Test-3 Hrs	
Dept. Meetings-2 Hrs	
College Meetings-2 Hrs	
Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To exemplify the intermediary position of Prochordates between Invertebrates and Vertebrates.
- To study the structure, functional organization.
- To study the adaptations and the economic importance of lower and higher chordates.

Syllabus

Unit I: Introduction to Chordata: General Characters (Diagnostic characters and additional Characters) and Classification up to classes with the name of the examples. Prochordata : General Characters and Classification up to orders with the names of the examples. Type Study: Ascidian – External features – Digestive and Reproductive system External features and Biological significance of the following (a) Amphioxus (b) Balanoglossus Agnatha: Petromyzon - External morphology; Ammocoetes Larva.

Unit II: Pisces: General Characters and Classification up to sub-classes with the names of the examples. Type Study: Scoliodon (Shark) - External characters - Placoid scales - Digestive System - Respiratory system - Receptor Organs - Urinogenital System. General topics: (i) Accessory respiratory organs in fishes (ii) Migration of fishes.

Unit III: Amphibia: General Characters and Classification upto orders with the names of the examples. External features and Biological significance of the following Examples: (a) Rhachophorus (b) Ambystoma (c) Axolotl Larva. General topic: Parental care in Amphibia Reptilia: General Characters and Classification up to orders with the names of the examples. External features and Biological significance of the following Examples: (a) Chelone mydas (b) Chamaeleon (c) Draco (d) Cobra General Topics: (i) Identification of poisonous and non-poisonous snakes of South India (ii) Venom apparatus - Biting mechanism- venom - First aid for snake bite - Antivenom.

Unit IV: Aves: General characters and classification up to subclasses with the names of the examples. Type study: Columba livia (Pigeon) - External characters - Flight muscles - Digestive system - Respiratory system - Urinogenital system General topics: (i) Migration of Birds (ii) Flight adaptations in Birds

Unit V: Mammalia: General Characters and Classification up to subclasses with the names of the examples. 498 Type study: Rabbit - External morphology - Digestive system – Respiratory system - Heart - Structure of Brain - Urinogenital system. General topics: (i) Egg laying mammals (ii) Adaptations of aquatic mammals

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2015
1-L1	Unit I: Introduction to Chordata.
2-L2	General Characters (Diagnostic characters and additional Characters) .
3- L3	Classification up to classes with the name of the examples.

4-L4	Prochordata : General Characters.
5-L5	Classification up to orders with the names of the examples.
6-L6	Type Study: Ascidian – External features – Digestive Reproductive sysytem (b) Balanoglossus .
7-L7	External features and Biological significance of the following (a) Amphioxus.
8- P1	Welcoming of First year and Inauguration of Mathematics Association
9- L8	Agnatha: Petromyzon - External morphology; Ammocoetes Larva.
10- L9	Unit II: Pisces: General Characters .
11-L10	Classification up to sub-classes with the names of the examples.
12-L11	Type Study: Scoliodon (Shark) - External characters .
13-L12	Placoid scales - Digestive System - Respiratory system .
14-L13	Receptor Organs - Urinogenital System.
15-L14	____ - Allotting portion for Internal Test-I
	Internal Test I begins on 20.07.2015
16-L15	General topics: (i) Accessory respiratory organs in fishes (ii) Migration of fishes.
17-IT-1	Internal Test-I
18-L16	Unit III: Amphibia: General Characters .
19-L17	____ - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Classification upto orders with the names of the examples.
21- L19	External features and Biological significance of the following Examples: (a) Rhachophorus (b) Ambystoma (c) Axolotl Larva.
22- P2	College level meeting/Cell function
23-L20	General topic: Parental care in Amphibia Reptilia.
24-L21	General Characters and Classification up to orders with the names of the examples.
25-L22	External features and Biological significance of the following Examples: (a) Chelone

	mydas (b) Chamaeleon .
26-L23	(c) Draco (d) Cobra .
27-L24	General Topics: (i) Identification of poisonous and non-poisonous snakes of South India .
28-L25	(ii) Venom apparatus - Biting mechanism- venom - First aid for snake bite – Antivenom.
29-L26	Unit IV: Aves: General characters .
30-L27	classification up to subclasses with the names of the examples.
31-L28	Type study: Columba livia (Pigeon) - External characters .
32-L29	Flight muscles .
33-L30	Digestive system .
34- P3	Department Seminar
35-L31	Respiratory system .
36-L32	_____ - Allotting portion for Internal Test-II
	Internal Test II begins on 31.08.2015
37- L33	Urinogenital system .
38- IT-II	Internal Test-II
39-L34	General topics: (i) Migration of Birds .
40-L35	_____ - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	(ii) Flight adaptations in Birds.
42- L37	Unit V: Mammalia: General Characters .
43- L38	Clasification up to subclasses with the names of the examples.
44- P4	College level meeting/ function
45-L39	. 498 Type study: Rabbit - External morphology .
46-L40	Digestive system .

47-L41	Respiratory system .
48-L42	Heart - Structure of Brain .
49-L43	Urinogenital system.
50-L44	_____ - Allotting portion for Internal Test-III
	Internal Test III begins on 05.10.2015
51 L45	General topics: (i) Egg laying mammals .
52- L46	(ii) Adaptations of aquatic mammals.
53-IT-III	Internal Test-III
54-L47	Unit Review.
55-L48	_____ - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
56- MT	Model Test begins on 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 “Animal Diversity II - Chordata”
CO1	Observation of the diversity in chordates and their classification.
CO2	Analysis of the significant adaptive features in all classes of Chordata.
CO3	Understand physiological and anatomical peculiarities through

	type study.
CO4	Appreciate transitional stages and their significance in evolution.
CO5	Understand what transformations are necessary to survive in different adaptive zones.
CO6	Create a positive attitude towards conservation of biodiversity.
CO7	Obtain overview of economically important vertebrates.
CO8	GD on venomous snakes
CO9	Discuss the beneficial insects
Experimental Learning	
EL1	To collect and categories different chordates specimens.
EL2	Observation of external features of specimens of chordates.
EL3	Identification of venomous snakes.
EL4	Identification of fishes.
Integrated Activity	
IA1	Identification of fishes in ponds
IA2	Identification commercial fishes.

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 Zoology

COURSE ACADEMIC PLAN (June 2015 to November 2015)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	Animal Physiology
Course Code	HZOM32
Class	II year (June 2015 to November 2015)
Semester	Odd
Staff Name	Dr. D. Paramanatha Swami Doss
Credits	5
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; $5 \times 16 = 80$; 16Hrs /unit)	

Course Objectives

- This course develops the knowledge about the functions of organs and tissues in the Animal.
- This study also provides the students with the basic understanding of the fundamental processes and mechanisms that serve and control the various functions of the body.
- The basic idea of paper was learned earlier and the detailed course structure were dealt.

Syllabus

ANIMAL PHYSIOLOGY

Unit I: Nutrition and Thermoregulation

Digestive tract – Structure and functions – Secretory functions of the alimentary tract and the glands – Gastro intestinal hormones – Digestion, Absorption and Metabolism of carbohydrates, proteins and lipids – Balanced diet – Malnutrition, energy balance, BMR. Thermoregulation – Body temperature, acclimation and acclimatization – Regulation of temperature in poikilotherms and homeotherms.

Unit II: Blood and circulation

Blood corpuscles, Haemopoiesis and formed elements, plasma function, blood volume and its regulation, blood groups, immunity, haemostasis. Cardiovascular system: Comparative

anatomy of heart structures in vertebrates, myogenic heart, specialized tissue, ECG – its principle and significance, cardiac cycle, heart as a pump, blood pressure, neural and chemical regulation of all above.

Unit III Respiration and Excretion

Respiration in air and water – Comparison of respiration in vertebrates – anatomical considerations – Human: Physiology and anatomy of the respiratory tract – respiratory pigments Gas transport between the lungs and tissues – Regulation of respiration. Respiratory adjustments in high altitudes.

Excretory products – Comparative physiology of excretion and types of excretory products in vertebrates. Human: Kidney – Nephron – Renal circulation – Urine formation and concentration. Renal disorders – Micturition and dialysis – Regulation of water and electrolyte balance – Protozoa, crustacean. Fresh water, marine and terrestrial animals – Hormonal control of osmo-iono regulation.

Unit IV Neuromuscular and sensory Physiology

Neuron – Structure, classification – Neurotransmitters – Synapse, conduction of nerve impulses – Reflex activity – Structure and function of spinal cord & brain – Electro encephalogram (EEG).

Muscles – Classification and properties – Mechanism of muscular contraction – energetics of muscular contraction – neuromuscular junction – Sense organs and receptors – sense organs of vision, hearing and equilibrium, smell and taste, cutaneous.

Unit V: Endocrinology and reproduction

Endocrine mechanisms in Invertebrates (Insects and Crustaceans) Human: Structure and functions of various endocrine glands – basic mechanism of hormone action – Estrus and endometrial reproductive cycles – Mammary glands – Neuroendocrine regulation.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2015
1-L1	Unit I: Nutrition and Thermoregulation – Introduction about Physiology
2-L2	Digestive tract – Structure and functions.
3- L3	Secretory functions of the alimentary tract and the glands.
4-L4	Gastro intestinal hormones.
5-L5	Digestion and absorption.
6-L6	Metabolism of food stuffs – carbohydrates, proteins and lipids.
7-L7	Balanced diet – Malnutrition, energy balance, BMR.
8-L8	Thermoregulation – Body temperature, acclimation and acclimatization.
9-L9	Regulation of temperature in poikilotherms and homeotherms.
10-P1	Revision
11-L10	Class test

12-L11	Unit II: Blood and circulation – Introduction about blood corpuscles.
13-L12	Welcoming of First year and Inauguration of Zoology Association
14-L13	Haemopoiesis and formed elements, plasma function.
15-L14	Blood volume and its regulation.
16-L15	Blood groups, immunity, haemostasis.
17-L16	Cardiovascular system: Comparative anatomy of heart structures in vertebrates
18-L17	Myogenic heart, specialized tissue, ECG – its principle and significance, cardiac cycle.
19-L18	Blood pressure, neural and chemical regulation.
20-L19	Revision
21-L20	Students Seminar
22-L21	Unit III Respiration - Respiration in air and water
23-L22	Comparison of respiration in vertebrates – anatomical considerations.
24-L23	Physiology and anatomy of the human respiratory tract, respiratory pigments.
25-L24	Gas transport between the lungs and tissues.
26-IT-1	Neural and chemical regulation of respiration.
27-L25	Respiratory adjustments in high altitudes.
28-L26	Excretion – General introduction
29-L27	Revision
30-L28	- Allotting portion for Internal Test-I
31- L29	Excretory products – Urea, Uric Acid, Ammonia etc
32- L30	Comparative physiology of excretion and types of excretory products in vertebrates.
33- L31	Human: Kidney – Nephron
34-P2	Internal Test-I (20.07.2015)
35- L32	Renal circulation – Urine formation and concentration
36- L33	Renal disorders – Micturition and dialysis
37- L34	Regulation of water and electrolyte balance
38- L35	_____ - Test Paper distribution and result analysis
39- L36	Entering Internal Test-I Marks into University portal
40- L37	Osmo iono regulation in Protozoa, crustacean
41- L38	Osmoregulation in Fresh water, marine and terrestrial animals.
42- L39	Hormonal control of osmo-iono regulation
43- L40	College level meeting/Cell function
44- L41	Revision
45- L42	Revision
46- L43	Students Seminar
47- L44	Students Seminar
48- L45	Unit IV Neuromuscular and sensory Physiology - Introduction
49- L46	Neuron – Structure, classification
50- L47	Neurotransmitters – History, important neurotransmitters, transport and release.
51- P3	Synapse – Anatomical and functional classification, functions, property
	Department Seminar
52- L48	Conduction of nerve impulses – Reflex activity – Classification and property.
53- L49	Structure and function of spinal cord & brain
54- L50	Electroencephalogram – Significance, method of recording, EEG during sleep.
55- L51	Revision
56-L52	- Allotting portion for Internal Test-II

57-L53	Students Power point presentation – Spinal Cord.
58-L54	Students Seminar - Central Neuroglial cells
59-IT-II	Internal Test-II (20.08.2015)
60- L55	Muscles – Classification and properties.
61- L56	- Test Paper distribution and result analysis
	Entering Internal Test-II Marks
62- L57	Students Seminar – Structure of skeletal muscles – Properties of Skeletal muscle.
63- L58	Mechanism of muscular contraction – energetics of muscular contraction.
64- L59	Neuromuscular junction – Motor unit, Transmission and Blockers.
65- L60	Students Seminar – Sense organ of taste.
66- L61	Students Seminar – Sense organ of hearing.
67- L62	Sense organ of vision – Structure, physiology of vision, visual pathway and process.
68- L63	Sense organ of smell – olfactory pathway, classification of odour / cutaneous receptor.
69- L64	Revision.
70- L65	Unit V: Endocrinology and reproduction – Introduction.
71- L66	Endocrine mechanisms in Invertebrates (Insects and Crustaceans).
72- L67	Human: Structure and functions of pituitary.
73- L68	Structure and functions of thyroid.
74-P4	College level meeting/ function
75- L69	Structure and functions of Adrenal Medulla and Adrenal Cortex.
76- L70	Students seminar – hormones and hormone action.
77- L71	Oestrous and endometrial cycle.
78- L72	Menstrual cycle.
79- L73	- Allotting portion for Internal Test-III
80- L74	Structure of Mammary glands.
81- L75	Neuroendocrine regulation of reproduction.
82-IT-III	Internal Test-III (05.10.2015)
83- L76	Revision
84- L77	- Test Paper distribution and result analysis
85- L78	Revision
	Entering Internal Test-III Marks into University portal
86- L79	Model Test (16.10.2015)
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 29.10.2015

Course Outcomes

Learning Outcomes	COs of the course “Animal Physiology”
CO1	Imparts knowledge about various metabolic and physiological mechanisms of the human body

CO2	Able to understand the necessity of balanced diet.
CO3	Describe the comparative anatomy of vertebrate heart.
CO4	Gain knowledge about the physiological concepts of nutrition digestion respiration excretion metabolism and osmoregulation.
CO5	Able to describe the neurophysiology and receptors
CO6	Gain knowledge about hormones and mechanism of hormone mechanism.
Experimental Learning	
EL1	Visit to nearby clinical lab to study the ECG and EEG.
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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Animal Physiology and Biochemistry
Course Code	B3ZB51
Class	III year (2015-2016)
Semester	Odd
Staff Name	P. Augustus Robince
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem	
Internal Test-3 Hrs	
Model Test-3 Hrs	
Dept. Meetings-2 Hrs	
College Meetings-2 Hrs	
Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- Carving an integrated approach to chemistry.
- Related to the functional significance of the various organs.
- Organ systems of animals.

Syllabus

. UNIT I ⌘ Introduction – Animal physiology and Biochemistry ⌘ Carbohydrates – Classification – Structure and functions of glucose, fructose, sucrose and glycogen ⌘ Proteins – Classification – Structure and function of albumin and glyco proteins ⌘ General structure of amino acids – essential, non essential amino acids. ⌘ Lipids – Classification – Structure and functions of lecithin, Cephalin, glycol lipids and cholesterol ⌘ Prostaglandins – Introduction – Structure – Classification – Functions

UNIT II ⌘ Enzymes – Classification – Nomenclature and Properties – Mechanism of enzyme action. ⌘ Digestion – Role of enzymes in carbohydrate, protein and fat digestion in man absorption of digested food materials in man. ⌘ Metabolism – Carbohydrates – Glycogenesis – Kreb’s cycle – Electron transport system. ⌘ Proteins – Deamination – Transamination – Urea cycle ⌘ Lipids – B-oxidation.

UNIT III ⌘ Respiration – respiratory pigments – Distribution – Composition – Properties – Functions – Transport and exchange of oxygen and carbon-di-oxide – Anaerobiosis – Respiratory Quotient. ⌘ Circulation – Origin and conduction of heart beat – Cardiac rhythm, cardiac cycle – ECG – Blood pressure – Heart diseases. ⌘ Excretion – Kinds of excretory products – Nephron – Mechanism of urine formation in man – Composition of urine – Dialysis – Nephritis – Blood urea.

UNIT IV ⌘ Muscle physiology – Ultra structure of skeletal muscle – Properties – Mechanism of muscle contraction – Tetanus – Muscle fatigue. ⌘ Nerve physiology – Structure and types of neuron. ⌘ Nerve impulse – Definition – Conduction of nerve impulse through nerve – Saltatory conduction – Synapse – Synaptic transmission of impulses – Neurotransmitters – Neuromuscular junction. 822

UNIT V ⌘ Endocrine system – Pituitary, thyroid, Parathyroid, Adrenal Islets of Langerhans – Testis Ovary. ⌘ menstrual cycle – The role of Hormones – Menopause – Pregnancy – Lactation. ⌘ Bioluminescence – Definitions – Types – Chemistry – Adaptive significance.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2015
1-L1	UNIT I – Introduction.
2-L2	Animal physiology and Biochemistry .
3- L3	Carbohydrates – Classification .
4-L4	Structure and functions of glucose.
5-L5	fructose, sucrose and glycogen.

6-L6	Proteins – Classification – Structure .
7-L7	and function of albumin and glyco proteins.
8- P1	Welcoming of First year and Inauguration of Mathematics Association
9- L8	General structure of amino acids – essential, non essential amino acids.
10- L9	lipids – Classification.
11-L10	Structure and functions of lecithin, Cephalin.
12-L11	glycol lipids and cholesterol.
13-L12	Prostaglandins – Introduction – Structure – Classification – Function
14-L13	UNIT II Enzymes – Classification.
15-L14	____ - Allotting portion for Internal Test-I
	Internal Test I begins on 20.07.2015
16-L15	Nomenclature and Properties .
17-IT-1	Internal Test-I
18-L16	Mechanism of enzyme action. .
19-L17	____ - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Digestion – Role of enzymes in carbohydrate, protein .
21- L19	fat digestion in man absorption of digested food materials in man.
22- P2	College level meeting/Cell function
23-L20	Metabolism – Carbohydrates – Glycogenesis – Kreb’s cycle – Electron transport system.
24-L21	Proteins – Deamination – Transamination – Urea cycle .
25-L22	Lipids – B-oxidation.
26-L23	UNIT III Respiration – respiratory pigments – Distribution – Composition – Properties – Functions – Transport and exchange of oxygen and carbon-di-oxide – Anaerobiosis – Respiratory Quotient.
27-L24	Circulation – Origin and conduction of heart beat – Cardiac rhythm, cardiac cycle – ECG – Blood pressure – Heart diseases.

28-L25	Excretion – Kinds of excretory products – Nephron .
29-L26	Mechanism of urine formation in man – Composition of urine – Dialysis – Nephritis – Blood urea.
30-L27	UNIT IV Muscle physiology – Ultra structure of skeletal muscle – Properties – Mechanism of muscle contraction – Tetanus – Muscle fatigue.
31-L28	Nerve physiology – Structure and types of neuron.
32-L29	Nerve impulse – Definition – Conduction of nerve impulse through nerve.
33-L30	Saltatory conduction – Synapse.
34- P3	Department Seminar
35-L31	Synaptic transmission of impulses – Neurotransmitters – Neuromuscular junction.
36-L32	____ - Allotting portion for Internal Test-II
	Internal Test II begins on 31.08.2015
37- L33	UNIT V Endocrine system – Pituitary.
38- IT-II	Internal Test-II
39-L34	thyroid, Parathyroid.
40-L35	____ - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Adrenal Islets of Langerhans .
42- L37	Testis Ovary.
43- L38	menstrual cycle .
44- P4	College level meeting/ function
45-L39	The role of Hormones .
46-L40	Menopause .
47-L41	Pregnancy .
48-L42	Lactation.
49-L43	Bioluminescence – Definitions.

50-L44	_____ - Allotting portion for Internal Test-III
	Internal Test III begins on 15.10.2015
51 L45	Types .
52- L46	Chemistry.
53-IT-III	Internal Test-III
54-L47	Adaptive significance.
55-L48	_____ - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
56- MT	Model Test begins on 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 “Animal Physiology and Biochemistry”
CO1	Form a perspective of health and biology through the study of physiology.
CO2	Study different systems and their inherent disorders and deficiencies.
CO3	Learn the structure and functions of bio-molecules and their role in metabolism.
CO4	Learn mechanism of enzyme action and other related information.

CO5	Understand the importance of Heart and circulatory system
CO6	Mechanism of Bioluminescence
CO7	Understand the importance of Brain and Nerves
CO8	Learn mechanism of Hormone action
CO9	Understand the Mechanism of Respiration
Experimental Learning	
EL1	Observing fire fly to understand Bioluminescence
EL2	Observation of Lungs of different animals
EL3	Identification of own blood group
EL4	Observing own blood cells
Integrated Activity	
IA1	Preparing Model of Heart
IA2	Observation of Morphology of different animals.

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 Zoology

COURSE ACADEMIC PLAN (2015-2016)

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	Applied Biotechnology
Course Code	R32B61
Class	I year 2015-2016
Semester	Even
Staff Name	Dr.(Mrs)E Ezhilmathi Sophia,.
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- To understand the concepts and steps of DNA construction
- To study the rule of biotechnology in different areas.

Syllabus

Unit – I

Environmental Biotechnology:

Water pollution: Biotechnological methods for Sewage and Waste water treatment - Primary treatment - Secondary treatment (Anaerobic digestion process and anaerobic filter) - Tertiary treatment (Ion exchange method)**Bioremediation:** Definition -types, Microbial degradation of selected Xeno biotics(Hydrocarbon, Pesticides). Role of genetically engineered micro organisms in bioremediation (Plasmid transfer, Super bug).**Biomining, Bioleaching and Bio fuels:** An overview of the role of microbial technology and biomining, bio leaching and bio fuel.

Unit –II

Agricultural Biotechnology: Basic technology for plant tissue culture (Callus and Explants culture) Production and application of single cell protein **Protoplast Fusion:** Somatic hybridization and micro propagation techniques and their applications. Genetic manipulation of 'nif' gene and 'nod' gene of nitrogen fixation.

Aqua culture Technology: Application of Biotechnological tools (ELISA & PCR) for disease diagnosis.

Unit – III

Bioprocess / Fermentation Technology: Definition, Products of Commercial

importance from Bio process technology. **Bio reactors:** Principle, Design of conventional and Advanced types (Continuous stirred tank Bioreactors CSTB and Airlift bioreactors)..

Metabolite production: Primary metabolites - Ethanol production – secondary metabolites - Penicillin - Enzyme production - galactosidase.

Biotransformation: Definition, principle and biotransformation of ethanol.

Unit – IV

Enzyme Technology: Enzymes definition, nomenclature and properties. **Enzyme**

production: Microbial organisms and enzyme production Commercial production of microbial enzymes - technique - industrial application of microbial enzymes - enzyme immobilization and their application. **Enzyme Biosensor:** Principle and types of biosensor - Applications of biosensor.

Unit – V

Human genome project: Introduction, objectives, principle, mapping methods and major contributions of Human genome project.

Gene therapy: Introduction, types of gene therapy, vectors used in gene therapy (viral vector) and gene therapy for cancer.

DNA applications: DNA probe - methods and mechanism - - DNA finger printing techniques and Application in forensic medicine.

DNA vaccines, Bio-weapons.

Reference books:

1. B.D Singh, —Biotechnology, Kalyani Publishers, No.1 Mahalakshmi street, T.Nagar, Chennai – 600 017.
2. C.Ratledge & B. Kristiansen —Basic Biotechnology| Cambridge University Press.
3. Prof. V. Kumaresan, —Animal Biotechnology|, Saras Publication, 114/35G A.R.P Camp Road, Periyavilai, Kattar P.O., Nagercoil, Kanyakumari -629 002.
4. Dubey R.C —A tex book of Biotechnology| S. Chand & Co., Ltd., New Delhi.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 03.12.2015
1-L1	Biotechnological methods for Sewage and Waste water treatment
2-L2	Primary treatment
3- L3	Secondary treatment
4-L4	Anaerobic digestion process
5-L5	anaerobic filter
6-L6	Tertiary treatment
7-L7	Ion exchange method
8- P1	Welcoming of First year and Inauguration of Zoology Association
9- L8	Bioremediation:
10- L9	Definition -types, Microbial degradation of selected Xenobiotics(Hydrocarbon, Pesticides
11-L10	Role of genetically engineered micro organisms inbioremediation (Plasmid transfer, Super bug
12-L11	Biomining,
13-L12	Bioleaching and Biofuels:
14-L13	An overview of the role of microbial technology and biominng, bioleachng and biofuel.
15-L14	Basic technology for plant tissue culture (Callus and

16-L15	Explants culture)
17- L16	Production and application of single cell protein Protoplast Fusion:
18- L17	Somatic hybridization
19- L18	micro propagation
20- L19	Techniques and their applications.
21- L20	Allotting portion for Internal Test-I
	Internal Test 19.01.2015
22- L21	Genetic manipulation of 'nif' gene and 'nod' gene of nitrogen fixation
23- IT-1	Internal Test-I
24- L22	Definition, Products of Commercial
25- L23	Importance from Bio process technology. Bioreactors:
26- L24	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Principle, Design of conventional and Advanced
28- L26	types (Continuous stirred tank Bioreactors
29- L27	CSTB and Airlift bioreactors).
30- P2	College level meeting/Cell function
31-L28	Metabolite production: Primary metabolites
32-L29	Ethanol production
33-L30	secondary metabolites
34- L31	Penicillin - Enzyme production
35- L32	galactosidase.
36- L33	Biotransformation: Definition, principle and biotransformation of ethanol
37- L34	Enzyme Technology: Enzymes definition, nomenclature and
38-L35	properties. Enzyme
39- L36	production: Microbial organisms and enzyme production Commercial
40- L37	production of
41- L38	microbial enzymes
42-P3	Department Seminar
43- L39	technique
44- L40	industrial application of microbial enzymes - enzyme 835
45- L41	Immobilization and their application.
46- L42	Enzyme Biosensor: Principle and types of biosensor
47- L43	Allotting portion for Internal Test-II
	Internal Test II begins 16.02.2015
48- L44	Applications of biosensor
49-IT-II	Internal Test-II
50-L45	Applications of biosensor
51- L46	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Applications of biosensor
53- L48	Human genome project: Introduction,
54- L49	objectives, principle, mapping methods
55- L50	major contributions of Human genome project.
56- L51	Gene therapy: Introduction, types of gene therapy, vectors used in gene therapy
57- L52	Vector and gene therapy for cancer.

58- L53	DNA applications: DNA probe
59-P4	College level meeting/ function
60- L54	methods and mechanism
61- L55	DNA finger printing techniques and Application in forensic medicine.
62- L56	DNA vaccines,
63- L57	Bio-weapons.
64- L58	Allotting portion for Internal Test-III
	Internal Test III begins 16.03.2015
65- L59	Revision
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 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 23.04.2016

Course Outcomes

Learning Outcomes	COs of the course “<Applied Biotechnology >”
CO1	Learn the r DNA contrition
CO2	Gain knowledge and r DNA in agriculture
CO3	Understand gene therapy
CO4	Study the bio-weapons’ bio-chips

- # 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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	Bio Statics and Computer Application.
Course Code	HZOM23.
Class	I year (2015-2016)
Semester	Even
Staff Name	P. Augustus Robince.
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- The objectives of biostatistics is to advance statistical science and its application
- The role of bio statics is an important one in designing studies and analysing data form research problems
- Computer study operate a variety of advanced spread sheet, operating system and word processing function

Syllabus

Unit I

Collection of Data : Primary and Secondary data -Methods of collecting primary data • sources of secondary data. **Sampling and Sample Designs** : Essentials of sampling Methods of sampling -Random sampling methods -Non random sampling methods Merits and Limitations of sampling. Classification and tabulation of data -Diagrammatic and graphic presentation of data.

Unit II

Measures of Central Tendency : Mean- Arithmetic mean -Weighted arithmetic mean • Median -Mode. **Measures of Dispersion** : Quartile deviation --Mean deviation • Standard deviation -Lorenz curve. **Skewness Moments and Kurtosis** : Measure of skewness -Absolute measure of skewness -Relative measure of skewness -Karl Pearson's coefficient of skewness- Rowley's coefficient of skewness. Moments. Measures of kurtosis. **Correlation analysis** : Types of Correlation -Methods of studying correlation Karl Pearson's coefficient of correlation -Regression Analysis -Regression line, Regression equations.

Unit

III

Probability and Expected Value : Concepts of probability -Types of events - Theorems of probability - conditional probability -Bayes' Theorem. **Theoretical Distribution** : Binomial distribution -Poisson distribution - Normal distribution. **Statistical Inference** : Test of hypothesis -procedure of testing hypothesis. **Estimation** : Test of significance for large sample - Test of significance for small samples -Student's t- distribution.

Unit IV:

Chi square test and a Goodness of fit-Yates correction F-Test and Analysis of Variance one way classification and two way classification .Experimental design -Randomized block design -Latin squares -The Sign Test -A rank sum test (The Mann-Whitney U Test).

Unit V

Bioinformatics : Information Technology in Biology - Types of sequences used in bioinformatics -Application of Bioinformatics. **Biological Database** : Objectives - Properties of Database -database retrieval system -Symbols used in data base • Nomenclature of DNA sequences Nomenclature of protein sequences -NCBI .SWISS• PROT. **Data Base Similarity Search Tools** : BLAST -FASTA -Application of bioinformatics tools -Homology search tools -Protein functional analysis tools -Sequences analysis tools -Structural analysis tools - Molecular modeling and visualizing tools Polygenetic analysis tools

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 02.12.2015
1-L1	Unit I Collection of Data : Primary and Secondary data.
2-L2	Methods of collecting primary data.
3- L3	sources of secondary data.
4-L4	Sampling and Sample Designs : Essentials of sampling.
5-L5	Methods of sampling.
6-L6	Random sampling methods.
7-L7	Non random sampling methods.
8- P1	Welcoming of First year and Inauguration of Mathematics Association
9- L8	Merits.
10- L9	Limitations of sampling.
11-L10	Classification of Data.
12-L11	tabulation of data.
13-L12	Diagrammatic Presentation of Data.
14-L13	graphic presentation of data.
15-L14	Unit II Measures of Central Tendency : Mean- Arithmetic mean Weighted
16-L15	arithmetic mean •Median –Mode.
17- L16	Measures of Dispersion : Quartile deviation .
18- L17	Mean deviation • Standard deviation.
19- L18	Lorenz curve.

20- L19	Skewness Moments and Kurtosis .
21- L20	_____ - Allotting portion for Internal Test-I
	Internal Test I begins on 25.01.2016
22- L21	Measure of skewness.
23- IT-1	Internal Test-I
24- L22	Absolute measure of skewness.
25- L23	Relative measure of skewness.
26- L24	_____ - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Karl Pearson's coefficient of skewness.
28- L26	Rowley's coefficient of skewness.
29- L27	Moments. Measures of kurtosis.
30- P2	College level meeting/Cell function
31-L28	Correlation analysis : Types of Correlation.
32-L29	Methods of studying correlation.
33-L30	Karl Pearson's coefficient of correlation .
34- L31	Regression Analysis .
35- L32	Regression line.
36- L33	Regression equations.
37- L34	Unit III: Probability and Expected value: Concepts of Probability.
38- L35	Types of events.
39- L36	Theorems of Probability.
40- L37	Conditional Probability.
41- L38	Bayes theorem.
42-P3	Department Seminar
43- L39	Theoretical Distribution :Binomial distribution.

44- L40	Poisson distribution - Normal distribution.
45- L41	Statistical Inference :Test of hypothesis procedure of testing hypothesis.
46- L42	Estimation : Test of significance for large sample - Test of significance for small samples -Student's- distribution
47- L43	_____ - Allotting portion for Internal Test-II
	Internal Test II begins on 22.02.2016
48- L44	Unit IV: Chi square test and a Goodness of fit.
49-IT-II	Internal Test-II
50-L45	Yates correction F-Test and Analysis of Variance one way classification.
51- L46	_____ - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	two way classification.
53- L48	Experimental design –Randomized block design -Latin squares –The Sign Test –A rank sum test (The Mann-Whitney U Test).
54- L49	Unit V: Bioinformatics: Information technology in biology.
55- L50	Types of sequences used in bioinformatics .
56- L51	Application of Bioinformatics.
57- L52	Biological Database : Objectives .
58- L53	Nomenclature of DNA sequences .
59-P4	College level meeting/ function
60- L54	Nomenclature of protein sequences
61- L55	NCBI .SWISS• PROT.
62- L56	Data Base Similarity Search Tools : BLAST -FASTA -Application of bioinformatics tools.
63- L57	Homology search tools –Protein functional analysis tools.
64- L58	_____ - Allotting portion for Internal Test-III
	Internal Test III begins on 28.03.2016
65- L59	Sequences analysis tools.

66- L60	Structural analysis tools .
67-IT-III	Internal Test-III
68- L61	Molecular modeling .
69- L62	visualizing tools Polygenetic analysis tools.
70- L63	_____ - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
71-MT	Model Test begins on 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 22.04.2016

Course Outcomes

Learning Outcomes	COs of the course “Bio Statics and Computer Application.”
CO1	Define the principal concepts about biostatistics.
CO2	Recognize the definition of statistics, its subject and its relation with the other sciences.
CO3	Collect data relating to variable/variables which will be examined and calculate descriptive statistics from these data.
CO4	Identify convenient sample by using sampling theory.
CO5	Define some concepts about hypothesis testing.
CO6	Apply hypothesis testing to the data through these concepts.
CO7	Arrange the results of the hypothesis testing and make a statistical decision.
CO8	Define the principal concepts about computer applications.

CO9	Define the principal concepts about bioinformatics.
Experimental Learning	
EL1	Perform linear regression model fitting and diagnosis
EL2	Communicate statistical analysis through written scientific report
EL3	Compare different generation computers
EL4	Relate Smart phones and computers
Integrated Activity	
IA1	Identify the Electronics equipment used in your home.
IA2	How computers are used in day today life

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology (2015-2016)
Course Name	Cell and molecular biology
Course Code	GMZO31
Class	II year
Semester	Odd(June 2015 to November 2015)
Staff Name	D.V.SHEEBA RAJAKUMARI.
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; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To provide with the core principles of molecular biology
- To gain higher level thinking skills
- To learn basic science and its applications

Syllabus

Unit I

Cell types – Prokaryotic & Eukaryotic. Microscopy – detailed study of compound microscope, phase contrast & electron microscope microscopes, Cytological techniques – Fixation & Fixatives – types of stains.

Unit II

Ultrastructure & functions of the following cell organelles: Plasma membrane, mitochondria, Golgi apparatus, endoplasmic reticulum, ribosomes, lysosomes, centriole.

Unit III

Nuclear components: Ultrastructure & functions of nucleus, nuclear membrane, nucleolus, chromosomes & their types, Cancer cell & Carcinogenesis: Definition, types, causes, properties, treatment, Oncogenes.

Unit IV

DNA: DNA as genetic material, Base pairs, constancy of DNA structure & Replication, Hybridization, Cell division – mitosis & mitotic apparatus, Meiosis & Synaptonemal complex.

Unit V

Different types of RNA, transcription, functional Unit of gene, promoter, coding sequences, processing of ribosomal RNA inhibitors of transcription various steps in protein synthesis. Genetic code – Codons. Anticodons, control of gene expression.

Reference Books :

1. Molecular Cell Biology – By Lodish H. Berk A., Zipursky S. Matsudaira P. Baltimore D. and Darnell J. WH Freeman and Co.
2. Cell and Molecular Biology By Derobertis, EDP ISE Publication
3. Molecular Biology of the Cell by Alberts et.al., Garland Publishing inc. New york
4. Cell and Molecular Biology – By Gupta PK Rastogi Publications Meerut, India
5. Cell and Molecular Biology – By Prakash & Lohar MIP Publishers, Chennai

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2015
1-L1	Syllabus discussion,
2-L2	Cell types – prokaryotic and eukaryotic .
3-L3	Microscopy – detailed study of compound microscope.
4-L4	Phase contrast and electron microscope , microscopes
5-L5	Cytological techniques –fixation and fixatives
6-L6	Types of stains
7-L7	Ultrastructure and functions of plasmamembrane
8- P1	Welcoming of First year and Inauguration of zoology Association
9- L8	Ultra structure and functions of mitochondria
10- L9	Ultra structure and functions of golgi apparatus
11-L10	Ultra structure and functions of endoplasmic reticulum
12-L11	Ultra structure and functions of ribosomes
13-L12	Ultra structure and functions of lysosomes
14-L13	Ultra structure and functions of centriole
15-L14	Ultra structure and functions of centriole - Allotting portion for Internal Test-I
	Internal Test I begins(20.07.2015)
16-L15	Ultra structure and functions of nucleus
17-IT-1	Internal Test-I
18-L16	Ultra structure and functions of nuclear membrane and nucleolus
19-L17	Ultra structure and functions of nuclear membrane and nucleolus - Test Paper

	distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Chromosomes and their types
21- L19	Cancer cells
22- P2	College level meeting/Cell function
23-L20	Carcinogenesis- definition
24-L21	Types and causes of cancer
25-L22	Properties and treatment of cancer
26-L23	Oncogenes
27-L24	DNA as genetic material
28-L25	Basepairs , constancy of DNA structure
29-L26	DNA replication and hybridization
30-L27	Cell division
31-L28	Mitosis and mitotic apparatus
32-L29	Miosis and synaptonemal complex
33-L30	Different types of RNA
34- P3	Department Seminar
35-L31	Transcription
36-L32	Transcription - Allotting portion for Internal Test-II
	Internal Test II begins(31.08.2015)
37- L33	Functional unit of gene.
38- IT-II	Internal Test-II
39-L34	Promoter
40-L35	Promoter - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Coding sequences
42- L37	Processing of ribosomal RNA
43- L38	Inhibitors of transcription
44- P4	College level meeting/ function
45-L39	Steps in protein synthesis
46-L40	Genetic code
47-L41	Codons
48-L42	Anti codons
49-L43	Control gene expression
50-L44	Control gene expression - Allotting portion for Internal Test-III
	Internal Test III begins(05.10.2015)
51 L45	Revesion
52- L46	Revesion
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(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 “<course name>”
CO1	Exhibit a knowledge base in genetics, cell and molecular biology and anatomy and physiology
CO2	Demonstrate the knowledge of common and advanced laboratory practices in cell and molecular biology.
CO3	Exhibit clear and concise communication of scientific data
CO4	Engage in review of scientific literature in the areas of biomedical sciences
CO5	Critique and professionally present primary literature articles in the general biomedical sciences field.
Experimental Learning	
EL1	To do working models to explain Genetic code
EL2	To do working models to explain Coding sequences
Integrated Activity	
IA1	Prepare chart for Codons
IA2	Prepare chart for Anti Codons

- # 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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	ENVIRONMENTAL BIOLOGY
Course Code	HZOM22
Class	I year (2015-2016)
Semester	EVEN
Staff Name	Dr.P. Elizmathi Sophia
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- To introduce the students to various regional and global concerns regarding the environment, including the natural challenges
- To study the various types of environmental pollutants and their effects
- To discuss the changing environment, and the developments of diverse technologies
- The subject aims to introduce specific examples and cases
- To explain how chemical, biological and molecular sciences can be applied to identify and address issues of environmental concerns.

Syllabus

Unit I : Ecosystem and productivity : Ecosystem – concepts, types – terrestrial and aquatic ecosystems, stability, food chain, food web and trophic levels. Energy flow in ecosystem. Primary productivity process – productivity in a fresh water pond ecosystem. Methods of measurement of primary productivity – Biogeochemical cycles – water cycle and nitrogen cycle.

Unit II : Population growth and pollution : Human population growth, population explosion in India – Soil waste management. Air, water, soil, noise and thermal pollution – sources, effects and control measures. Nuclear hazards : non-degradable pollutants – biotransformation, biomagnifications, bioremediation and soil issues.

Unit III : Resource management : Natural resources – renewable and non-renewable resources. Concept of conservation and management of natural resources. Forest resources – Ecological and economic importance of forest - types and management –forest resources of India – deforestation and its effects. Water resources : distribution Indian water resources. Mineral resources – uses and exploration of mineral resources. Energy resources –energy resources types – `solar, wind, geothermal, hydroelectricity, hydrogen, tidal energy, biomass and nuclear energy.

Unit IV : Biodiversity concept : Biodiversity – Concept and principle of biodiversity – genetic, species and ecosystem diversity. Similarity and Dominance index, `Evenness index, Richness index and Association index. Sampling methods, values and use of diversity, loss of animal diversity and endangered wildlife species. Hot spots – red list – endangered and endemic species.

Unit V : Biodiversity conservation : Human impact on biological diversity – causes for the loss of biodiversity. Fragmentation of biodiversity – Biogeographic zones in India Zoogeographical realms – Geograpy and major biomass, Wildlife of India – values of wildlife. Conservation of wildlife *in situ* and *ex situ*. Conservation practices : Wildlife sanctuaries, national parks and biosphere reserves.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 02.12.2015
1-L1	Ecosystem and productivity
2-L2	Ecosystem – concepts
3- L3	Ecosystem – types
4-L4	Terrestrial and aquatic ecosystems
5-L5	Stability, food chain, food web and trophic levels
6-L6	Energy flow in ecosystem.
7-L7	Primary productivity process
8- P1	Zoology Association activities
9- L8	Productivity in a fresh water pond ecosystem.
10- L9	Methods of measurement of primary productivity
11-L10	Methods of measurement of primary productivity
12-L11	Biogeochemical cycles
13-L12	Water cycle and nitrogen cycle
14-L13	Population growth and pollution
15-L14	Human population growth
16-L15	Population explosion in India
17- L16	Soil waste management
18- L17	Air, water, soil, noise and thermal pollution
19- L18	Sources, effects and control measures
20- L19	Nuclear hazards
21- L20	Non-degradable pollutants - Allotting portion for Internal Test-I
	Internal Test I begins
22- L21	Biotransformation, biomagnifications,
23- IT-1	Internal Test-I
24- L22	Bioremediation and soil issues.
25- L23	Resource management
26- L24	Natural resources - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Renewable and non-renewable resources
28- L26	Concept of conservation and management of natural resources
29- L27	Forest resources
30- P2	College level meeting/Cell function
31-L28	Ecological and economic importance of forest
32-L29	Types and management of forest resources
33-L30	Forest resources of India
34- L31	Deforestation and its effects
35- L32	Water resources
36- L33	Distribution Indian water resources
37- L34	Mineral resources – uses and exploration of mineral resources.
38- L35	Energy resources
39- L36	Energy resources types
40- L37	Solar, wind, geothermal, hydroelectricity
41- L38	Hydrogen, tidal energy, biomass and nuclear energy.

42-P3	Department Seminar
43- L39	Biodiversity concept
44- L40	Concept and principle of biodiversity
45- L41	Genetic, species and ecosystem diversity
46- L42	Similarity and Dominance index
47- L43	Evenness index - Allotting portion for Internal Test-II
	Internal Test II begins
48- L44	Richness index
49-IT-II	Internal Test-II
50-L45	Association index.
51- L46	Sampling methods - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Values and use of diversity
53- L48	loss of animal diversity and endangered wildlife species.
54- L49	Hot spots – red list – endangered and endemic species.
55- L50	Biodiversity conservation
56- L51	Human impact on biological diversity
57- L52	causes for the loss of biodiversity
58- L53	Fragmentation of biodiversity
59-P4	College level meeting/ function
60- L54	Biogeographic zones in India Zoogeographical realms
61- L55	Geography and major biomass
62- L56	Wildlife of India –
63- L57	values of wildlife
64- L58	Conservation of wildlife <i>in situ</i> and <i>ex situ</i> . - Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Conservation practices
66- L60	Wildlife sanctuaries, national parks and biosphere reserves.
67-IT-III	Internal Test-III
68- L61	Revision of Unit I & II
69- L62	Revision of Unit III & IV
70- L63	Revision of Unit V - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
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 “ENVIRONMENTAL BIOLOGY”
CO1	Describe and debate various global and regional environmental concerns that affect various forms of life.
CO2	Appreciate the impact of human activities on other life and the environment.
CO3	Argue the significance of native biodiversity and need for its conservation.
CO4	Investigate specific cases of environmental pollution or natural challenges, and their impacts.
CO5	Apply chemistry, biology, molecular biology and microbiology skills to environment issues.
CO6	Reflect on the scientific concerns, including ethical and social issues, to the environment associated with the applications of new technologies.
CO7	Perform literature searches on specific environmental issues, critically analyse the literature and present an appraisal of that literature.
Experimental Learning	
EL1	Issues of environmental concerns, e.g., diverse types of pollutants from industrial, mining or agricultural activities and/or health care practices; case studies in these areas.
EL2	The effects of pollutants on living organisms; case studies.
EL3	Environmental stress factors affecting plant life, and their impacts on sustainability and biodiversity; case studies.
Integrated Activity	
IA1	Take a survey of species richness in band of Thamirabarani river.
IA2	Prepare a model for Ecosystem

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	ENVIRONMENTAL BIOLOGY
Course Code	HZOM22
Class	I year (2014-2015)
Semester	EVEN
Staff Name	Dr.M.Rajakumari
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- To introduce the students to various regional and global concerns regarding the environment, including the natural challenges
- To study the various types of environmental pollutants and their effects
- To discuss the changing environment, and the developments of diverse technologies
- The subject aims to introduce specific examples and cases
- To explain how chemical, biological and molecular sciences can be applied to identify and address issues of environmental concerns.

Syllabus

Unit I : Ecosystem and productivity : Ecosystem – concepts, types – terrestrial and aquatic ecosystems, stability, food chain, food web and trophic levels. Energy flow in ecosystem. Primary productivity process – productivity in a fresh water pond ecosystem. Methods of measurement of primary productivity – Biogeochemical cycles – water cycle and nitrogen cycle.

Unit II : Population growth and pollution : Human population growth, population explosion in India – Soil waste management. Air, water, soil, noise and thermal pollution – sources, effects and control measures. Nuclear hazards : non-degradable pollutants – biotransformation, biomagnifications, bioremediation and soil issues.

Unit III : Resource management : Natural resources – renewable and non-renewable resources. Concept of conservation and management of natural resources. Forest resources – Ecological and economic importance of forest - types and management –forest resources of India – deforestation and its effects. Water resources : distribution Indian water resources. Mineral resources – uses and exploration of mineral resources. Energy resources –energy resources types – `solar, wind, geothermal, hydroelectricity, hydrogen, tidal energy, biomass and nuclear energy.

Unit IV : Biodiversity concept : Biodiversity – Concept and principle of biodiversity – genetic, species and ecosystem diversity. Similarity and Dominance index, `Evenness index, Richness index and Association index. Sampling methods, values and use of diversity, loss of animal diversity and endangered wildlife species. Hot spots – red list – endangered and endemic species.

Unit V : Biodiversity conservation : Human impact on biological diversity – causes for the loss of biodiversity. Fragmentation of biodiversity – Biogeographic zones in India Zoogeographical realms – Geograpy and major biomass, Wildlife of India – values of wildlife. Conservation of wildlife *in situ* and *ex situ*. Conservation practices : Wildlife sanctuaries, national parks and biosphere reserves.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 03.12.2014
1-L1	Ecosystem and productivity
2-L2	Ecosystem – concepts
3- L3	Ecosystem – types
4-L4	Terrestrial and aquatic ecosystems
5-L5	Stability, food chain, food web and trophic levels
6-L6	Energy flow in ecosystem.
7-L7	Primary productivity process
8- P1	Zoology Association activities
9- L8	Productivity in a fresh water pond ecosystem.
10- L9	Methods of measurement of primary productivity
11-L10	Methods of measurement of primary productivity
12-L11	Biogeochemical cycles
13-L12	Water cycle and nitrogen cycle
14-L13	Population growth and pollution
15-L14	Human population growth
16-L15	Population explosion in India
17- L16	Soil waste management
18- L17	Air, water, soil, noise and thermal pollution
19- L18	Sources, effects and control measures
20- L19	Nuclear hazards
21- L20	Non-degradable pollutants - Allotting portion for Internal Test-I
	Internal Test I begins
22- L21	Biotransformation, biomagnifications,
23- IT-1	Internal Test-I
24- L22	Bioremediation and soil issues.
25- L23	Resource management
26- L24	Natural resources - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Renewable and non-renewable resources
28- L26	Concept of conservation and management of natural resources
29- L27	Forest resources
30- P2	College level meeting/Cell function
31-L28	Ecological and economic importance of forest
32-L29	Types and management of forest resources
33-L30	Forest resources of India
34- L31	Deforestation and its effects
35- L32	Water resources
36- L33	Distribution Indian water resources
37- L34	Mineral resources – uses and exploration of mineral resources.
38- L35	Energy resources
39- L36	Energy resources types
40- L37	Solar, wind, geothermal, hydroelectricity
41- L38	Hydrogen, tidal energy, biomass and nuclear energy.

42-P3	Department Seminar
43- L39	Biodiversity concept
44- L40	Concept and principle of biodiversity
45- L41	Genetic, species and ecosystem diversity
46- L42	Similarity and Dominance index
47- L43	Evenness index - Allotting portion for Internal Test-II
	Internal Test II begins
48- L44	Richness index
49-IT-II	Internal Test-II
50-L45	Association index.
51- L46	Sampling methods - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Values and use of diversity
53- L48	loss of animal diversity and endangered wildlife species.
54- L49	Hot spots – red list – endangered and endemic species.
55- L50	Biodiversity conservation
56- L51	Human impact on biological diversity
57- L52	causes for the loss of biodiversity
58- L53	Fragmentation of biodiversity
59-P4	College level meeting/ function
60- L54	Biogeographic zones in India Zoogeographical realms
61- L55	Geography and major biomass
62- L56	Wildlife of India –
63- L57	values of wildlife
64- L58	Conservation of wildlife <i>in situ</i> and <i>ex situ</i> . - Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Conservation practices
66- L60	Wildlife sanctuaries, national parks and biosphere reserves.
67-IT-III	Internal Test-III
68- L61	Revision of Unit I & II
69- L62	Revision of Unit III & IV
70- L63	Revision of Unit V - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
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 “ENVIRONMENTAL BIOLOGY”
CO1	Describe and debate various global and regional environmental concerns that affect various forms of life.
CO2	Appreciate the impact of human activities on other life and the environment.
CO3	Argue the significance of native biodiversity and need for its conservation.
CO4	Investigate specific cases of environmental pollution or natural challenges, and their impacts.
CO5	Apply chemistry, biology, molecular biology and microbiology skills to environment issues.
CO6	Reflect on the scientific concerns, including ethical and social issues, to the environment associated with the applications of new technologies.
CO7	Perform literature searches on specific environmental issues, critically analyse the literature and present an appraisal of that literature.
Experimental Learning	
EL1	Issues of environmental concerns, e.g., diverse types of pollutants from industrial, mining or agricultural activities and/or health care practices; case studies in these areas.
EL2	The effects of pollutants on living organisms; case studies.
EL3	Environmental stress factors affecting plant life, and their impacts on sustainability and biodiversity; case studies.
Integrated Activity	
IA1	Take a survey of species richness in band of Thamirabarani river.
IA2	Prepare a model for Ecosystem

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Phil. Zoology
Course Name	Advance In Animal Bio Technology And Nano technology
Course Code	HZOC12
Class	I year (2015-2016)
Semester	Odd
Staff Name	P. Augustus Robince
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs(5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To understand the techniques used in Gene manipulation
- To study the methodology of Gene Transformation
- To study the Genomics and Proteomics
- To understand the Nanotechnology and its uses

Syllabus

Unit I:

Cell dynamics, recombinant DNA technology, Introducing DNA into animal cells: Injection, electroporation, viral vectors, Allitix exchange, vectorless mode of gene transfer
Tissue culture in biomedical and biochemical research; regulatory proteins, blood products
vaccines and hormones.

Unit II:

Transgenic animals, fertilization and embryo transfer, foreign gene expressions -- IPM •
Mapping and sequencing the Human genome, The human genome project & ethical, legal and social
issues. Ethical issues in animal biotechnology -- Genetically modified organisms,
phylogenetics using mitochondrial genomes.

Unit III:

Utility of Biotechnology and genetic engineering. Genomics and proteomics DNA
fingerprinting -- diagnostic and forensics -- Gene therapy, probes -- monoclonal antibodies •
detection of genetic diseases, DNA bar-coding of animals.

Unit IV:

Nanotechnology basics -- Introduction to nanoworld, classification of nano materials,
application of nanocrystals, nanofactories, mechanochemistry, nanobiosensors -- Optical
biosensors -- DNA sensors Quantum dots -- application in biotechnology -- Is nanotechnology
bad or good?

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Unit V:

Nanotechnology in biomedical applications nanomedicines and drug delivery systems,
health and environmental impacts of nanotechnology.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2015
1-L1	Unit I: Cell dynamics
2-L2	recombinant DNA technology
3- L3	Introducing DNA into animal cells
4-L4	Injection
5-L5	electroporation
6-L6	viral vectors Allitix exchange
7-L7	vectorless mode of gene transfer Tissue culture in biomedical and biochemical research
8- P1	Welcoming of First year and Inauguration of Mathematics Association
9- L8	regulatory proteins
10- L9	blood products vaccines
11-L10	hormones
12-L11	Unit II: Transgenic animals
13-L12	fertilization
14-L13	embryo transfer
15-L14	_____ - Allotting portion for Internal Test-I
	Internal Test I begins
16-L15	foreign gene expressions--IPM
17-IT-1	Internal Test-I
18-L16	Mapping the Human Genome
19-L17	_____ - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal

20-L18	sequencingtheHumangenome
21- L19	The humangenomeproject.
22- P2	College level meeting/Cell function
23-L20	Ethical issues
24-L21	legal issues
25-L22	social issues
26-L23	Ethical issuesin animal biotechnology
27-L24	Genetically modifiedorganisms
28-L25	phylogeneticsusingmitogenomes
29-L26	Unit III: UtilityofBiotechaology
30-L27	Utility of genetic engineering
31-L28	Genomics andproteomics
32-L29	DNA fingerprinting
33-L30	diagnosticandforensics
34- P3	Department Seminar
35-L31	Genetherapy
36-L32	_____ - Allotting portion for Internal Test-II
	Internal Test II begins
37- L33	probes-monoclonalantibodies
38- IT-II	Internal Test-II
39-L34	detectionogeneticdiseases
40-L35	_____ - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	DNAbar-codingofanimals
42- L37	UnitIV: Nanotechnologybasics-Introduction to nanoworld, classification ofnano materials, applicationctnanocrystals,

43- L38	nanofactories,mechanochemistry,
44- P4	College level meeting/ function
45-L39	nanobiosensors
46-L40	optical biosensors
47-L41	DNA sensors Quantum dots – application in biotechnology
48-L42	Is nanotechnology bad or good?
49-L43	Unit V: Nanotechnology in biomedical applications
50-L44	_____ - Allotting portion for Internal Test-III
	Internal Test III begins
51 L45	nanomedicines
52- L46	drug delivery systems
53-IT-III	Internal Test-III
54-L47	health and environmental impacts of nanotechnology.
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 23.11.2018

Course Outcomes

Learning Outcomes	COs of the course “Advances in Animal Bio Technology And Nano technology”
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CO1	Studied all the techniques used in Gene manipulation
CO2	Familiar in the methodology of Gene Transformation
CO3	Explanation of Genomics and Proteomics
CO4	Understand the Nanotechnology
CO5	Determine the structure of different Nano Particles
CO6	Application of Nano Particles in different fields
CO7	Conclude the merits and demerits of Nano Particles
CO8	Future of Nano particle
CO9	Explain the uses of Nano Particles in Drug delivery
Experimental Learning	
EL1	Collect the material made up of Nanoparticles and Observe
EL2	To do Models of DNA and RNA
EL3	GD merits and demerits of Nano Particles
EL4	Collect information about GM Food
Integrated Activity	
IA1	Prepare a Model for carbon Nano tube
IA2	How Nano particles used in day-to-day life

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Phil Zoology
Course Name	RESEARCH METHODOLOGY
Course Code	HZOC11
Class	M.Phil (2015-2016)
Semester	Odd
Staff Name	Dr.M.Rajakumari
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- Overview of Research and its Methodologies .
- Students should know why educational research is undertaken, and the audiences that profit from research studies
- To be able to describe the method of chromatography and its applications
- Knowledge of the structure and function of the major organ systems, including the molecular, biochemical and cellular mechanisms for maintaining homeostasis
- Provide an introduction to what bioinformatics is and why it is important
- Provide an overview of the application areas of bioinformatics, with a focus on the topics that will be taught in the course

Syllabus

Unit I :

Sources of research data- methods of collection, analysis and interpretation. organization of research paper, web based literature survey, citation index, impact factor, copy right, plagiarism.

Unit II :

High Performance Liquid Chromatography (HPLC) and its applications; SOS PAGE and Gradient Gel Electrophoresis, separation of nucleic acids; Gel Documentation, Isoelectric focussing, Southern, Northern and Western blotting techniques; Polymerase Chain Reaction (PCR), Microscopy- SEM, TEM, Fluorescence.

Unit III :

Immunology: Radio Immuno Assay (RIA), ELISA & Hybridoma technology and their applications: Rapid Immunodiagnostic procedures - Microbiology; Colony Forming Unit (CFU); Evaluation of antimicrobial activity - Kirby- Bauer procedure; Minimal Inhibitory Concentration (MIC): Qualitative analysis of water; Most Probable Number (MPN) index and Membrane filter technique; Cultivation of anaerobic microorganisms: GasPak system and Minimal Inhibitory Concentration (MIC).

Unit IV :

Diversity indices; using of softwares for calculating Biodiversity methods.

Unit V :

Bioinformatics-definition: Biological databases; Sequence comparison; Multiple sequence alignment; Profiles, motifs and feature identification; Phylogenetic data analysis, Bioinformatics in genomes; Bioinformatics software.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2015
1-L1	Primary Data Collection Methods
2-L2	Quantitative Methods
3- L3	Qualitative Methods
4-L4	Secondary Data Collection Methods
5-L5	Data analysis and interpretation
6-L6	Organization of research paper
7-L7	Design and Development of a Process for Web-based Survey Research
8- P1	Welcoming of First year and Inauguration of Zoology Association
9- L8	Citation Indexing
10- L9	Web of Science database
11-L10	Limitations of WoS Data base
12-L11	Indian Citation Index (ICI)
13-L12	The impact factor
14-L13	Tools for Impact analysis
15-L14	Copy right, plagiarism.
16-L15	High Performance Liquid Chromatography (HPLC) and its applications
17- L16	SOS PAGE
18- L17	Gradient Gel Electrophoresis
19- L18	Separation of nucleic acids
20- L19	Gel Documentation
21- L20	Isoclectric focussing - Allotting portion for Internal Test-I
	Internal Test I begins
22- L21	Southern,Northern and Western blotting techniques
23- IT-1	Internal Test-I
24- L22	Polymerase Chain Reaction (PCR)
25- L23	Study of Transmission Electron Microscopy (TEM)
26- L24	Study of Scanning Electron Microscopy (SEM) - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Fluorescence
28- L26	Immunology
29- L27	Radio Immuno Assay (RIA)
30- P2	College level meeting/Cell function
31-L28	ELISA&Hybridoma technology and their applications
32-L29	Rapid Immunodiagnostic procedures
33-L30	Microbiology; Colony Forming Unit (CU)
34- L31	Evaluation of antimicrobial activity
35- L32	Kirby- Bauer procedure
36- L33	Minimal Inhibitory Concentration (MIC)
37- L34	Qualitative analysis of water
38- L35	Most Probable Number (MPN) index and Membrane filter technique
39- L36	Cultivation of anaerobic microorganisms
40- L37	GasPak system
41- L38	Minimal Inhibitory Concentration (MIC).

42-P3	Department Seminar
43- L39	Why quantify biodiversity?
44- L40	How do we measure biodiversity?
45- L41	Alpha diversity, Beta diversity, Gamma diversity,
46- L42	Describing Communities
47- L43	Biodiversity - Allotting portion for Internal Test-II
	Internal Test II begins
48- L44	Species Richness
49-IT-II	Internal Test-II
50-L45	Species diversity
51- L46	Diversity indices - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Simpson Diversity Index
53- L48	Shannon – Weiner Index
54- L49	Evenness
55- L50	What is bioinformatics?
56- L51	Why bioinformatics is necessary?
57- L52	Field of Bioinformatics
58- L53	Bioinformatics key areas
59-P4	College level meeting/ function
60- L54	Structural bioinformatics
61- L55	Basis of sequence alignment
62- L56	Scoring a sequence alignment
63- L57	Protein sequence alignment (DNA alignment)
64- L58	Biological databanks and databases - Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Primary and secondary Database
66- L60	Applications of Bioinformatics
67-IT-III	Internal Test-III
68- L61	Revision of Units I & II
69- L62	Revision of Units III & IV
70- L63	Revision of Unit V - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
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 “<RESEARCH METHODOLOGY>”
CO1	understand some basic concepts of research and its methodologies
CO2	select and define appropriate research problem and parameters
CO3	To be able to describe the method of chromatography and its applications
CO4	The students will be able to identify the cellular and molecular basis of immune responsiveness.
CO5	The students will be able to describe the roles of the immune system in both maintaining health and contributing to disease.
CO6	Know and understand the main principles and practices of collecting data in the field.
CO7	Locate and use the main databases at the NCBI and EBI resources
CO8	Know the difference between databases, tools, repositories and be able to use each one to extract specific information
CO9	Extract data from specific databases using accessions numbers, gene names etc.
Experimental Learning	
EL1	organize and conduct research (advanced project) in a more appropriate manner
EL2	Know the main principles and methods for surveying resource use
EL3	Be able to conduct a threat assessment for a site.
EL4	Use selected tools at NCBI and EBI to run simple analyses on genomic sequences
Integrated Activity	
IA1	write a research report and thesis
IA2	Design a model of Immunoglobulins

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Phil. Zoology
Course Name	SERICULTURE
Course Code	HZOO24
Class	M.Phil(2015-2016)
Semester	Even
Staff Name	Dr.M.Rajakumari
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- Train the students in identifying the diseases and pests of the mulberry plant.
- It also involves giving students a thorough knowledge about the cultivation of mulberry, maintenance of the farm, seed technology, silkworm rearing and silk reeling.
- Students get to learn about the quality of various things like leaf, seed cocoon, commercial cocoon and fibre so that they can get maximum return when actually practiced.
- We get to learn about the various skills that are necessary for self employment in the mulberry and seed production.
- To develop highly qualified professional manpower in Silk and Sericulture sector
- In Sericulture the basic requirement lies on systematic quality based coaching and training
- To train and provide expert human resource to Silk industry and expected to bring direct benefits to Rural development and sericulture farming community.

Syllabus

Unit I :

Introduction – definition – Scope – State of the art of silk industries in china, Japan and India. Mulberry and Non mulberry silk Industry in India.

Mulberry silkworm races – classification on the basis of the origin and voltinism characteristics features. Seed organization – seed Cocoon production – silkworm egg production – pure, Hybrid.

Non mulberry silkworms – different species – habit and habitats: Food plants (a) Tasar food plants – terminal species – shorea robusta (b) Muga food plants – Listsea polyantha – Guercus sp, (c) Eri food plants – Castor, Tapioca.

Unit II :

Mulberry growth and nutrition. Importance of oil in mulberry cultivation – Sources of nutrients in soil – Role of essential elements in plant growth of Mulberry. Propagation (a) Seedlings – Methods of raising seedlings. (b) Saplings – selection of plants for cutting. (c) grafting. Selection of stock and scion – physiological features – grafting types – stem, root, ind bud techniques. (d) layering, types – techniques. Nursery raising, layout bed size – oil composition.

Mulberry Forms, bush, middlings and low trees, monocrop and mixed crop pattern. Suitable variety for cultivation – measuring. Planting system: Row and pit system – advantages and disadvantages – Intercultivation – Time and type of initial harvests.

Unit III :

Silkworm – Systematic position – Order Lepidoptera – Family Bombycidae, life history of Bolyx mori – morphology of egg, larva, pupa and adult. Morphology and anatomy of the organ systems in silkworm. Digestive system including mouth parts – excretory, respiratory, circulatory, muscular, nervous and reproductive systems – Silk gland structure silk proteins moulting and hormonal control of meta morphosis.

Rearing: Selection of model house, Rearing appliances, Disinfection; Types of disinfection – concentration of disinfectants – Selection of races for rearing Bievoltine and multivoltine their advantages and disadvantages. Incubation – influence of environmental conditions on egg development – black boxing. Chawki rearing: Brushing different types – loose eggs and sheet eggs. Cellular and mass brushing – Selection of leaf for brushing – Time of transportation and storage of leaf for Chawki worms – environmental conditions – leaf requirements – different Chawki rearing methods – Gox rearing – Cellular rearing – bed cleaning with neg – feeding schedule spacing – Symptoms and care during moulting periods. Late age rearing: Spacing – leaf requirements – environmental conditions – feeding and bed cleaning schedules – methods of rearing. Shelf shoot and floor rearing – advantages and disadvantages – Bed cleaning schedules: Mounting: Types of mountings – bamboo – plastic, evolving – rotary – bottle brush – advantages and disadvantages – Spinning environmental conditions for spinning. Harvesting of cocoons: Time of harvest – setting of cocoons – preservation, transportation of cocoons – leaf cocoon ratio – cost of cocoon production.

Unit IV :

/Diseases of Silkworm - Introduction and Classification of different types of Silkworm diseases, Protozoan diseases - pebrine - symptom - and mode of infection - prevention and control. Bacterial disease -- Flacherie- Symptoms -- Causative agents -- factors influencing Flacherie - Sources and mode of infection - prevention and control, viral diseases - grasserie
- Symptoms mode of infection- defection, prevention and control Fungal diseases •

Muscardine - Symptoms of different types of fungal diseases -- Causative agents mode of infection -- Prevention and control. Aspergillus diseases symptoms - Causative agents • mode of infection -- prevention and control, General account of disinfection and relative efficiencies of different disinfections. /

/ Disease of mulberry: Classification of diseases of mulberry. Fungal diseases of

Mulberry and their occurrence - Symptoms and control, a) leaf spot, b) leaf rust, c) powdery mildew, d) Leaf blight, e) Root rot bacterial - viral and mycoplasmal diseases of mulberry • control measures.

Root knot nematode diseases of mulberry - its occurrence - Symptoms and control.

Mineral deficiency Symptoms mulberry and reclamation, Fungicide formulations and method of applications.

Unit V :

Cocoon marketing - Cocoon markets - Transport of Cocoons -- Compositin of cocoon -- Physical characters of Cocoon considered for commercial purposes -- Defective Cocoons.

Silk reeling: Stifling - Storage of Cocoons - Sorting of Cocoon -- Deflossing - Cocoon riddling - Cocoon mixing or blending - Cocoon boiling and brushing - Brushing - Reeling operations -- Reeling Appliances - Re-reeling - finishing - Raw silk Testing - Silk wastes.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 02.12.2015
1-L1	Introduction - Sericulture
2-L2	State of the art of silk industries in China, Japan and India
3- L3	Mulberry and Non Mulberry Silk Industry in India.
4-L4	Mulberry Silkworm races
5-L5	Classification on the basis of the origin and voltinism characteristic features
6-L6	Seed organization
7-L7	seed Cocoon production
8- P1	Zoology Association activities
9- L8	Silkworm egg production -- Pure, hybrid.
10- L9	Non mulberry silkworms -- different species - habit and habitats
11-L10	Food plants (a) Tasar food plants Terminalia species - <i>Shorea robusta</i>
12-L11	(b) Muga food plants - <i>Listsea polyantha</i> - <i>Guercus sp</i>
13-L12	. (c) Eri food plants - Castor, Tapioca.
14-L13	Mulberry growth and nutrition
15-L14	Importance of soil in Mulberry cultivation
16-L15	Sources of nutrients in soil
17- L16	Role of essential elements in plant growth of Mulberry
18- L17	Seedlings - Methods of raising seedlings
19- L18	Saplings - selection of plants for cutting
20- L19	Grafting: Selection of stock and scion physiological features - grafting types-

	stem. root, ind bud techniques
21- L20	layering: types - techniques. Nursery raising: layout: bed size - soil composition. - Allotting portion for Internal Test-I
	Internal Test I begins
22- L21	Mulberry Forms: bush, middlings and low trees, monocrop and mixed crop pattern
23- IT-1	Internal Test-I
24- L22	Suitable variety for cultivation - manuring
25- L23	Planting system: Row and pit system - advantages and disadvantages
26- L24	Intercultivation - Time and type of initial harvests - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Silk worm -- Systematic position - Order Lepidoptera - Family Bombycidae. Life history of <i>Bombyx mori</i> - morphology of egg, larva, pupa and adult
28- L26	Morphology and anatomy of the organ systems in silkworm
29- L27	Digestive System including mouth parts -• excretory, respiratory, circulatory, muscular, nervous and reproductive Systems
30- P2	College level meeting/Cell function
31-L28	Silk gland structure silk proteins. moulting and hormonal control of metamorphosis.
32-L29	Rearing: Selection of site model house, Rearing appliances
33-L30	Disinfection: Types of disinfection - concentration of disinfectants
34- L31	Selection of races for rearing Bivoltine and multivoltine their advantages and disadvantages
35- L32	Incubation - influence of environmental conditions on egg development - black boxing
36- L33	Chawki rearing: Brushing different types-• loose eggs and sheet eggs
37- L34	Late age rearing: Spacing- leaf requirement- environmental conditions -- feeding and cleaning schedules - methods of rearing: Shelf, shoot and floor rearing- advantage and disadvantage
38- L35	Bed cleaning schedules. Mounting: Types of mountages - bamboo - plastic, evolving - rotary- bottle brush- advantages and disadvantages
39- L36	Spinning- environmental conditions for spinning.
40- L37	Harvesting of cocoons; Time of harvest - Sorting of cocoons
41- L38	Preservation. transportation of cocoons - leaf cocoon ratio - cost of cocoon production
42-P3	Department Seminar
43- L39	Introduction and Classification of different types of Silkworm diseases
44- L40	Protozoan diseases - pebrine - symptom - and mode of infection - prevention and control.
45- L41	Bacterial disease -- Flacherie- Symptoms -- Causative agents -- factors influencing Flacherie
46- L42	Sources and mode of infection - prevention and control, viral diseases - grasserie
47- L43	Symptoms mode of infection - Allotting portion for Internal Test-II
	Internal Test II begins
48- L44	Fungal diseases - Muscardine - Symptoms of different types of fungal diseases
49-IT-II	Internal Test-II
50-L45	Causative agents - mode of infection -- prevention and control

51- L46	General account of disinfection and relative efficiencies of different disinfections. - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Disease of mulberry: Classification of diseases of mulberry
53- L48	Fungal diseases of Mulberry and their occurrence
54- L49	Symptoms and control, a) leaf spot, b) leaf rust, c) powdery mildew
55- L50	Symptoms and control, d) Leaf blight, e) Root rot bacterial
56- L51	Viral and mycoplasmal diseases of mulberry control measures.
57- L52	Root knot nematode diseases of mulberry - its occurrence
58- L53	Mineral deficiency Symptoms mulberry and reclamation
59-P4	College level meeting/ function
60- L54	Fungicide formulations and method of applications.
61- L55	Cocoon marketing - Cocoon markets - Transport of Cocoons -- Compositin of cocoon
62- L56	Physical characters of Cocoon considered for commercial purposes
63- L57	Defective Cocoons.
64- L58	Silk reeling: Stifling - Storage of Cocoons - Sorting of Cocoon -- Deflossing - Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Cocoon riddling - Cocoon mixing or blending - Cocoon boiling and brushing - Brushing
66- L60	Reeling operations -- Reeling Appliances - Re-reeling - finishing - Raw silk Testing - Silk wastes.
67-IT-III	Internal Test-III
68- L61	Revision of Unit I & II
69- L62	Revision of Unit III & IV
70- L63	Revision of Unit V - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
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 “<SERICULTURE>”
CO1	Learned about Indian Silk Industry
CO2	Understood the process of Mulberry cultivation
CO3	Watch the life cycle of silkworm stage by stage
CO4	Practice the rearing methods
CO5	Select the rear model
CO6	Learned about silkworm diseases
CO7	Learned about Mulberry plants infections
Experimental Learning	
EL1	To develop an expert manpower to handle the own sericulture units/ entrepreneurship/ Corporate sector units.
EL2	To give scientific knowledge about mulberry cultivation , silkworm rearing techniques to the students.
EL3	To make the student aware about Soil to Silk concept, Sericulture Extension and innovative technology /techniques etc.
EL4	To train the students in compressive Silk production techniques .
Integrated Activity	
IA1	Form a Mulberry Garden
IA2	Prepare a silkworm rearing house

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Developmental Zoology, Ecology, Animal Physiology and Evolution
Course Code	JAZO21
Class	I year (December 2016 to April 2017)
Semester	Even
Staff Name	Dr. D. Paramanatha Swami Doss
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To understand the sequential changes from cellular grade of organization to organ grade of organization in the development of multicellular organisms.
- To study the interaction and the interdependence among environmental factors and living organisms.
- To understand the functional significance of various organs and organ systems of animals.
- To discern the evolutionary significance of the animals, origin of species, effects of mutation.

Syllabus

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Zoology) Semester-II/Allied - II

DEVELOPMENTAL ZOOLOGY, ECOLOGY, ANIMAL PHYSIOLOGY AND EVOLUTION

UNIT I: Early development in Man: Structure of sperm and ovum; Fertilization – Cleavage, Morula, Blastocyst, Implantation and gastrulation – Fate map. Placenta in mammals – types and functions. Test tube babies – Twins – Amniocentesis. Nuclear Transplantation in *Acetabularia*.

UNIT II: Abiotic factors: Biological effects of Temperature and Light; Biotic factors: Symbiosis, Commensalism, Mutualism, Parasitism, Prey-predator Relationship; Adaptations: Desert adaptations. Community: Ecosystem – Structure and dynamics of a pond.

UNIT III: Nutrition: Food constituents – Carbohydrates, Proteins and Fats. Digestion: Role of enzymes in carbohydrate, protein and fat digestion. Absorption: Absorption of digested food. Metabolism: Carbohydrate metabolism: Glycogenesis, Glycogenolysis, Glycolysis. Respiration: Transport and exchange of oxygen and carbon dioxide. Haemoglobin.

UNIT IV: Excretion: Structure of Nephron – Urine formation – Dialysis Nervous Co-ordination: Structure and types of neurons – Nerve impulse, conduction of nerve impulse through neuron and synapse. Reproduction: Structure of human testis and ovary, Graffian follicle, Menstrual cycle and its hormonal control.

UNIT V: Theories of Evolution: Darwinism, Mutation theory of De Vries. Adaptive radiation in birds. Mimicry and Colouration.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 01.12.2016
1-L1	UNIT I: Introduction about the Developmental Zoology.
2-L2	Early development in Man: Structure of sperm and ovum.
3- L3	Fertilization – Events of fertilization.
4-L4	Cleavage – formation of 2 cell stage, 4 cell stage, 8 cell stage and so on.
5-L5	Morula – structure formation blastocoel, division micromeres and macromeres.
6-L6	Implantation – structure of uterus, endometrium, days after fertilization etc.
7-L7	Gastrulation – Formation of endoderm, formation of mesoderm and formation of ectoderm.
8- P1	Zoology Association Meeting
9- L8	Structure of gastrula – Neural plate, notochord, archenteron, dorsal lip of blastopore.
10- L9	Fate map – predetermined organ forming areas.
11-L10	Placenta in mammals – Characteristics – Functions.
12-L11	Placenta – Classification – based of foetal membrane – based on the distribution of villi. Classification – based on nature of contact – based on the types of tissue involved.
13-L12	Test tube baby – procedure – Fruity and Gift method.
14-L13	Twins – importance of twins study – Identical, Siamese, Fraternal twins.
15-L14	Amniocentesis – Procedure - Allotting portion for Internal Test-I
	Internal Test I begins
16-L15	Nuclear Transplantation in <i>Acetabularia</i> – the importance of nucleus by different experiments.
17-IT-1	Internal Test-I (24.01.2017)
18-L16	Unit II: Introduction about Ecology, Abiotic and biotic factors
19-L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal

20-L18	Temperature – ranges – thermal stratification – biological effects and adaptations.
21- L19	Light – source – spectrum – light on water – biological effects.
22- P2	College level meeting/Cell function
23-L20	Animal relationships – Symbiosis with examples, Commensalism with examples.
24-L21	Mutualism with examples, parasitism with examples.
25-L22	Prey – predation relationship –types of parasites - parasitic adaptations.
26-L23	Desert adaptations – Characteristics of desert – adaptations – water conservation, water getting, tolerance of heat and protection.
27-L24	Ecosystem – abiotic and biotic factors of a pond ecosystem.
28-L25	Food chain – Food web – Energy flow – Pyramids – Ecological succession
29-L26	UNIT III: Introduction about animal physiology.
30-L27	Nutrition: Food constituents – Carbohydrates, Proteins and Lipids.
31-L28	Digestion: Role of enzymes in carbohydrate digestion.
32-L29	Role of enzymes in protein and lipid digestion.
33-L30	Absorption: Structure of Intestinal Villi - Absorption of carbohydrates, proteins and lipids.
34- P3	Department Seminar
35-L31	Metabolism: Glycogenesis, Glycogenolysis.
36-L32	Glycolysis – steps – the role of enzymes.
	Internal Test II begins
37- L33	Respiration: Transport and exchange of oxygen and carbon dioxide - Chloride shift.
38- IT-II	Internal Test-II (24.02.2017)
39-L34	Haemoglobin – Structure and importance.
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Excretion: Structure of Nephron - Allotting portion for Internal Test-II
42- L37	Urine formation – ultrafiltration, reabsorption and secretion – Dialysis.
43- L38	Structure of neurons – types of neurons – nerve impulse.
44- P4	College level meeting/ function
45-L39	Conduction of nerve impulse through neuron and synapse.
46-L40	Structure of human testis and ovary – Graafian follicle
47-L41	Menstrual cycle – Hormonal control of menstrual cycle.
48-L42	Unit V: Introduction about evolution
49-L43	Theories of Darwin.
50-L44	Allotting portion for Internal Test-III
	Internal Test III begins
51 L45	Mutation theory of De Vries.
52- L46	Adaptive radiation in birds.
53-IT-III	Internal Test-III
54-L47	Mimicry and colouration – types of colouration – colouration and evolution.
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 21.04.2017

Course Outcomes

Learning Outcomes	COs of the course “Developmental Zoology, Ecology, Animal Physiology and Evolution”
CO1	Realize the knowledge about the basic concept of embryology.
CO2	Able to understand the structure of male and female gametes.
CO3	Understand the mechanism of gastrulation.
CO4	Gain fundamental knowledge about the formation of test tube baby.
CO5	Understand the ecological relationships between organisms and their environment.
CO6	Able to explain the role of organism in energy transfer.
CO7	Know about the various forms of animal associations.
CO8	Realize how the desert animals have adapted to their environment.
CO9	Be familiar with the concept and importance of theories of evolution.
Experimental Learning	
EL1	Study the types of placenta with the help of museum specimens.
EL2	Construct the model pond ecosystem and to study the interaction of abiotic and biotic factors.
EL3	Study the concept of batesian mimicry by comparing the Common cuckoo and shikra
Integrated Activity	
IA1	--

- # 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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Animal Physiology and Biochemistry
Course Code	B3ZB51
Class	III year (2016-2017)
Semester	Odd
Staff Name	Dr.P. Elizmathi Sophia
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem	
Internal Test-3 Hrs	
Model Test-3 Hrs	
Dept. Meetings-2 Hrs	
College Meetings-2 Hrs	
Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- Carving an integrated approach to chemistry.
- Related to the functional significance of the various organs .
- Organ systems of animals.

Syllabus

. UNIT I ⌘ Introduction – Animal physiology and Biochemistry ⌘ Carbohydrates – Classification – Structure and functions of glucose, fructose, sucrose and glycogen ⌘ Proteins – Classification – Structure and function of albumin and glyco proteins ⌘ General structure of amino acids – essential, non essential amino acids. ⌘ Lipids – Classification – Structure and functions of lecithin, Cephalin, glycol lipids and cholesterol ⌘ Prostaglandins – Introduction – Structure – Classification – Functions

UNIT II ⌘ Enzymes – Classification – Nomenclature and Properties – Mechanism of enzyme action. ⌘ Digestion – Role of enzymes in carbohydrate, protein and fat digestion in man absorption of digested food materials in man. ⌘ Metabolism – Carbohydrates – Glycogenesis – Kreb’s cycle – Electron transport system. ⌘ Proteins – Deamination – Transamination – Urea cycle ⌘ Lipids – B-oxidation.

UNIT III ⌘ Respiration – respiratory pigments – Distribution – Composition – Properties – Functions – Transport and exchange of oxygen and carbon-di-oxide – Anaerobiosis – Respiratory Quotient. ⌘ Circulation – Origin and conduction of heart beat – Cardiac rhythm, cardiac cycle – ECG – Blood pressure – Heart diseases. ⌘ Excretion – Kinds of excretory products – Nephron – Mechanism of urine formation in man – Composition of urine – Dialysis – Nephritis – Blood urea.

UNIT IV ⌘ Muscle physiology – Ultra structure of skeletal muscle – Properties – Mechanism of muscle contraction – Tetanus – Muscle fatigue. ⌘ Nerve physiology – Structure and types of neuron. ⌘ Nerve impulse – Definition – Conduction of nerve impulse through nerve – Saltatory conduction – Synapse – Synaptic transmission of impulses – Neurotransmitters – Neuromuscular junction. 822

UNIT V ⌘ Endocrine system – Pituitary, thyroid, Parathyroid, Adrenal Islets of Langerhans – Testis Ovary. ⌘ menstrual cycle – The role of Hormones – Menopause – Pregnancy – Lactation. ⌘ Bioluminescence – Definitions – Types – Chemistry – Adaptive significance.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2014
1-L1	UNIT I – Introduction.
2-L2	Animal physiology and Biochemistry .
3- L3	Carbohydrates – Classification .
4-L4	Structure and functions of glucose.
5-L5	fructose, sucrose and glycogen.

6-L6	Proteins – Classification – Structure .
7-L7	and function of albumin and glyco proteins.
8- P1	Welcoming of First year and Inauguration of Mathematics Association
9- L8	General structure of amino acids – essential, non essential amino acids.
10- L9	lipids – Classification.
11-L10	Structure and functions of lecithin, Cephalin.
12-L11	glycol lipids and cholesterol.
13-L12	Prostaglandins – Introduction – Structure – Classification – Function
14-L13	UNIT II Enzymes – Classification.
15-L14	____ - Allotting portion for Internal Test-I
	Internal Test I begins on 30.07.2014
16-L15	Nomenclature and Properties .
17-IT-1	Internal Test-I
18-L16	Mechanism of enzyme action.
19-L17	____ - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Digestion – Role of enzymes in carbohydrate, protein .
21- L19	fat digestion in man absorption of digested food materials in man.
22- P2	College level meeting/Cell function
23-L20	Metabolism – Carbohydrates – Glycogenesis – Kreb’s cycle – Electron transport system.
24-L21	Proteins – Deamination – Transamination – Urea cycle .
25-L22	Lipids – B-oxidation.
26-L23	UNIT III Respiration – respiratory pigments – Distribution – Composition – Properties – Functions – Transport and exchange of oxygen and carbon-di-oxide – Anaerobiosis – Respiratory Quotient.
27-L24	Circulation – Origin and conduction of heart beat – Cardiac rhythm, cardiac cycle – ECG – Blood pressure – Heart diseases.

28-L25	Excretion – Kinds of excretory products – Nephron .
29-L26	Mechanism of urine formation in man – Composition of urine – Dialysis – Nephritis – Blood urea.
30-L27	UNIT IV Muscle physiology – Ultra structure of skeletal muscle – Properties – Mechanism of muscle contraction – Tetanus – Muscle fatigue.
31-L28	Nerve physiology – Structure and types of neuron.
32-L29	Nerve impulse – Definition – Conduction of nerve impulse through nerve.
33-L30	Saltatory conduction – Synapse.
34- P3	Department Seminar
35-L31	Synaptic transmission of impulses – Neurotransmitters – Neuromuscular junction.
36-L32	____ - Allotting portion for Internal Test-II
	Internal Test II begins on 18.08.2014
37- L33	UNIT V Endocrine system – Pituitary.
38- IT-II	Internal Test-II
39-L34	thyroid, Parathyroid.
40-L35	____ - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Adrenal Islets of Langerhans .
42- L37	Testis Ovary.
43- L38	menstrual cycle .
44- P4	College level meeting/ function
45-L39	The role of Hormones .
46-L40	Menopause .
47-L41	Pregnancy .
48-L42	Lactation.
49-L43	Bioluminescence – Definitions.

50-L44	_____ - Allotting portion for Internal Test-III
	Internal Test III begins on 15.09.2014
51 L45	Types .
52- L46	Chemistry.
53-IT-III	Internal Test-III
54-L47	Adaptive significance.
55-L48	_____ - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
56- MT	Model Test begins on 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 “Animal Physiology and Biochemistry”
CO1	Form a perspective of health and biology through the study of physiology.
CO2	Study different systems and their inherent disorders and deficiencies.
CO3	Learn the structure and functions of bio-molecules and their role in metabolism.
CO4	Learn mechanism of enzyme action and other related information.

CO5	Understand the importance of Heart and circulatory system
CO6	Mechanism of Bioluminescence
CO7	Understand the importance of Brain and Nerves
CO8	Learn mechanism of Hormone action
CO9	Understand the Mechanism of Respiration
Experimental Learning	
EL1	Observing fire fly to understand Bioluminescence
EL2	Observation of Lungs of different animals
EL3	Identification of own blood group
EL4	Observing own blood cells
Integrated Activity	
IA1	Preparing Model of Heart
IA2	Observation of Morphology of different animals.

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	IMMUNOLOGY & MICROBIOLOGY
Course Code	SMZO62
Class	III year (2016-2017)
Semester	Even
Staff Name	L.Jansi Rani
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- To study the immune system and their role of our body..
- To study about Salient features of antigen- antibody reaction.
- To discuss about Humoral immune response - primary & secondary response
- To study the History & Scope of microbiology
- To learned about Industrial microbiology : production of Antibiotic penicillin.

Syllabus

UNIT I

History and Scope of Immunology.

Immunity-Type of Immunity - Innate & acquired, passive & active.

Lymphoid organs –primary & secondary (Thymus, Bone marrow, Bursa of fabricius , Spleen, Tonsil, Lymph node, Peyer's patches) – Structure and Functions.

(15L)

UNIT II

Immunoglobulin-Structure, Function, Biological properties of Ig classes. Interaction of Antigen and antibody.

Salient features of antigen- antibody reaction. Types of antigen-antibody reaction – Agglutination, Precipitation, Opsonization, Cytolysis.

(15L)

UNIT III

Immune response-Lymphocyte as unit of immune system, stem cells - Structure and lineage, T cells, B cells & Macrophages.

Humoral immune response - primary & secondary responses - B cell activation. Cell - Mediated immune response - Type of T cells & functions.

Tumour immunology.

(15L)

UNIT IV

Introduction : History & Scope of microbiology. General structure of microbes (Bacteria, virus). Bacterial growth : Culture media & selective media; Continuous & batch culture techniques, growth curve.

(14L)

UNIT V

Food microbiology :Food poisoning ; Food spoilage & preservation.

Industrial microbiology : production of Antibiotic penicillin.

Soil microbiology : Role of soil microbes in N₂ fixation.

Medical microbiology : Diseases caused by bacteria in different systems of man as given below: Dermal – Streptococcal inflammation : - Tuberculosis;

Gastro-intestinal-dysentery:Reproductive – Gonorrhoea.

Viral diseases with reference to causative organisms, symptoms, impact on the host & control measures, AIDS , Rabies, Chicken pox, Measles, Influenza & polio.

(16L)

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 07.12.2017
1-L1	History and Scope of Immunology.

2-L2	Immunity-Type of Immunity
3- L3	Immunity-Innate & acquired
4-L4	Immunity-passive & active.
5-L5	Lymphoid organs –primary
6-L6	Lymphoid organs – secondary
7-L7	Structure and Functions–Thymus
8- P1	Zoology Association activities
9- L8	Structure and Functions - Bone marrow
10- L9	Structure and Functions - Bursa of fabricius
11-L10	Structure and Functions - Spleen
12-L11	Structure and Functions - Tonsil
13-L12	Structure and Functions - Lymph node
14-L13	Structure and Functions - Peyer's patches)
15-L14	Immunoglobulin-Structure
16-L15	Immunoglobulin- Function
17- L16	Biological properties of Ig classes
18- L17	Interaction of Antigen
19- L18	Interaction of antibody.
20- L19	Salient features of antigen-
21- L20	Antibody reaction. - Allotting portion for Internal Test-I
	Internal Test I begins
22- L21	Types of antigen
23- IT-1	Internal Test-I
24- L22	Antibody reaction
25- L23	Agglutination, Precipitation
26- L24	Opsonization, Cytolysis.- Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Immune response
28- L26	Lymphocyte as unit of immune system
29- L27	Stem cells
30- P2	College level meeting/Cell function
31-L28	Structure and lineage - T cells
32-L29	Structure and lineage - B cells & Macrophages.
33-L30	Humoral immune response
34- L31	Primary & secondary responses
35- L32	B cell activation.
36- L33	Cell - Mediated immune response.
37- L34	Type of T cells
38- L35	Functions of T cells
39- L36	Tumour immunology.
40- L37	Introduction : Microbiology
41- L38	History of microbiology
42-P3	Department Seminar
43- L39	Scope of microbiology
44- L40	General structure of microbes -Bacteria
45- L41	General structure of microbes -Virus.
46- L42	Bacterial growth : Culture media
47- L43	Bacterial growth :Selective media - Allotting portion for Internal Test-II

	Internal Test II begins
48- L44	Continuous & batch culture techniques
49-IT-II	Internal Test-II
50-L45	Bacterial growth :Growth curve
51- L46	Food microbiology - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Food poisoning
53- L48	Food spoilage & preservation.
54- L49	Industrial microbiology
55- L50	Production of Antibiotic penicillin
56- L51	Soil microbiology
57- L52	Role of soil microbes in N ₂ fixation
58- L53	Medical microbiology
59-P4	College level meeting/ function
60- L54	Diseases caused by bacteria in different systems of man - Dermal
61- L55	Diseases caused by bacteria in different systems of man – Streptococcal inflammation
62- L56	Diseases caused by bacteria in different systems of man - Tuberculosis
63- L57	Gastro-intestinal-dysentery:
64- L58	Reproductive – Gonorrhoea- Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Viral diseases with reference to causative organisms, symptoms,
66- L60	Impact on the host & control measures, AIDS , Rabies, Chicken pox, Measles, Influenza & polio.
67-IT-III	Internal Test-III
68- L61	Revision of I & II units
69- L62	Revision of III & IV units
70- L63	Revision of Unit V - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
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 “<IMMUNOLOGY & MICROBIOLOGY>”
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CO1	The students will be able to identify the cellular and molecular basis of immune responsiveness.
CO2	The students will be able to describe the roles of the immune system in both maintaining health and contributing to disease.
CO3	The students will be able to describe immunological response and how it is triggered and regulated.
CO4	The students will be able to demonstrate a capacity for problem-solving about immune responsiveness.
CO5	The students will be able to transfer knowledge of immunology into clinical decision-making through case studies presented in class.
CO6	Understand the rationale in medium formulation & design for microbial fermentation, sterilization of medium and air
CO7	Discuss Microbial contamination/product spoilage and antimicrobial preservation of pharmaceutical formulations during production and in products
CO8	Understand various plant microbes interactions especially rhizosphere, phyllosphere and mycorrhizae and their applications especially the biofertilizers and their production techniques
CO9	Discuss the biosynthesis and the degradation pathways involved.
Experimental Learning	
EL1	Knowledge of the structure and function of the major organ systems, including the molecular, biochemical and cellular mechanisms for maintaining homeostasis
EL2	Knowledge of the pathogenesis of diseases, interventions for effective treatment, and mechanisms of health maintenance to prevent disease
EL3	A commitment to lifelong learning and independently seeking new knowledge and skills in their own recognized areas of learning deficit
EL4	Demonstrate a knowledge and understanding of microbiological assays of growth promoting and growth inhibiting substances.
Integrated Activity	
IA1	Provide students with in-depth training on the conduct and management of research from inception to completion using a wide range of techniques.
IA2	Enable students to acquire expertise in the use and application of the methods of data collection and analysis.

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	BioStat Computer Application And Bio-Informatics
Course Code	GMZO63
Class	III year (2016 - 2017)
Semester	Even
Staff Name	P. Augustus Robince
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- .The objectives of biostatistics are to advance statistical science and its application
- The role of bio statics is an important one in designing studies and analysing data form research problems
- Computer study operate a variety of advanced spread sheet, operating system and word processing function

Syllabus

Unit – I Definition and Scope: Collection of Data – Sampling methods – Variables – Discrete and continuous – Presentation of Data – Classification and Tabulation : Parts of table. Diagrams and Graphs: Line diagrams – Bar Diagram – Pie diagrams – Histogram – Frequency polygon – Frequency poly curve. Measures of Central Tendency – Calculation of Mean, Mode and Median.

Unit –II Measures of dispersion: Variance – Range – Standard Deviation and standard Error. Chi – Square test- Calculation and applications and students t ' Test. Correlation : Introduction – Types – Perfect positive and negative, Linear and nonlinear – Methods – Scatter diagram, Karl Pearson's correlation coefficient – Interpretation of the correlation coefficient.

Unit – III Introduction to computer – what is computer – generation of computer – components of computer – input devices - output devices – CPU – Primary and Secondary Memory – operating system. Introduction to M.S. Office software covering word processing, spread sheet and presentation software. MS word basics: creating word document –editing aligning – adding bullets, numbering and symbols – printing. MS excel –entering and editing cell entries –adjusting row and column height – Pie-bar-line chart preparation. Uses of internet - Email, Internet Browsing, Web.

Unit – IV Bioinformatics: Introduction – Definition of Bioinformatics- History—Importance of Bioinformatics- Scope and application of bioinformatics – components of Bioinformatics-- Bioinformatics in life science. Biological sequence analysis –sequence alignment - pair wise sequence comparison – multiple sequence alignment.

Unit – V Major Data bases in Bioinformatics – Nucleic acid sequence databases –EMBL – Genbank – Protein sequence database – SWISS-PROT. Databases Similarity Search Tools : BLAST FASTA – Application of bioinformatics tools. Database Retrieval Tools : ENTREZ – Locus link – Pub Med (Publishers on Medicine) SRS. Protein structure visualizing tools – RasMol, Swiss PDB viewer.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 01.12.2016
1-L1	Unit – I Definition and Scope: Collection of Data .
2-L2	Sampling methods.
3- L3	Variables.
4-L4	Discrete and continuous.
5-L5	Presentation of Data.
6-L6	Classification and Tabulation : Parts of table.
7-L7	Diagrams and Graphs: Line diagrams .
8- P1	Welcoming of First year and Inauguration of Mathematics Association
9- L8	Bar Diagram.
10- L9	Pie diagrams .
11-L10	Histogram .
12-L11	Frequency polygon.
13-L12	Frequency poly curve.

14-L13	Measures of Central Tendency.
15-L14	Calculation of Mean, Mode and Median.
16-L15	Unit –II Measures of dispersion: Variance – Range – Standard Deviation and standard Error.
17- L16	Chi – Square test- Calculation and applications and students t Test.
18- L17	Correlation : Introduction – Types – Perfect positive and negative.
19- L18	Linear and nonlinear – Methods – Scatter diagram.
20- L19	Karl Pearson’s correlation coefficient – Interpretation of the correlation coefficient.
21- L20	_____ - Allotting portion for Internal Test-I
	Internal Test I begins on 24.01.2017
22- L21	Unit – III Introduction to computer – what is computer – generation of computer.
23- IT-1	Internal Test-I
24- L22	components of computer – input devices - output devices.
25- L23	CPU – Primary and Secondary Memory – operating system.
26- L24	_____ - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Introduction to M.S.
28- L26	Office software covering word processing, spread sheet and presentation software.
29- L27	MS word basics: creating word document.
30- P2	College level meeting/Cell function
31-L28	Editingaligning.
32-L29	adding bullets.
33-L30	Numbering.
34- L31	symbols.
35- L32	printing.
36- L33	MS excel –entering.
37- L34	editing cell entries.
38- L35	adjusting row .
39- L36	column height .
40- L37	Pie-bar-line chart preparation.
41- L38	Uses of internet.
42-P3	Department Seminar
43- L39	Email.
44- L40	Internet Browsing.
45- L41	Web.
46- L42	Unit – IV Bioinformatics: Introduction – Definition of Bioinformatics.
47- L43	_____ - Allotting portion for Internal Test-II
	Internal Test II begins on 24.02.2017
48- L44	History— Importance of Bioinformatics.
49-IT-II	Internal Test-II
50-L45	Scope and application of bioinformatics —components of Bioinformatics--

	Bioinformatics in life science.
51- L46	_____ - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Biological sequence analysis –sequence alignment.
53- L48	pair wise sequence comparison –multiple sequence alignment.
54- L49	Unit –V Major Data bases in Bioinformatics – Nucleic acid sequence databases .
55- L50	EMBL – Genbank.
56- L51	Protein sequence database – SWISS-PROT.
57- L52	Databases Similarity Search Tools : BLAST FASTA .
58- L53	Application of bioinformatics tools.
59-P4	College level meeting/ function
60- L54	Database Retrieval Tools : ENTREZ .
61- L55	Locus link – Pub.
62- L56	Med (Publishers on Medicine).
63- L57	SRS.
64- L58	_____ - Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Protein structure visualizing tools.
66- L60	RasMol,
67-IT-III	Internal Test-III
68- L61	Swiss .
69- L62	PDB viewer
70- L63	_____ - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
71-MT	Model Test begins on 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 “BioStat Computer Application And Bio-Informatics”
CO1	Define the principal concepts about biostatistics.
CO2	Recognize the definition of statistics, its subject and its relation with the other sciences.
CO3	Collect data relating to variable/variables which will be examined and calculate descriptive statistics from these data.
CO4	Identify convenient sample by using sampling theory.
CO5	Define some concepts about hypothesis testing.
CO6	Apply hypothesis testing to the data through these concepts.
CO7	Arrange the results of the hypothesis testing and make a statistical

	decision.
CO8	Define the principal concepts about computer applications.
CO9	Define the principal concepts about bioinformatics.
Experimental Learning	
EL1	Perform linear regression model fitting and diagnosis
EL2	Communicate statistical analysis through written scientific report
EL3	Compare different generation computers
EL4	Relate Smart phones and computers
Integrated Activity	
IA1	Identify the Electronics equipment used in your home.
IA2	How computers are used in day today life

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 Zoology

COURSE ACADEMIC PLAN (2016-2017)

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Poultry Science
Course Code	B32B5F
Class	I year 2016-2017
Semester	Even
Staff Name	Dr.(Mrs)E EzhilmathiSophia,.
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; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To conservation of resources via the recycling of waste material and the recoveries of more valuable products

Syllabus

UNIT I

Gene Cloning: the basic steps, types of restriction enzymes, Lipases-linkers and adaptors, DNA, transformation, selection of recombinants. Hybridization techniques, chemical synthesis of oligonucleotides. RFLP, PCR and DNA sequencing techniques.

Vectors

UNIT II

Plasmid biology: cloning vector based on pBR322 and bacteriophage. Cloning vector for yeast. Cloning vector for Agrobacterium twnefaciens. Cloning vector for mammalin cells. Simian virus 40 – Gene transfer technology: Particle bombardment, Micro injection techniques.

Poultry manure – Volume, composition and values. Nutritional content of eggs. Management of chicks, growers, layers and broilers. Lighting for chicks, growers, layers and broilers.

Summer and winter management. Debarking – Forced moulting

UNIT III Animal Biotechnology

Cell culture: Organ Culture, whole embryo culture, Embryo transfer- in-vitro fertilization (IVF) technology, Dolly-in vitro fertilization and embryo transfer in human. Transgenic animals. Human gen therapy. Cryobiology.

UNIT IV Microbial Biotechnology

Fermentation: Bioreactor. Microbial products: primary and Secondary Metabolites. Protein Engineering. Bioremediation of Hydrocarbons industrial wastes and heavy metals. Single cell protein Biopolymers, Bio pesticides and Bio fertilizers Xenobiotics, bio-leaching, bio-mining and bio fuels.

UNIT V Medical biotechnology

Drug Development: Production of pharmaceuticals by gentian; engineered cells (hormones, interferon's); microbial transformation for production of important pharmaceuticals (steroids and semi-synthetic antibiotics); drug design and drug targeting. Diagnostic kit development for micro analysis.

UNIT VI Nanobiotechnology

Nanobiotechnology: a brief history of the super small; introduction to nanofabrication, Nanolithography Nanobiotechnology, nanotunes and buckyballs; application of Nanobiotechnology: Drug delivery, drug discovery; health Risks and concerns of Nanobiotechnology.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2016
1-L1	Gene Cloning: the basic steps, types of restriction enzymes,
2-L2	Lipases-linkers and adaptors, Vectors
3- L3	DNA, transformation,
4-L4	selection of recombinants
5-L5	Hybridization techniques,
6-L6	chemical synthesis of
7-L7	Californian cages – management of cage birds
8- P1	Welcoming of First year and Inauguration of Zoology Association
9- L8	ologonucleotides. RFLP, PCR and DNA sequencing techniques.
10- L9	Plasmid biology:
11-L10	cloning vector based on pBR322 and bacteriophage.
12-L11	Cloning vector for yeast. Cloning vector for Agrobacterium twenefaciens. Cloning vector for mammalin cells.
13-L12	Simian virus 40 – Gene transfer technology: Particle bombardment, Micro injection techniques.
14-L13	Poultry manure – Volume, composition and values. Nutritional content of eggs. Management of chicks, growers, layers and broilers. Lighting for chicks,
15-L14	Allotting portion for Internal Test-I
	Internal Test I begins
16-L15	growers, layers and broilers.

17-IT-1	Internal Test-I
18-L16	Summer and winter management. Debarking – Forced moulting
19-L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Organ Culture
21- L19	Cell culture:
22- P2	College level meeting/Cell function
23-L20	whole embryo culture, Embryo transfer- in-vitro fertilization (IVF) technology,
24-L21	Dolly- in vitro fertilization and embryo transfer in human. Transgenic animals. Human gen therapy.
25-L22	Cryobiology.
26-L23	Fermentation: Bioreactor. Microbial products: primary and Secondary Metabolites.
27-L24	Protein Engineering. Bioremediation of Hydrocarbons industrial wastes and heavy metals.
28-L25	Single cell protein Biopolymers, Bio pesticides and Bio fertilizers Xenobiotics,
29-L26	bio-leaching, bio-mining and bio fuels.
30-L27	Drug Development
31-L28	Production of pharmaceuticals by gentian; engineered cells (hormones, interferon's
32-L29	microbial transformation for production of important pharmaceuticals (steroids and semi-synthetic antibiotics);
33-L30	Nanobiotechnology:
34- P3	Department Seminar
35-L31	brief history of the super small; introduction to nanofabrication,.
36-L32	Allotting portion for Internal Test-II
	Internal Test II begins
37- L33	Nanolithography Nanobiotechnology,
38- IT-II	Internal Test-II
39-L34	application of
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Nanobiotechnology: Drug delivery, drug discovery;
42- L37	Nanobiotechnology:
43- L38	Drug delivery,
44- P4	College level meeting/ function
45-L39	drug discovery
46-L40	health Risks
47-L41	concerns of Nanobiotechnology
48-L42	health Risks and concerns of Nanobiotechnology
49-L43	nanotunes and
50-L44	Allotting portion for Internal Test-III
	Internal Test III begins
51 L45	buckyballs;
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
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 31.10.2016

Course Outcomes

Learning Outcomes	
CO1	Familiarization with biological database
CO2	Principles and procedure on genetic selection of fish
CO3	Biotechnological approach in genetic studies in fishes
CO4	Studies of new techniques of gene manipulation
CO5	Knowledge on biotechnological tools in aquaculture
CO6	Role of genetics in species identification
Experimental Learning	
EL1	To do working models to explain C DNA
Integrated Activity	
IA1	Prepare chart for bio mining
IA2	Prepare chart for bio fuel

- # 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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Developmental Biology
Course Code	JMZO21
Class	I year (December 2016 to April 2017)
Semester	Even
Staff Name	Dr. D. Paramanatha Swami Doss
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To understand the sequential changes from cellular grade of organization to organ grade of organization in the development of multicellular organisms.

Syllabus

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Zoology) Semester-II/Core-3

DEVELOPMENTAL ZOOLOGY

UNIT I: Definition and Scope of Developmental Zoology – Gametogenesis – Spermatogenesis – Oogenesis – Vitellogenesis – Structure of Sperm and Egg in Chick. Fertilization: Pre and Post fertilization events – significance; Parthenogenesis.

UNIT II: Cleavage in chick – Fate map of Chick – Gastrulation in Chick – Chick Embryo 48, 72 Hrs. Manipulations of reproduction in Human: Infertility (male and female) – IUI - Invitro fertilization –Artificial insemination - Test tube babies – Amniocentosis.

UNIT III: Organogenesis: Development of brain and heart in chick. Organizer: Primary and secondary organizers. Morphogenetic fields and gradient hypothesis.

UNIT IV: Hormonal control of Amphibian metamorphosis. Extra-embryonic membranes in chick – Development, Types and Physiology. Placenta in Mammals – Types and Physiology.

UNIT V: Nuclear Transplantation in *Acetabularia* - Regeneration – Types – Regeneration in Amphibians – Regeneration in *Planaria*. Birth control: Contraceptive devices: Surgical method – Hormonal methods – Physical barriers – IUCD.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 01.12.2016
1-L1	Unit I: General introduction about the Developmental Zoology.
2-L2	The programme of development – Historical thoughts – Concepts – Theories and Scope of Developmental Biology.
3- L3	Gametogenesis – Origin of primordial germ cells – transport of germ cells.
4-L4	Spermatogenesis – Phases of formation of spermatid, events of spermiogenesis.
5-L5	Oogenesis – Multiplication, Growth and Maturation phases.
6-L6	Vitellogenesis, hormonal control of oogenesis – Polar bodies.
7-L7	Structure of sperm and egg of chick.
8- P1	Zoology Association Meeting
9- L8	Fertilization – Pre and Post fertilization events – Physiological changes.
10- L9	Fertilization – Physical, chemical, cytological factors involved in fertilization – Activation. Significance.
11-L10	Parthenogenesis – Types of natural parthenogenesis – Artificial parthenogenesis – Significance.
12-L11	Unit II: Introduction about cleavage and gastrulation
13-L12	Cleavage – Salient features – Structure of morula – Blastula – types.
14-L13	Cleavage laws – Meridional and Vertical planes of Cleavage – Factors affecting cleavage.
15-L14	Allotting portion for Internal Test-I
	Internal Test I begins
16-L15	Patterns of Cleavage – Types of holoblastic cleavage – Types of meroblastic cleavage.
17-IT-1	Internal Test-I (24.01.2017)
18-L16	Fate map of chick – Presumptive organ forming areas.
19-L17	Gastrulation - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Events in gastrulation – formation of endoderm – formation of primitive streak and mesoderm – Structure of gastrula.
21- L19	Chick blastoderm – structure of 48 and 72 hours chick embryo.
22- P2	College level meeting/Cell function
23-L20	Artificial insemination – Human artificial insemination.
24-L21	Manipulations of reproduction in Human: Infertility (male and female) – types and causes of infertility.
25-L22	Invitro Fertilization – IVF in Human – IVF in farm animals – Methods – Advantages of IVF.
26-L23	Test tube baby, Procedure, Methods (Gift method and Fruity method) – Advantages.
27-L24	Aminocentesis – Procedure and importance.
28-L25	Unit III: Derivatives of germinal layers.

29-L26	Development of Brain in Chick – Development of neural tube – Differentiation of brain and Flexures.
30-L27	Development of Heart – Formation of endocardial tube – Formation of S shaped heart – Differentiation.
31-L28	Organizer – properties of organizer, structure of organizer, primary and secondary organizer, neural and chain of induction, competence and mechanism.
32-L29	Morphogenetic fields – Characteristics.
33-L30	Gradient theory – types of gradient, experimental evidences, factors affecting gradients, mechanism of gradient system.
34- P3	Department Seminar
35-L31	Revision and Group Discussion.
36-L32	Unit IV: Introduction - Allotting portion for Internal Test-II
	Internal Test II begins
37- L33	Hormonal control of Amphibian metamorphosis, interaction of thyroxine and tissues.
38- IT-II	Internal Test-II (24.02.2017)
39-L34	Foetal membrane - Types of foetal membranes, development of chorion, amnion, yolk sac and allantois. Physiology of foetal membranes.
40-L35	Placenta in mammals – Characteristics – Functions. Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Placenta – Classification – based of foetal membrane.
42- L37	Placenta – Classification based on the distribution of villi. Classification – based on nature of contact – based on the types of tissue involved.
43- L38	Development of placenta – histotrophic nutrition, implantation, trophosphongia etc.
44- P4	College level meeting/ function
45-L39	Revision and Group Discussion.
46-L40	Unit V: Introduction about infertility.
47-L41	Nuclear Transplantation in <i>Acetabularia</i> – the importance of nucleus by different experiments.
48-L42	Regeneration – Laws of regeneration, types of regeneration and events in regeneration.
49-L43	Birth control – Necessity, types of contraceptive devices, tubectomy and vasectomy.
50-L44	Class test Allotting portion for Internal Test-III
	Internal Test III begins
51 L45	Hormonal control of birth control – contraceptive pills, injection, implants, patch and vaginal ring.
52- L46	Intrauterine contraceptive devices – non-hormonal copper containing IUD and hormonal Progestogen releasing IUD.
53-IT-III	Internal Test-III
54-L47	Revision and Group Discussion.
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 21.04.2017

Course Outcomes

Learning Outcomes	COs of the course “Developmental Biology”
CO1	Understand the basic concepts of developmental biology.
CO2	Able to know how fertilization, cleavage and gastrulation occur.
CO3	Gain knowledge about the basic concepts of organogenesis.
CO4	Understand the role of the Nieukoop center and the Spemann-Mangold organizer in animal development.
CO5	Describe the concepts of growth, regeneration and ageing
CO6	Learn about the techniques of IVF and IUI.
CO7	Describe the classification, physiology and functions of placenta.
CO8	Able to understand the importance of nucleus through nuclear transplantation experiment.
CO9	Aware about the various contraceptive devices.
Experimental Learning	
EL1	Study the classification of placenta by using museum specimens.
EL2	Learn the various developmental stages of chick embryo through live chick blastoderm.
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 ZOOLOGY

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc Zoology
Course Name	Environmental Studies
Course Code	JEVS11
Class	I year (2016-2017)
Semester	Odd
Staff Name	Dr.D.V. Sheeba Rajakaumari
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

- Creating the awareness about environmental problems among people.
- Imparting basic knowledge about the environment and its allied problems.
- Developing an attitude of concern for the environment.
- Motivating public to participate in environment protection and environment improvement.
- Acquiring skills to help the concerned individuals in identifying and solving environmental problems.
- Striving to attain harmony with Nature.

Syllabus

ENVIRONMENTAL STUDIES

UNIT I: THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Definition, scope and importance Natural resources and associated problems: a) Forest resources: Use and over-exploitation, deforestation, timber extraction, dams and their effects on forests and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, dams-benefits and problems, water conservation and watershed management. c) Mineral resources: Use and exploitation, environmental effects. d) Food resources: World food problems, changes, effects of modern agriculture, fertilizer-pesticide problems. e) Energy resources: Growing energy needs, renewable and non

renewable energy sources, alternate energy sources. f) Land resources: Land as a resource, land degradation, man-induced landslides, soil erosion and desertification.

UNIT II: ECOSYSTEMS

a) Forest Ecosystem, b) Grassland Ecosystem, c) Desert ecosystem, d) Aquatic Ecosystem (Ponds, rivers, oceans, estuaries), Energy flow in the ecosystem Ecological succession Food Chains, Food Webs and Ecological Pyramids.

UNIT III: BIODIVERSITY AND ITS CONSERVATION

Introduction Definition: Genetic, species and ecosystem diversity. Biogeographically classification of India Values of Biodiversity Biodiversity at global, national and local levels India as a mega-diversity nation Hot-Spots of biodiversity Threats to biodiversity Endangered and endemic species of India Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT IV: ENVIRONMENTAL POLLUTION

Definition- Causes, effects and control measures of:- a) Air Pollution, b) Water Pollution, c) Soil Pollution, d) Marine Pollution e) Noise Pollution. f) Thermal Pollution Solid Waste Management Disaster Management: Floods, earthquake, cyclone and landslides.

UNIT V: SOCIAL ISSUES AND THE ENVIRONMENT

Climatic change, global warming, acid rain, ozone depletion. Wasteland reclamation Consumerism and Waste products, use and through plastics Environment Protection Act Air (Prevention and Control of Pollution) Act Water (Prevention and Control of Pollution) Act Wildlife Protection Act Forest Conservation Act Population Explosion — Family Welfare Programme Human Rights

REFERENCES:

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2. Agarwal. K.C. 2001. Environmental Biology, Nidi Publications Limited, Bikaner.
3. A.K.De. 1999. Environmental Chemistry, Wiley Eastern Limited, India.
4. Jadhav,H. and Bhosale, V.M.1995. Environmental Protection and Laws, Himalaya Publishing House, Delhi. pp284.
5. Odum, E.P.1971. Fundamentals of Ecology, W.B.Saunders Co., USA. pp.574.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on (16-06-2016)
1-L1	a) Forest resources: Use and over-exploitation, deforestation, timber extraction, dams and their effects on forests and tribal people.
2-L2	b) Water resources: Use and over-utilization of surface and ground water, floods, drought, dams-benefits and problems, water conservation and watershed management.
3- P1	Zoology Association
4-L3	c) Mineral resources: Use and exploitation, environmental effects. d) Food resources: World food problems, changes, effects of modern

	agriculture, fertilizer-pesticide problems.
5-L4	e) Energy resources: Growing energy needs, renewable and non renewable energy sources, alternate energy sources. f) Land resources: Land as a resource, land degradation, man-induced landslides, soil erosion and desertification Allotting portion for Internal Test-I
	Internal Test I begins (25-07-2016)
6-IT-I	Internal Test-I
7-L5	a) Forest Ecosystem Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
8-L6	b) Grassland Ecosystem c) Desert ecosystem
9-L7	d) Aquatic Ecosystem (Ponds, rivers, oceans, estuaries)
10-P2	College level meeting/Cell function
11-L8	Energy flow in the ecosystem Ecological succession Food Chains, Food Webs and Ecological Pyramids
12-L9	BIODIVERSITY AND ITS CONSERVATION- Introduction, Definition
13-P3	Department Seminar
14-L10	Genetic, species and ecosystem diversity. Biogeographically, classification of India
15-L11	Values of Biodiversity, Biodiversity at global, national and local levels, India as a mega-diversity nation, Hot-Spots of biodiversity
16-L12	Threats to biodiversity, Endangered and endemic species of India, Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. Allotting portion for Internal Test-II
	Internal Test II begins (22-08-2016)
17-IT-1	Internal Test-II
18-L13	a) Air Pollution, b) Water Pollution
	Entering Internal Test-II Marks into University portal
19-L14	c) Soil Pollution, d) Marine Pollution
20- P2	College level meeting/ function
21-L15	e) Noise Pollution. d) Thermal Pollution
22-L16	Solid Waste Management Disaster Management: Floods, earthquake, cyclone
23- L17	Landslides, Climatic change, global warming, acid rain, ozone depletion. Allotting portion for Internal Test-III
	Internal Test III begins (03-10-2016)
24- IT-III	Internal Test-III
25-L18	Wasteland reclamation Consumerism and Waste products, use and through plastics Environment Protection Act, Air (Prevention and Control of Pollution) Act
	Entering Internal Test-III Marks into University portal
26-MT	Model Test (17-10-2016)
27-MT	Model Test
28-MT	Model Test
29-L19	Water (Prevention and Control of Pollution) Act Wildlife Protection Act Forest Conservation Act Population Explosion
30-L20	Family Welfare Programme Human rights. Model test paper distribution and previous year university question

	paper discussion Feedback of the Course, analysis and report preparation
	Last Working day on (30-11-2016)

Course Outcomes

Learning Outcomes	COs of the course “<Environmental studies>”
CO1	Students will understand the interactions of environmental components
CO2	They will understand and interpret the lithosphere, atmosphere, hydrosphere and biosphere.
CO3	Motivate public to participate in environment protection and environment improvement.
CO4	Acquire skills to identifying and solving environmental problems.
CO5	They will understand and interpret the interrelationships between landforms, weather, water and ecosystems.

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	ECOLOGY & TOXICOLOGY
Course Code	JMZO22
Class	I year (2016-2017)
Semester	Even
Staff Name	Dr. M. Rajakumari
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To study the interaction and interdependence among environmental factors and living organisms
- To enumerate the ill-effects and the health hazards of toxic agents released to the environment
- To discern the evolutionary significance of animals, theories origin of species and significance.

Syllabus

UNIT I

- i. **Abiotic factors** : Biological Effect of temperature and light.
- ii. **Biotic factors**: Producer, Consumers and Decomposers.
- iii. **Ecosystem**: Pond, Forest

UNIT II

- i. Food chain, Food web, Trophic levels, Energy flow, Ecological Pyramids
- ii. Animal Relationships: Mutualism, Commensalism, Antagonism (Antibiosis, Parasitism, Predation and Competition)

UNIT III

Population Ecology: Definition – Density – Natality – Mortality – Age – Distribution – Age pyramids – Population growth – Population fluctuations – Regulation of Population density - Animal Dispersion.

Community Ecology: Definition - Community stratification-Periodicity – Community interdependence – Ecotone - Edge effect- Ecological niche- Concept of community – Ecological Succession.

Adaptation:

- Desert Adaptation
- Cave Adaptation

UNIT IV

Wild life Conservation: Definition- Endangered Species – Causes for Depletion, Necessity for conservation – Methods of conservation – Sanctuaries – National Parks.

Remote sensing: Its application in agriculture, Fisheries, Forest management and Flood Management.

Urbanization: Reasons for urbanization, Urban problems, Methods to control urban growth.

UNIT V

Introduction to Toxicology, Definition, Outline classification of Toxicant.

Toxic agents and mode of action of Pesticides, metals, solvents, carcinogens, poisons
Environmental toxicology and public health.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 01.12.2016
1-L1	Abiotic factors - Light and temperature of an ecosystem
2-L2	Effects of light on plants
3- L3	Ecological classifications, Measurement of light intensity
4-L4	The temperature factor, Vernalization, Thermoperiodism
5-L5	Importance of temperature to plant
6-L6	Ecological classes of plants based on temperature
7-L7	Biotic factors of Ecosystem
8- P1	Zoology Association activities
9- L8	What are Producers?
10- L9	Macroconsumers - Plants eaters (herbivores), Flesh eater (carnivores), Variety eaters(omnivores)
11-L10	Decomposers
12-L11	Ecosystem - Pond
13-L12	Eco system - Forest
14-L13	Food chain
15-L14	Food web - Allotting portion for Internal Test-I
	Internal Test I begins
16-L15	Trophic levels
17-IT-1	Internal Test-I
18-L16	Energy flow
19-L17	Ecological Pyramids - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Animal Relationships
21- L19	Mutualism
22- P2	College level meeting/Cell function
23-L20	Commensalism,
24-L21	Antagonism (Antibiosis, Parasitism, Predation and Competition)
25-L22	Population Ecology: Definition
26-L23	Population Ecology: Density
27-L24	Natality – Mortality
28-L25	Age -Distribution - Age pyramids
29-L26	Population Growth – population fluctuations
30-L27	Regulation of Population density – Animal Dispersion
31-L28	Community Ecology: Definition
32-L29	Community stratification-Periodicity
33-L30	Community interdependence – Ecotone -
34- P3	Department Seminar
35-L31	Edge effect- Ecological niche- Concept of community –Ecological Succession.
36-L32	Adaptation - Allotting portion for Internal Test-II
	Internal Test II begins
37- L33	Wild life Conservation: Definition.
38- IT-II	Internal Test-II
39-L34	Endangered Species – Causes for Depletion
40-L35	Necessity for conservation – Test Paper distribution and result analysis

	Entering Internal Test-II Marks into University portal
41-L36	Methods of conservation
42- L37	Sanctuaries – National Parks
43- L38	Remote sensing: Its application in agriculture
44- P4	College level meeting/ function
45-L39	Remote sensing: Its application in Fisheries,
46-L40	Remote sensing: Its application in Forest management and Flood Management.
47-L41	Urbanization: Reasons for urbanization, Urban problems,
48-L42	Methods to control urban growth.
49-L43	Introduction to Toxicology, Definition, Outline classification of Toxicant
50-L44	Toxic agents and mode of action of Pesticides- Allotting portion for Internal Test-III
	Internal Test III begins
51 L45	Mode of action of metals, solvents, carcinogens, poisons
52- L46	Environmental toxicology and public health.
53-IT-III	Internal Test-III
54-L47	Revision of Unit I & II
55-L48	Revision of Unit III & IV - 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 21.04.2017

Course Outcomes

Learning Outcomes	COs of the course “<ECOLOGY & TOXICOLOGY>”
CO1	Define the concepts that are the ambient, environment, biome, biosphere, ecosphere, ecological relationship and factors, and homeostasis.
CO2	Categorize the living things according to their tolerance to the ecological factors.
CO3	Define the applying fields of ecology which constitutes the basic of the environmental sciences.
CO4	Define the applying fields of ecology in earth ecosystems.
CO5	Relate with organisms by defining the practical fields about environmental pollution matter.
CO6	Define all biotic and abiotic factors that are related to individual, population, community and ecosystem and defines the relationships between them.
CO7	Define the ecosystems and material cycles.
CO8	Define big ecosystems.
CO9	Evaluate the environmental impact of toxic compounds in emissions and immissions

Experimental Learning	
EL1	Know important aspects in environmental pollution, understand this discipline's role in society and be able to assess ethical issues within this field.
EL2	Be able to collect and analyze environmental samples, perform statistical analysis of data and interpretation and presentation of research results.
EL3	Knowledge of the physicochemical and/or biophysical processes of importance to the natural environment.
EL4	Evaluate personal and authoritative rights and duties with toxic pollutants.
Integrated Activity	
IA1	Plan the projects and apply these projects by searching the studies about practical ecology fields that had been done before.
IA2	Assess the influence of the toxic compounds released on the public health Assess safety conditions and apply related safety regulations when dealing with toxic substances.

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 ZOOLOGY

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc Zoology
Course Name	Personality Development
Course Code	GCSB5A
Class	III year (2016-2017)
Semester	Odd
Staff Name	Dr.D.V.Sheeba Rajakumari
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 enable the students to groom their personality and prove themselves as good Samaritans of the Society.
- To know the applications of concepts, Theories or issues in human development.
- To know the Qualities of effective leadership
- To aware ideas to tackle the problem of human stress
- To learn about types of interview

Syllabus

Semester V

PERSONALITY DEVELOPMENT

Unit. I Personality – meaning, definition -determinants of personality- major traits-theories of personality development

Unit 2 Personality concepts

Personality concepts -self image; self esteem, self- monitoring -advantages and disadvantages of self monitoring, perception- meaning, process of perception; factors influencing perception, Errors in perception- attitudes -types of attitudes and factors influencing attitudes

Unit 3 Leadership definition of leadership - leadership style - theories of leadership- qualities of an effective leadership

Unit 4 Skills- meaning and types of skills; communication - definition and importance and process of communication; methods of communication- barriers in communication and technologies of effective communication

Unit 5 Interview- meaning and types of interview- planning for an interview- types of questions in interview- employer's expectations from a candidate.

Reference

1. personality development - books of MS University Publications

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin (16-06-2016)
1-L1	Personality
2-L2	meaning
3- L3	meaning
4-L4	definition
5-L5	definition
6-L6	determinants of personality
7-L7	determinants of personality
8- P1	Zoology Association
9- L8	major traits
10- L9	major traits
11-L10	major traits-theories of personality development
12-L11	Personality concepts
13-L12	Personality concepts -self image
14-L13	self esteem, self- monitoring
15-L14	advantages and disadvantages of self monitoring
	Allotting portion for Internal Test-I
	Internal Test I begins(25-07-2016)
16-L15	perception
17-IT-1	Internal Test-I
18-L16	meaning, process of perception
19-L17	factors influencing perception Errors in perception
	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	attitudes
21- L19	types of attitudes
22- P2	College level meeting/Cell function
23-L20	factors influencing attitudes
24-L21	Leadership
25-L22	definition of leadership
26-L23	definition of leadership
27-L24	definition of leadership
28-L25	leadership style

29-L26	leadership style
30-L27	theories of leadership
31-L28	theories of leadership
32-L29	qualities of an effective leadership
33-L30	Skills
34- P3	Department Seminar
35-L31	meaning
36-L32	types of skills
	Allotting portion for Internal Test-II
	Internal Test II begins(22-08-2016)
37- L33	communication
38- IT-II	Internal Test-II
39-L34	definition
40-L35	importance and process of communication
	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	importance and process of communication
42- L37	methods of communication
43- L38	barriers in communication
44- P4	College level meeting/ function
45-L39	technologies of effective communication
46-L40	technologies of effective communication
47-L41	Interview
48-L42	meaning and types of interview
49-L43	meaning and types of interview
50-L44	planning for an interview
	Allotting portion for Internal Test-III
	Internal Test III begins(03-10-2016)
51 L45	planning for an interview
52- L46	types of questions in interview
53-IT-III	Internal Test-III
54-L47	employer's expectations from a candidate
55-L48	employer's expectations from a candidate
	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 (30-11-2016)

Course Outcomes

Learning Outcomes	COs of the course “<Personality Development>”
CO1	enable the students to groom their personality and prove themselves as good Samaritans of the Society
CO2	known the applications of concepts, Theories or issues in human development
CO3	known the Qualities of effective leadership
CO4	aware ideas to tackle the problem of human stress
CO5	Get ideas about the types of interview

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 ZOOLOGY

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc Zoology
Course Name	Value based education
Course Code	GVBE21
Class	Iyear (2016-2017)
Semester	Even
Staff Name	L.Jansi Rani
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; $5 \times 4 = 20$; 4Hrs /unit)	

Course Objectives

- To enable the students to understand the social realities
- To know the value of human rights
- to inculcate an essential value system towards building a healthy society.
- to get knowledge about the mass media

Syllabus

VALUE BASED EDUCATION

Unit I:

Social Justice Definition – need – parameters of social justice – factors responsible for social injustice – caste and gender – contributions of social reformers.

Unit II :

Human Rights and Marginalized People Concept of Human Rights – Principles of human rights – human rights and Indian constitution – Rights of Women and children – violence against women – Rights of marginalized People – like women, children, dalits, minorities, physically challenged etc

Unit III

Social Issues and Communal Harmony Social issues – causes and magnitude - alcoholism, drug addiction, poverty, unemployment etc – communal harmony –concept –religion and its place in public in public domain – separation of religion from politics –secularism role of civil society

Unit IV

Media Education and Globalized World Scenario Mass media – functions –characteristics –need and purpose of media literacy – effects and influence - - youth and children – media power – socio cultural and political consequences mass mediated culture - - consumeristic culture – Globalization – new media- prospects and challenges

Unit V

Values and Ethics Personal values – family values – social values – cultural values – Professional values – and overall ethics – duties and responsibilities

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on (02-12-2015)
1-L1	Definition – need – parameters of social justice
2-L2	factors responsible for social injustice
3- P1	Zoology Association
4-L3	caste and gender
5-L4	contributions of social reformers
	Allotting portion for Internal Test-I
	Internal Test I begins(25-01-2016)
6-IT-I	Internal Test-I
7-L5	Concept of Human Rights – Principles of human rights Test Paper distribution and result analysis

	Entering Internal Test-I Marks into University portal
8-L6	human rights and Indian constitution – Rights of Women and children
9-L7	violence against women
10-P2	College level meeting/Cell function
11-L8	Rights of marginalized People – like women, children, dalits, minorities, physically challenged etc
12-L9	Social issues – causes and magnitude - alcoholism, drug addiction,
13-P3	Department Seminar
14-L10	poverty, unemployment etc
15-L11	communal harmony –concept –religion and its place in public in public domain
16-L12	separation of religion from politics –secularism role of civil society
	Allotting portion for Internal Test-II
	Internal Test II begins(22-02-2016)
17-IT-1	Internal Test-II
18-L13	Mass media –functions –characteristics
	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
19-L14	need and purpose of media literacy – effects and influence
20- P2	College level meeting/ function
21-L15	youth and children – media power – socio cultural and political consequences mass mediated culture
22-L16	consumerist culture – Globalization – new media- prospects and challenges
23- L17	Personal values – family values – social values – cultural values
	Allotting portion for Internal Test-III
	Internal Test III begins(28-03-2016)
24- IT-III	Internal Test-III
25-L18	Professional values – and overall ethics – duties and responsibilities
	Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
26-MT	Model Test(11-04-2016)
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 “<Value base education>”
CO1	Value based education makes purity of heart
CO2	It helps totakes the whole society to the top
CO3	It creates awareness about human rights
CO4	It makes sincerity
CO5	It bringscommunal harmony in public

- # 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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Animal Diversity II - Chordata
Course Code	GMZO12
Class	I year (2016 - 2017)
Semester	Odd
Staff Name	L.Jansi Rani
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem	
Internal Test-3 Hrs	
Model Test-3 Hrs	
Dept. Meetings-2 Hrs	
College Meetings-2 Hrs	
Remaining 50 Hrs(5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To exemplify the intermediary position of Prochordates between Invertebrates and Vertebrates.
- To study the structure, functional organization.
- To study the adaptations and the economic importance of lower and higher chordates.

Syllabus

Unit I

Introduction to Chordata: General Characters (Diagnostic characters and additional Characters) and Classification up to classes with the name of the examples. Prochordata : General Characters and Classification up to orders with the names of the examples. Type Study: Ascidian – External features – Digestive and Reproductive system External features and Biological significance of the following (a) Amphioxus (b) Balanoglossus Agnatha: Petromyzon - External morphology; Ammocoetes Larva.

Unit II

Pisces: General Characters and Classification up to sub-classes with the names of the examples. Type Study: Scoliodon (Shark) - External characters - Placoid scales - Digestive System - Respiratory system - Receptor Organs - Urinogenital System. General topics: (i) Accessory respiratory organs in fishes (ii) Migration of fishes.

Unit III

Amphibia: General Characters and Classification upto orders with the names of the examples. External features and Biological significance of the following Examples: (a) Rhachophorus (b) Ambystoma (c) Axolotl Larva. General topic: Parental care in Amphibia Reptilia: General Characters and Classification up to orders with the names of the examples. External features and Biological significance of the following Examples: (a) Chelone mydas (b) Chamaeleon (c) Draco (d) Cobra General Topics: (i) Identification of poisonous and non-poisonous snakes of South India (ii) Venom apparatus - Biting mechanism- venom - First aid for snake bite - Antivenom.

Unit IV

Aves: General characters and classification up to subclasses with the names of the examples. Type study: Columba livia (Pigeon) - External characters - Flight muscles - Digestive system - Respiratory system - Urinogenital system General topics: (i) Migration of Birds (ii) Flight adaptations in Birds

Unit V

Mammalia: General Characters and Clasification up to subclasses with the names of the examples. 498 Type study: Rabbit - External morphology - Digestive system – Respiratory system - Heart - Structure of Brain - Urinogenital system. General topics: (i) Egg laying mammals (ii) Adaptations of aquatic mammals

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2015
1-L1	Unit I: Introduction to Chordata.
2-L2	General Characters (Diagnostic characters and additional Characters) .
3- L3	Classification up to classes with the name of the examples.
4-L4	Prochordata : General Characters.
5-L5	Classification up to orders with the names of the examples.
6-L6	Type Study: Ascidian – External features – Digestive Reproductive sysytem (b) Balanoglossus .
7-L7	External features and Biological significance of the following (a) Amphioxus.
8- P1	Welcoming of First year and Inauguration of Mathematics Association
9- L8	Agnatha: Petromyzon - External morphology; Ammocoetes Larva.
10- L9	Unit II: Pisces: General Characters .
11-L10	Classification up to sub-classes with the names of the examples.
12-L11	Type Study: Scoliodon (Shark) - External characters .
13-L12	Placoid scales - Digestive System - Respiratory system .
14-L13	Receptor Organs - Urinogenital System.
15-L14	____ - Allotting portion for Internal Test-I
	Internal Test I begins on 20.07.2015
16-L15	General topics: (i) Accessory respiratory organs in fishes (ii) Migration of fishes.
17-IT-1	Internal Test-I
18-L16	Unit III: Amphibia: General Characters .
19-L17	____ - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal

20-L18	Classification upto orders with the names of the examples.
21- L19	External features and Biological significance of the following Examples: (a) Rhachophorus (b) Ambystoma (c) Axolotl Larva.
22- P2	College level meeting/Cell function
23-L20	General topic: Parental care in Amphibia Reptilia.
24-L21	General Characters and Classification up to orders with the names of the examples.
25-L22	External features and Biological significance of the following Examples: (a) Chelone mydas (b) Chamaeleon .
26-L23	(c) Draco (d) Cobra .
27-L24	General Topics: (i) Identification of poisonous and non-poisonous snakes of South India .
28-L25	(ii) Venom apparatus - Biting mechanism- venom - First aid for snake bite – Antivenom.
29-L26	Unit IV: Aves: General characters .
30-L27	classification up to subclasses with the names of the examples.
31-L28	Type study: Columba livia (Pigeon) - External characters .
32-L29	Flight muscles .
33-L30	Digestive system .
34- P3	Department Seminar
35-L31	Respiratory system .
36-L32	_____ - Allotting portion for Internal Test-II
	Internal Test II begins on 31.08.2015
37- L33	Urinogenital system .
38- IT-II	Internal Test-II
39-L34	General topics: (i) Migration of Birds .
40-L35	_____ - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal

41-L36	(ii) Flight adaptations in Birds.
42- L37	Unit V: Mammalia: General Characters .
43- L38	Clasification up to subclasses with the names of the examples.
44- P4	College level meeting/ function
45-L39	. 498 Type study: Rabbit - External morphology .
46-L40	Digestive system .
47-L41	Respiratory system .
48-L42	Heart - Structure of Brain .
49-L43	Urinogenital system.
50-L44	____ - Allotting portion for Internal Test-III
	Internal Test III begins on 05.10.2015
51 L45	General topics: (i) Egg laying mammals .
52- L46	(ii) Adaptations of aquatic mammals.
53-IT-III	Internal Test-III
54-L47	Unit Review.
55-L48	____ - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
56- MT	Model Test begins on 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 2910.2015

Course Outcomes

Learning Outcomes	COs of the course “Animal Diversity II - Chordata”
CO1	Observation of the diversity in chordates and their classification.
CO2	Analysis of the significant adaptive features in all classes of Chordata.
CO3	Understand physiological and anatomical peculiarities through type study.
CO4	Appreciate transitional stages and their significance in evolution.
CO5	Understand what transformations are necessary to survive in different adaptive zones.
CO6	Create a positive attitude towards conservation of biodiversity.
CO7	Obtain overview of economically important vertebrates.
CO8	GD on venomous snakes
CO9	Discuss the beneficial insects
Experimental Learning	
EL1	To collect and categories different chordates specimens.
EL2	Observation of external features of specimens of chordates.
EL3	Identification of venomous snakes.
EL4	Identification of fishes.
Integrated Activity	
IA1	Identification of fishes in ponds
IA2	Identification commercial fishes.

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	Animal Physiology
Course Code	HZOM32
Class	II year (June 2017 to November 2017)
Semester	Odd
Staff Name	Dr. D. Paramanatha Swami Doss
Credits	5
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; $5 \times 16 = 80$; 16 Hrs /unit)	

Course Objectives

- This course develops the knowledge about the functions of organs and tissues in the Animal.
- This study also provides the students with the basic understanding of the fundamental processes and mechanisms that serve and control the various functions of the body.
- The basic idea of paper was learned earlier and the detailed course structure were dealt.

Syllabus

ANIMAL PHYSIOLOGY

Unit I: Nutrition and Thermoregulation

Digestive tract – Structure and functions – Secretory functions of the alimentary tract and the glands – Gastro intestinal hormones – Digestion, Absorption and Metabolism of carbohydrates, proteins and lipids – Balanced diet – Malnutrition, energy balance, BMR. Thermoregulation – Body temperature, acclimation and acclimatization – Regulation of temperature in poikilotherms and homeotherms.

Unit II: Blood and circulation

Blood corpuscles, Haemopoiesis and formed elements, plasma function, blood volume and its regulation, blood groups, immunity, haemostasis. Cardiovascular system: Comparative

anatomy of heart structures in vertebrates, myogenic heart, specialized tissue, ECG – its principle and significance, cardiac cycle, heart as a pump, blood pressure, neural and chemical regulation of all above.

Unit III Respiration and Excretion

Respiration in air and water – Comparison of respiration in vertebrates – anatomical considerations – Human: Physiology and anatomy of the respiratory tract – respiratory pigments Gas transport between the lungs and tissues – Regulation of respiration. Respiratory adjustments in high altitudes.

Excretory products – Comparative physiology of excretion and types of excretory products in vertebrates. Human: Kidney – Nephron – Renal circulation – Urine formation and concentration. Renal disorders – Micturition and dialysis – Regulation of water and electrolyte balance – Protozoa, crustacean. Fresh water, marine and terrestrial animals – Hormonal control of osmo-iono regulation.

Unit IV Neuromuscular and sensory Physiology

Neuron – Structure, classification – Neurotransmitters – Synapse, conduction of nerve impulses – Reflex activity – Structure and function of spinal cord & brain – Electro encephalogram (EEG).

Muscles – Classification and properties – Mechanism of muscular contraction – energetics of muscular contraction – neuromuscular junction – Sense organs and receptors – sense organs of vision, hearing and equilibrium, smell and taste, cutaneous.

Unit V: Endocrinology and reproduction

Endocrine mechanisms in Invertebrates (Insects and Crustaceans) Human: Structure and functions of various endocrine glands – basic mechanism of hormone action – Estrus and endometrial reproductive cycles – Mammary glands – Neuroendocrine regulation.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2017
1-L1	Unit I: Nutrition and Thermoregulation – Introduction about Physiology
2-L2	Digestive tract – Structure and functions.
3- L3	Secretory functions of the alimentary tract and the glands.
4-L4	Gastro intestinal hormones.
5-L5	Digestion and absorption.
6-L6	Metabolism of food stuffs – carbohydrates, proteins
7-L7	Balanced diet – Malnutrition, energy balance, BMR.
8-L8	Thermoregulation – Body temperature, acclimation and acclimatization.
9-L9	Regulation of temperature in poikilotherms and homeotherms.
10-P1	Revision
11-L10	Student Seminar – Metabolism of lipid

12-L11	Unit II: Blood and circulation – Introduction about blood corpuscles.
13-L12	Welcoming of First year and Inauguration of Zoology Association
14-L13	Haemopoiesis and formed elements, plasma function.
15-L14	Blood volume and its regulation.
16-L15	Blood groups, immunity, haemostasis.
17-L16	Cardiovascular system: Comparative anatomy of heart structures in vertebrates
18-L17	Myogenic heart, specialized tissue, ECG – its principle and significance, cardiac cycle.
19-L18	Blood pressure - physiology
20-L19	Revision
21-L20	Students Seminar - Neural and chemical regulation.
22-L21	Unit III Respiration - Respiration in air and water
23-L22	Comparison of respiration in vertebrates – anatomical considerations.
24-L23	Physiology and anatomy of the human respiratory tract, respiratory pigments.
25-L24	Gas transport between the lungs and tissues.
26-IT-1	Neural and chemical regulation of respiration.
27-L25	Respiratory adjustments in high altitudes.
28-L26	Excretion – General introduction
29-L27	Revision
30-L28	- Allotting portion for Internal Test-I
31- L29	Excretory products – Urea, Uric Acid, Ammonia etc
32- L30	Comparative physiology of excretion and types of excretory products in vertebrates.
33- L31	Human: Kidney – Nephron
34-P2	Internal Test-I (31.07.2017)
35- L32	Renal circulation – Urine formation and concentration
36- L33	Renal disorders – Micturition and dialysis
37- L34	Regulation of water and electrolyte balance
38- L35	- Test Paper distribution and result analysis
39- L36	Entering Internal Test-I Marks into University portal
40- L37	Osmo iono regulation in Protozoa, crustacean
41- L38	Osmoregulation in Fresh water, marine and terrestrial animals.
42- L39	Hormonal control of osmo-iono regulation
43- L40	College level meeting/Cell function
44- L41	Revision
45- L42	Revision
46- L43	Students Seminar
47- L44	Students Seminar
48- L45	Unit IV Neuromuscular and sensory Physiology - Introduction
49- L46	Neuron – Structure, classification
50- L47	Neurotransmitters – History, important neurotransmitters, transport and release.
51- P3	Synapse – Anatomical and functional classification, functions, property
	Department Seminar
52- L48	Conduction of nerve impulses – Reflex activity – Classification and property.
53- L49	Structure and function of spinal cord & brain
54- L50	Electroencephalogram – Significance, method of recording, EEG during sleep.
55- L51	Revision
56-L52	- Allotting portion for Internal Test-II

57-L53	Students Power point presentation – Brain
58-L54	Students Seminar - Autonomous Neuroglial cells
59-IT-II	Internal Test-II (30.08.2017)
60- L55	Muscles – Classification and properties
61- L56	- Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
62- L57	Students Seminar – Structure of skeletal muscles – Properties of Skeletal muscle.
63- L58	Mechanism of muscular contraction – energetics of muscular contraction.
64- L59	Neuromuscular junction – Motor unit, Transmission and Blockers.
65- L60	Sense organ of vision – Structure, physiology of vision, visual pathway and process.
66- L61	Students Seminar – Sense organ of hearing.
67- L62	Students Seminar – Sense organ of taste
68- L63	Sense organ of smell – olfactory pathway, classification of odour / cutaneous receptor.
69- L64	Revision.
70- L65	Unit V: Endocrinology and reproduction – Introduction.
71- L66	Endocrine mechanisms in Invertebrates (Insects and Crustaceans).
72- L67	Human: Structure and functions of pituitary.
73- L68	Structure and functions of thyroid.
74-P4	College level meeting/ function
75- L69	Structure and functions of Adrenal Medulla and Adrenal Cortex.
76- L70	Students seminar – hormones and hormone action.
77- L71	Oestrous and endometrial cycle.
78- L72	Menstrual cycle.
79- L73	- Allotting portion for Internal Test-III
80- L74	Structure of Mammary glands.
81- L75	Neuroendocrine regulation of reproduction.
82-IT-III	Internal Test-III (03.10.2017)
83- L76	Revision
84- L77	- Test Paper distribution and result analysis
85- L78	Revision
	Entering Internal Test-III Marks into University portal
86- L79	Model Test (19.10.2017)
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 19.10.2017

Course Outcomes

Learning Outcomes	COs of the course “Animal Physiology”
CO1	Able to understand how the poikilotherms and homeotherms regulate their body temperature.

CO2	Know about the intestinal hormones and their role in digestion.
CO3	Able to explain the physiology of cardio vascular system.
CO4	Gain knowledge about the respiration in air and water.
CO5	Imparts knowledge about the neuro and chemical mechanism of respiration.
CO6	Able to describe the regulation of water and electrolyte balance in different animal taxa.
CO7	Describe the importance of neurotransmitters.
CO8	Understand the physiology and functions of endocrine glands.
CO9	Learn about the structure of sense organs.
Experimental Learning	
EL1	Visit to nearby clinical lab to study the ECG and EEG.
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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	Cell and Molecular Biology
Course Code	KZOM11
Class	I year (June 2016 to November 2016)
Semester	Odd
Staff Name	Dr. D. Paramanatha Swami Doss
Credits	5
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; $5 \times 16 = 80$; 16Hrs /unit)	

Course Objectives

- Provide an overview of cell structure and function at the molecular level.
- Help the student to know the general structure, organization and function of eukaryotic cells
- To study the cellular components underlying mitotic cell division.
- To study the receptor mechanisms, Cell signaling and signal transduction

Syllabus

MSU/2016-17/PG -Colleges/M.Sc. (Zoology) Semester -I /Core-2

CELL AND MOLECULAR BIOLOGY

Unit I: Structure and functions of cell types – Prokaryotes, Eukaryotes. Plasma membrane – structure of membrane, models. Membrane transport, membrane potentials – Extracellular space – cell adhesion, intercellular recognition – intercellular junctions. Mitochondria – ultrastructure – functions – energetic – cellular respiration – Biogenesis.

Unit II: Ultrastructure of Ribosomes – Endoplasmic reticulation and Golgi complex. Biosynthesis of secretory proteins on ribosomes and rough endoplasmic reticulum- post-translational modifications of proteins both in the RER and SER. Golgi Complex- formation of disulfide bonds- glycosylation – proteolytic cleavage – golgi sorting - molecular mechanism of vesicular traffic – transport of proteins into mitochondria. Lysozyme – ultrastructure – enzymes– origin and functions of lysosome.

Unit III: Cell – Cell signaling – signaling mechanisms, signal molecules – signal receptors – form of intracellular signaling – cell surface receptors – signal transduction – pathways – signaling from plasma membrane to nucleus. Cell adhesion – calcium dependent hemophilic cell – cell adhesion – N-CAMs mediated calcium independent hemophilic cell – cell adhesion. Cell matrix adhesion – cell matrix adhesion proteins – integrins – Hemidesmosomes – collagen and non-collagen components.

Unit IV: Nucleus – structure and function. Nucleo-cytoplasmic interaction, Nuclear transplantation. Cell fusion – homokaryons, heterokaryons, cytoplasts, karyoplasts.

Unit V: Cell division – mitosis – molecular mechanisms for regulating mitotic events – cyclins and their kinases (cdks) – cell death and its regulation- Characteristics of cancer cells, causes and onset of cancer.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2016
1-L1	Unit I: Structure of cell - Structure and functions of cell types.
2-L2	Prokaryotes, Eukaryotes – Structure and difference.
3- L3	Plasma membrane – structure of membrane, models – Trilaminar, Unit membrane, bimolecular, lattice and micellar model.
4-L4	Functions of plasma membrane - Membrane transport, membrane potentials.
5-L5	Cellular mechanism of Extracellular space.
6-L6	Cell adhesion, intercellular recognition
7-L7	Intercellular junctions – tight junction – gap junction.
8-L8	Mitochondria – origin and ultrastructure
9-L9	General functions
10-P1	Welcoming of First year and Inauguration of Zoology Association
11-L10	Student seminar – Kreb’s cycle
12-L11	Electron transport chain, oxidative phosphorylation, energetics
13-L12	Biogenesis. Group discussion
14-L13	Revision
15-L14	Unit II – General introduction about cell organelles.
16-L15	Ultrastructure of Ribosomes – 70s and 80s ribosomes –functions.
17-L16	Ultrastructure and functions of Golgi complex.
18-L17	Ultrastructure of Endoplasmic reticulum – Functions of Rough and Smooth ER.
19-L18	Biosynthesis of secretary proteins on ribosomes and rough endoplasmic reticulum.
20-L19	Students Seminar - post- translational modifications of proteins both in the RER and SER.
21-L20	Golgi Complex- formation of disulfide bonds- glycosylation – proteolytic cleavage
22-L21	Molecular mechanism of vesicular traffic.
23-L22	Allotting portion for Internal Test-I
	Internal Test I begins

24-L23	Secretary Proteins - transport of proteins into mitochondria.
25-L24	Lysosomes – Ultra structure.
26-IT-1	Internal Test-I (25.07.2016)
27-L25	Enzymes and origin of lysosomes, polymorphism in lysosomes, functions of lysosomes.
28-L26	Revision
29-L27	Group discussion about cell organelles.
30-L28	Test Paper distribution and result analysis
	Entering Internal Test-I Marks
31- L29	Unit III: General introduction
32- L30	Cell – Cell signaling – signaling mechanisms.
33- L31	Signalling molecules - paracrine signalling, endocrine signalling, autocrine signalling, and direct signalling across gap junctions.
34-P2	College level meeting/Cell function
35- L32	Signal receptors - Intracellular receptor, Cell surface receptor and G – protein coupled receptor.
36- L33	Signal transduction – stages – reception, transduction and response.
37- L34	Pathways – signaling from plasma membrane to nucleus.
38- L35	Cell adhesion – calcium dependent hemophilic cell to cell adhesion.
39- L36	Student seminar – Signal transduction mechanism.
40- L37	N-CAMs mediated calcium independent hemophilic cell – cell adhesion.
41- L38	Cell matrix adhesion – Extra cellular matrix adhesion.
42- L39	Importance of cell matrix adhesion proteins.
43- L40	Integrins – Structure, Functions and Importance.
44- L41	Hemidesmosomes – Structure, elements and filaments.
45- L42	Collagen and non-collagen components of hemidesmosomes.
46- L43	Revision
47- L44	Revision
48- L45	Group discussion
49- L46	Unit IV: General Introduction
50- L47	Nucleus – structure and function
51- P3	Department Seminar
52- L48	Nucleo-cytoplasmic interaction – Comparative study.
53- L49	Nuclear transplantation in acetabularia, amphibians.
54- L50	Cell fusion – types, methods, in human therapy.
55- L51	Students seminar - Homokaryons and heterokaryons
56-L52	Allotting portion for Internal Test-II
	Internal Test II begins
57-L53	Students seminar - Cytoplasts, karyoplasts
58-L54	Revision
59-IT-II	Internal Test-II (22.08.2016)
60- L55	Revision
61- L56	Test Paper distribution and result analysis
	Entering Internal Test-II Marks
62- L57	Group discussion
63- L58	Unit V: Introduction
64- L59	Cell division - Interphase
65- L60	Student Seminar - Mitosis

66- L61	Student Seminar - Meiosis
67- L62	Molecular mechanisms for regulating mitotic events.
68- L63	Cell cycle Interphase, G1 phase, S Phase and G2 Phase.
69- L64	Meiotic Phase or Mitotic phase.
70- L65	Student Seminar – Chromosomal movements – Metaphase, Anaphase
71- L66	Cyclins and their kinases (cdks)
72- L67	Cdks, cyclins and CKIs: roles beyond cell cycle regulation.
73- L68	Cell death and its regulation.
74-P4	College level meeting/ function
75- L69	Cell birth and aging
76- L70	Cancer biology – Properties of cancer, Tumour progression.
77- L71	Types of cancer, Harmfull effects of cancer, diagnosis of cancer.
78- L72	Characteristics of cancer cells, causes and onset of cancer.
79- L73	- Allotting portion for Internal Test-III
	Internal Test III begins
80- L74	Group discussion.
81- L75	Revision
82-IT-III	Internal Test-III (03.10.2016)
83- L76	Revision
84- L77	- Test Paper distribution and result analysis
85- L78	Revision
	Entering Internal Test-III Marks
86- L79	Model Test (17.10.2016)
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 30.11.2016

Course Outcomes

Learning Outcomes	COs of the course “Cell and Molecular Biology”
CO1	Describe the ultra-structure and functions of cell organelles.
CO2	Hypothesize and describe protein structure, folding and sorting
CO3	Narrate how cell movement and cell-cell communication occur and discuss mechanisms of signal transduction.
CO4	Understand the processes that control eukaryotic cell cycle and cell death.
CO5	Able to understand the causes and consequences of cancer.
CO6	Study the overview the nuclear transplantation.
Experimental Learning	
EL1	--
EL2	--
EL3	--
EL4	--
Integrated Activity	--

- # 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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	ENDOCRINOLOGY
Course Code	PZOM14
Class	I year (2016-2017)
Semester	Odd
Staff Name	Dr.M.Rajakumari
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- To study about Scope of Endocrinology
- To Discuss about Endocrine glands
- To learned about Hormones and reproduction : Ovary and Testis
- To study about Gastrointestinal hormones and its function
- To understand Hormones regulation on migration

Syllabus

Unit I : Scope of Endocrinology – Hormones – Chemical structure – Synthesis –

classification – Characteristic features of hormones –General and principles of hormone action, Cell signaling and hormonal action – Cyclic AMP.

Unit II : Functional organization of hormones of Endocrine glands – pituitary (hypophysis) : Adenohypophysial and Neurohypophysial hormones – Thyroid – Pancreas – Adrenal – Pineal gland (Epiphysis).

Unit III : Hormones and reproduction : Ovary and Testis – Hormonal control of mammary glands, ovarian cycles, pregnancy and Lactation – Placenta and its endocrine function.

Unit IV : Gastrointestinal hormones and its function – regulation of hormone metabolism and mineral metabolism – carbohydrate metabolism . Influence of hormones on growth and development – Hormones and calcium – phosphate homeostasis

Unit V : Hormonal regulation of osmoregulation – Thermoregulation – Hormones and behavior – Hormones regulation on migration – Regeneration – Metamorphosis – Environmental endocrinology.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2016
1-L1	Scope of Endocrinology
2-L2	Concept of Secretion
3- L3	Hormones as messengers
4-L4	Classification of hormones
5-L5	Steroid Hormones
6-L6	Amino acid derivatives
7-L7	Characteristic features of hormone
8- P1	Welcoming of First year and Inauguration of Zoology Association
9- L8	Discovery of Hormones
10- L9	General and principles of hormone action - Mechanism of Hormone action
11-L10	Cell signaling
12-L11	Hormonal action
13-L12	Cyclic AMP.
14-L13	Functional organization of hormones of Endocrine glands
15-L14	Pituitary gland - Anatomy
16-L15	Hormones of adenohypophysis
17- L16	Neurohypophysial hormones
18- L17	Thyroid stimulating hormones TSH
19- L18	Thyroid Gland
20- L19	Endocrine Pancreas
21- L20	Pancreactemy - Allotting portion for Internal Test-I
	Internal Test I begins
22- L21	Adrenal gland or Suprarenals
23- IT-1	Internal Test-I
24- L22	Pineal gland (Epiphysis).
25- L23	Hormones and reproduction
26- L24	Ovary- Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Testis
28- L26	Hormonal control of mammary glands,
29- L27	Hormonal control of mammary glands,
30- P2	College level meeting/Cell function
31-L28	ovarian cycles,
32-L29	pregnancy
33-L30	Lactation
34- L31	Placenta and its endocrine function.
35- L32	Placenta and its endocrine function.
36- L33	Gastrointestinal hormones
37- L34	Function of Gastrointestinal hormones
38- L35	Regulation of hormone metabolism
39- L36	Regulation of hormone metabolism
40- L37	Mineral metabolism
41- L38	Mineral metabolism

42-P3	Department Seminar
43- L39	Carbohydrate metabolism
44- L40	Carbohydrate metabolism
45- L41	Influence of hormones on growth
46- L42	Influence of hormones on growth
47- L43	Influence of hormones on growth and development - Allotting portion for Internal Test-II
	Internal Test II begins
48- L44	Influence of hormones on growth and development
49-IT-II	Internal Test-II
50-L45	Hormones and calcium
51- L46	Hormones and calcium - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Phosphate homeostasis
53- L48	Phosphate homeostasis
54- L49	Hormonal regulation of osmoregulation
55- L50	Hormonal regulation of osmoregulation
56- L51	Thermoregulation
57- L52	Thermoregulation
58- L53	Hormones and behavior
59-P4	College level meeting/ function
60- L54	Hormones and behavior
61- L55	Hormones regulation on migration
62- L56	Hormones regulation on migration
63- L57	Regeneration
64- L58	_Regeneration - Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Metamorphosis
66- L60	Environmental endocrinology.
67-IT-III	Internal Test-III
68- L61	Revision of Unit I & II
69- L62	Revision of Unit III & IV
70- L63	Revision of Unit V - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
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 “<ENDOCRINOLOGY>”
CO1	know the properties of polypeptide structure hormones.
CO2	know the properties of steroid structure hormones.
CO3	relate the membrane receptor and the hormones.
CO4	relate the stoplasm receptor and the hormones.
CO5	illustrate what kind of hormone is synthesised in what kind of endocrine gland.
CO6	explain what kind of hormone is released from what kind of endocrine gland.
CO7	list the interior hypopyhse lobe hormones.
CO8	list the posterior hypopyhse lobe hormones.
Experimental Learning	
EL1	make experiments to understand living organisms, and analyse and interpret the results
EL2	explain the systems of living organisms and their functioning
EL3	define biological problems
EL4	make experiment, application and analysis to solve biological problems
Integrated Activity	
IA1	Arrange a workshop on “Thyroid Gland”
IA2	Make a slide share of Mechanism of Hormone action

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	ENDOCRINOLOGY
Course Code	PZOM14
Class	I year (2016-2017)
Semester	Odd
Staff Name	Dr.M.Jansi Rani
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- To study about Scope of Endocrinology
- To Discuss about Endocrine glands
- To learned about Hormones and reproduction : Ovary and Testis
- To study about Gastrointestinal hormones and its function
- To understand Hormones regulation on migration

Syllabus

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Unit III : Hormones and reproduction : Ovary and Testis – Hormonal control of mammary glands, ovarian cycles, pregnancy and Lactation – Placenta and its endocrine function.

Unit IV : Gastrointestinal hormones and its function – regulation of hormone metabolism and mineral metabolism – carbohydrate metabolism . Influence of hormones on growth and development – Hormones and calcium – phosphate homeostasis

Unit V : Hormonal regulation of osmoregulation – Thermoregulation – Hormones and behavior – Hormones regulation on migration – Regeneration – Metamorphosis – Environmental endocrinology.

Course Calendar

Hour allotment	Class Schedule
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1-L1	Scope of Endocrinology
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3- L3	Hormones as messengers
4-L4	Classification of hormones
5-L5	Steroid Hormones
6-L6	Amino acid derivatives
7-L7	Characteristic features of hormone
8- P1	Welcoming of First year and Inauguration of Zoology Association
9- L8	Discovery of Hormones
10- L9	General and principles of hormone action - Mechanism of Hormone action
11-L10	Cell signaling
12-L11	Hormonal action
13-L12	Cyclic AMP.
14-L13	Functional organization of hormones of Endocrine glands
15-L14	Pituitary gland - Anatomy
16-L15	Hormones of adenohypophysis
17- L16	Neurohypophysial hormones
18- L17	Thyroid stimulating hormones TSH
19- L18	Thyroid Gland
20- L19	Endocrine Pancreas
21- L20	Pancreatic islets - Allotting portion for Internal Test-I
	Internal Test I begins
22- L21	Adrenal gland or Suprarenals
23- IT-1	Internal Test-I
24- L22	Pineal gland (Epiphysis).
25- L23	Hormones and reproduction
26- L24	Ovary- Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Testis
28- L26	Hormonal control of mammary glands,
29- L27	Hormonal control of mammary glands,
30- P2	College level meeting/Cell function
31-L28	ovarian cycles,
32-L29	pregnancy
33-L30	Lactation
34- L31	Placenta and its endocrine function.
35- L32	Placenta and its endocrine function.
36- L33	Gastrointestinal hormones
37- L34	Function of Gastrointestinal hormones
38- L35	Regulation of hormone metabolism
39- L36	Regulation of hormone metabolism
40- L37	Mineral metabolism
41- L38	Mineral metabolism

42-P3	Department Seminar
43- L39	Carbohydrate metabolism
44- L40	Carbohydrate metabolism
45- L41	Influence of hormones on growth
46- L42	Influence of hormones on growth
47- L43	Influence of hormones on growth and development - Allotting portion for Internal Test-II
	Internal Test II begins
48- L44	Influence of hormones on growth and development
49-IT-II	Internal Test-II
50-L45	Hormones and calcium
51- L46	Hormones and calcium - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Phosphate homeostasis
53- L48	Phosphate homeostasis
54- L49	Hormonal regulation of osmoregulation
55- L50	Hormonal regulation of osmoregulation
56- L51	Thermoregulation
57- L52	Thermoregulation
58- L53	Hormones and behavior
59-P4	College level meeting/ function
60- L54	Hormones and behavior
61- L55	Hormones regulation on migration
62- L56	Hormones regulation on migration
63- L57	Regeneration
64- L58	_Regeneration - Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Metamorphosis
66- L60	Environmental endocrinology.
67-IT-III	Internal Test-III
68- L61	Revision of Unit I & II
69- L62	Revision of Unit III & IV
70- L63	Revision of Unit V - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
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 “<ENDOCRINOLOGY>”
CO1	know the properties of polypeptide structure hormones.
CO2	know the properties of steroid structure hormones.
CO3	relate the membrane receptor and the hormones.
CO4	relate the stoplasm receptor and the hormones.
CO5	illustrate what kind of hormone is synthesised in what kind of endocrine gland.
CO6	explain what kind of hormone is released from what kind of endocrine gland.
CO7	list the interior hypopyhse lobe hormones.
CO8	list the posterior hypopyhse lobe hormones.
Experimental Learning	
EL1	make experiments to understand living organisms, and analyse and interpret the results
EL2	explain the systems of living organisms and their functioning
EL3	define biological problems
EL4	make experiment, application and analysis to solve biological problems
Integrated Activity	
IA1	Arrange a workshop on “Thyroid Gland”
IA2	Make a slide share of Mechanism of Hormone action

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	EVOLUTION
Course Code	PZOM23
Class	II year (2016-2017)
Semester	EVEN
Staff Name	Dr.M.Rajakumari
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- To learned about Origin of cell .
- To explain Experiment of Urey and Miller
- To discuss the Evidences and Theories of Evolution
- To understand the Mechanism of Evolution & Population genetics
- To explain Simpson's definition of the higher taxa
- To analyse Phylogenetic tree and stages of primate evolution

Syllabus

- Unit I :** Origin of cells and unicellular evolution : Origin of basic biological molecules, abiogenesis, biogenesis, Biochemical origin of life, biological evolution (protenoids and microsphere coacervates), biogeny of protein and nucleic acid ,concept of Oparin and Haldane – Experiment of Urey and Miller
- Unit II :** Evidences and Theories of Evolution : Evidences : From Paleontology – Geological time scales and its major events - Types of fossils and process of fossilization – Evidences from biogeography – Evidences from morphology, comparative anatomy, embryology, biochemistry and physiology. Theories of organic evolution : Lamarkism, Darwinism, Mutation theory, Modern synthetic theory.
- Unit III :** Mechanism of Evolution : Population genetics – population, gene pool, gene frequency ; Hardy – Weinberg law, Gene frequency and its impacts, natural selection, migration and genetic drift, variations, isolating mechanism and origin of species – Allopatric and sympatric speciation.
- Unit IV :** Origin of Higher Taxa : Simpson's definition of the higher taxa, Simpson's adaptive grid, pre-adaptations and post-adaptations, patterns of evolution : convergent evolution and parallel evolution, Micro evolution, Macro evolution (adaptive radiation), Mega evolution, Connecting link between vertebrate classes, quantum evolution. Rates of Evolution : Horotely, Bradytely and Tachytely, Graduation versus punctuated equilibrium, Extinction and its causes.
- Unit V :** Mankind evolution : Phylogenetic tree and stages of primate evolution including Homo sapiens. Place and time of origin, characteristics and ancestors of man. Evolutionary trends of man evolution, cultural evolution of man, allometry, altruism and kith and kin selection.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 01.12.2016
1-L1	Origin of cells
2-L2	Unicellular evolution
3-L3	Origin of basic biological molecules,
4-L4	Abiogenesis
5-L5	Biogenesis
6-L6	Biochemical origin of life
7-L7	Biological evolution - Protenoids
8- P1	Zoology Association - Activities
9- L8	Biological evolution - Microsphere coacervates
10- L9	Biogeny of protein
11-L10	Biogeny of nucleic acid
12-L11	Concept of Oparin and Haldane
13-L12	Concept of Oparin and Haldane
14-L13	Experiment of Urey and Miller
15-L14	Evidences and Theories of Evolution
16-L15	Evidences : From Paleontology
17- L16	Geological time scales and its major events
18- L17	Types of fossils
19- L18	Process of fossilization
20- L19	Evidences from biogeography
21- L20	Evidences from morphology - Allotting portion for Internal Test-I
	Internal Test I begins
22- L21	Comparative anatomy, embryology, biochemistry and physiology
23- IT-1	Internal Test-I
24- L22	Theories of organic evolution
25- L23	Lamarkism,
26- L24	Darwinism - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Mutation theory
28- L26	Modern synthetic theory.
29- L27	Mechanism of Evolution
30- P2	College level meeting/Cell function
31-L28	Population genetics
32-L29	Population, gene pool, gene frequency
33-L30	Hardy – Weinberg law
34- L31	Gene frequency and its impacts
35- L32	Natural selection
36- L33	Migration and genetic drift variations
37- L34	Isolating mechansism
38- L35	Origin of species
39- L36	Allopatric and sympatric speciation.
40- L37	Origin of Higher Taxa

41- L38	Simpson's definition of the higher taxa
42-P3	Department Seminar
43- L39	Simpson's adaptive grid
44- L40	Pre-adaptations and post-adaptations
45- L41	Patterns of evolution
46- L42	convergent evolution and parallel evolution
47- L43	Micro evolution - Allotting portion for Internal Test-II
	Internal Test II begins
48- L44	Macro evolution (adaptive radiation)
49-IT-II	Internal Test-II
50-L45	Mega evolution
51- L46	Connecting link between vertebrate classes - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Quantum evolution
53- L48	Rates of Evolution
54- L49	Horotely, Bradytely and Tachytely
55- L50	Graduation versus punctuated equilibrium
56- L51	Extinction and its causes
57- L52	Mankind evolution
58- L53	Phylogenetic tree
59-P4	College level meeting/ function
60- L54	Stages of primate evolution
61- L55	Homo sapiens
62- L56	Place and time of origin
63- L57	Characteristics and ancestors of man
64- L58	Evolutionary trends of man evolution - Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Cultural evolution of man
66- L60	Allometry, altruism and kith and kin selection.
67-IT-III	Internal Test-III
68- L61	Revision of Unit I & II
69- L62	Revision of Unit III & IV
70- L63	Revision of Unit V - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
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 “<EVOLUTION>”
CO1	Explain how Darwin's personal observations led to his concept of biological evolution.
CO2	Outline various contemporary observations of biological evolution.
CO3	Specify how the process of selective breeding has led to various breeds of domestic animals.
CO4	Compare and contrast anatomical, developmental, and molecular homologies.
CO5	Explain the importance of the discovery of transitional fossils.
CO6	Name the evolutionary trends revealed by study of horse evolution.
CO7	Explain the principle of convergent evolution.
CO8	Explain the evolutionary significance of homologous and vestigial structures.
CO9	Describe several ways that a species might acquire new genes.
Experimental Learning	
EL1	Explain causes and role of extinction in evolution
EL2	Describe cell cycles and its regulation
EL3	To identify chromosomal mutations and in borne errors of metabolism
EL4	Write down molecular biology techniques
Integrated Activity	
IA1	Make a PPT of Evidences and Theories of Evolution
IA2	Prepare a model of Cultural evolution of man

- # 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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	Research Methodology
Course Code	HZOE41
Class	II year (2016-2017)
Semester	Even
Staff Name	Dr. P. Elizmathi Sophia
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- Students should know why educational research is undertaken, and the audiences that profit from research studies
- To be able to describe the method of chromatography and its applications
- To study the Principle and working Mechanism of Different types of Microscopes
- To be familiar with the all the techniques used in the field of Biology.

Syllabus

Unit I : Research – Characteristics – types of research – steps in research – objectives of research – research report formatting and typing – laboratory safety – intellectual property rights.

Unit II : Microscopy – Principles – types of light microscopes – bright field – dark field – phase contrast – fluorescence – scanning – micrometry. Electron microscopes and types – atomic force and magnetic force microscopes.

Unit III : Centrifuge – types – principles and applications. pH meter – types – principles and applications. Colorimeter – principles and applications. Cryopreservation and its applications. Freezing and freeze drying microtomes. Cytotechniques.

Unit IV : Chromatography – paper – thin layer – column – gas liquid chromatography – affinity chromatography. Electrophoresis – paper – cellulose acetate – gel – immune electrophoresis. Blotting techniques – southern – northern – western. Radioactive counters – autoradiography – labeling studies.

Unit V : Spectrophotometer - Spectrofluorimeter – ESR – NMR Spectrophotometer – Flame Emission Photometry.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 01.12.2016
1-L1	Unit I : Research.
2-L2	Characteristics.
3- L3	types of research .
4-L4	steps in research.
5-L5	objectives of research.
6-L6	research report formatting.
7-L7	Typing.
8- P1	Welcoming of First year and Inauguration of Mathematics Association
9- L8	laboratory safety.

10- L9	intellectual property rights
11-L10	Unit II : Microscopy.
12-L11	Principles.
13-L12	types of light microscopes.
14-L13	bright field.
15-L14	dark field.
16-L15	phase contrast.
17- L16	fluorescence.
18- L17	scanning.
19- L18	micrometry.
20- L19	Electron microscopes.
21- L20	_____ - Allotting portion for Internal Test-I
	Internal Test I begins on 24.01.2017
22- L21	Types.
23- IT-1	Internal Test-I
24- L22	atomic force and magnetic force microscopes.
25- L23	Unit III : Centrifuge.
26- L24	_____ - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Types.
28- L26	Principles.
29- L27	applications.
30- P2	College level meeting/Cell function
31-L28	pH meter – types.
32-L29	Principles.
33-L30	applications.

34- L31	Colorimeter –principles.
35- L32	applications.
36- L33	Cryopreservation.
37- L34	its applications.
38- L35	Freezing.
39- L36	freeze drying microtomes.
40- L37	Cytotechniques.
41- L38	Unit IV : Chromatography.
42-P3	Department Seminar
43- L39	paper.
44- L40	thin layer .
45- L41	column .
46- L42	gas liquid chromatography.
47- L43	____ - Allotting portion for Internal Test-II
	Internal Test II begins on 24.02.2017
48- L44	affinity chromatography.
49-IT-II	Internal Test-II
50-L45	Electrophoresis.
51- L46	____ - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	paper.
53- L48	cellulose acetate – gel.
54- L49	immune electrophoresis.
55- L50	Blotting techniques.
56- L51	southern – northern – western.
57- L52	Radioactive counters .

58- L53	Autoradiography.
59-P4	College level meeting/ function
60- L54	labeling studies.
61- L55	Unit V : Spectrophotometer.
62- L56	Spectrofluorimeter.
63- L57	ESR.
64- L58	____ - Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	NMR Spectrophotometer.
66- L60	Autoradiography.
67-IT-III	Internal Test-III
68- L61	Radioactive counters .
69- L62	Flame Emission Photometry
70- L63	____ - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
71-MT	Model Testbegins on 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 “Research Methodology”
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CO1	understand some basic concepts of research and its methodologies
CO2	select and define appropriate research problem and parameters
CO3	To be able to describe the method of chromatography and its applications
CO4	The students will be able to describe the working mechanism of Microscopes.
CO5	The students will be able to write Research reports.
CO6	Know and understand the main uses of Radio Labelling
CO7	To be able to use all types of spectrosopes
CO8	Should be aware with Plagiarism
CO9	Familiar with all the instrument available in the Laboratory
Experimental Learning	
EL1	organize and conduct research (advanced project) in a more appropriate manner
EL2	Know the main principles and methods for surveying resource use
EL3	Be able to conduct a threat assessment for a site.
EL4	Use all available instruments in the field of Biology
Integrated Activity	
IA1	write a research report and thesis
IA2	Write a proposal for Research funding

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	Research Methodology
Course Code	HZOE41
Class	II year (2016-2017)
Semester	Even
Staff Name	P. Augustus Robince
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- Students should know why educational research is undertaken, and the audiences that profit from research studies
- To be able to describe the method of chromatography and its applications
- To study the Principle and working Mechanism of Different types of Microscopes
- To be familiar with the all the techniques used in the field of Biology.

Syllabus

Unit I : Research – Characteristics – types of research – steps in research – objectives of research – research report formatting and typing – laboratory safety – intellectual property rights.

Unit II : Microscopy – Principles – types of light microscopes – bright field – dark field – phase contrast – fluorescence – scanning – micrometry. Electron microscopes and types – atomic force and magnetic force microscopes.

Unit III : Centrifuge – types – principles and applications. pH meter – types – principles and applications. Colorimeter – principles and applications. Cryopreservation and its applications. Freezing and freeze drying microtomes. Cytotechniques.

Unit IV : Chromatography – paper – thin layer – column – gas liquid chromatography – affinity chromatography. Electrophoresis – paper – cellulose acetate – gel – immune electrophoresis. Blotting techniques – southern – northern – western. Radioactive counters – autoradiography – labeling studies.

Unit V : Spectrophotometer - Spectrofluorimeter – ESR – NMR Spectrophotometer – Flame Emission Photometry.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 01.12.2016
1-L1	Unit I : Research.
2-L2	Characteristics.
3- L3	types of research .
4-L4	steps in research.
5-L5	objectives of research.
6-L6	research report formatting.
7-L7	Typing.
8- P1	Welcoming of First year and Inauguration of Mathematics Association
9- L8	laboratory safety.

10- L9	intellectual property rights
11-L10	Unit II : Microscopy.
12-L11	Principles.
13-L12	types of light microscopes.
14-L13	bright field.
15-L14	dark field.
16-L15	phase contrast.
17- L16	fluorescence.
18- L17	scanning.
19- L18	micrometry.
20- L19	Electron microscopes.
21- L20	_____ - Allotting portion for Internal Test-I
	Internal Test I begins on 24.01.2017
22- L21	Types.
23- IT-1	Internal Test-I
24- L22	atomic force and magnetic force microscopes.
25- L23	Unit III : Centrifuge.
26- L24	_____ - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Types.
28- L26	Principles.
29- L27	applications.
30- P2	College level meeting/Cell function
31-L28	pH meter – types.
32-L29	Principles.
33-L30	applications.

34- L31	Colorimeter –principles.
35- L32	applications.
36- L33	Cryopreservation.
37- L34	its applications.
38- L35	Freezing.
39- L36	freeze drying microtomes.
40- L37	Cytotechniques.
41- L38	Unit IV : Chromatography.
42-P3	Department Seminar
43- L39	paper.
44- L40	thin layer .
45- L41	column .
46- L42	gas liquid chromatography.
47- L43	____ - Allotting portion for Internal Test-II
	Internal Test II begins on 24.02.2017
48- L44	affinity chromatography.
49-IT-II	Internal Test-II
50-L45	Electrophoresis.
51- L46	____ - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	paper.
53- L48	cellulose acetate – gel.
54- L49	immune electrophoresis.
55- L50	Blotting techniques.
56- L51	southern – northern – western.
57- L52	Radioactive counters .

58- L53	Autoradiography.
59-P4	College level meeting/ function
60- L54	labeling studies.
61- L55	Unit V : Spectrophotometer.
62- L56	Spectrofluorimeter.
63- L57	ESR.
64- L58	____ - Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	NMR Spectrophotometer.
66- L60	Autoradiography.
67-IT-III	Internal Test-III
68- L61	Radioactive counters .
69- L62	Flame Emission Photometry
70- L63	____ - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
71-MT	Model Testbegins on 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 “Research Methodology”
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CO1	understand some basic concepts of research and its methodologies
CO2	select and define appropriate research problem and parameters
CO3	To be able to describe the method of chromatography and its applications
CO4	The students will be able to describe the working mechanism of Microscopes.
CO5	The students will be able to write Research reports.
CO6	Know and understand the main uses of Radio Labelling
CO7	To be able to use all types of spectrometers
CO8	Should be aware with Plagiarism
CO9	Familiar with all the instrument available in the Laboratory
Experimental Learning	
EL1	organize and conduct research (advanced project) in a more appropriate manner
EL2	Know the main principles and methods for surveying resource use
EL3	Be able to conduct a threat assessment for a site.
EL4	Use all available instruments in the field of Biology
Integrated Activity	
IA1	write a research report and thesis
IA2	Write a proposal for Research funding

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Developmental Zoology, Ecology, Animal Physiology and Evolution
Course Code	SAZO21
Class	I year (December 2017 to April 2018)
Semester	Even
Staff Name	Dr. D. Paramanatha Swami Doss
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To understand the sequential changes from cellular grade of organization to organ grade of organization in the development of multicellular organisms.
- To study the interaction and the interdependence among environmental factors and living organisms.
- To understand the functional significance of various organs and organ systems of animals.
- To discern the evolutionary significance of the animals, origin of species, effects of mutation.

Syllabus

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

DEVELOPMENTAL ZOOLOGY, ECOLOGY, ANIMAL PHYSIOLOGY AND EVOLUTION

UNIT I: Early development in Man: Structure of sperm and ovum; Fertilization – Cleavage, Morula, Blastocyst, Implantation and gastrulation – Fate map. Placenta in mammals – types and functions. Test tube babies – Twins – Amniocentesis.

Nuclear Transplantation in *Acetabularia*.

UNIT II: Abiotic factors: Biological effects of Temperature and Light; Biotic factors: Symbiosis, Commensalism, Mutualism, Parasitism, Prey-predator Relationship.

Adaptations: Desert adaptations.

Community: Ecosystem – Structure and dynamics of a pond.

UNIT III: Nutrition: Food constituents – Carbohydrates, Proteins and Fats.

Digestion: Role of enzymes in carbohydrate, protein and fat digestion.

Absorption: Absorption of digested food.

Metabolism: Carbohydrate metabolism: Glycogenesis, Glycogenolysis, Glycolysis.

Respiration: Transport and exchange of oxygen and carbon dioxide. Haemoglobin.

UNIT IV: Excretion: Structure of Nephron – Urine formation – Dialysis Nervous Co-ordination: Structure and types of neurons – Nerve impulse, conduction of nerve impulse through neuron and synapse.

Reproduction: Structure of human testis and ovary, Graffian follicle, Menstrual cycle and its hormonal control.

UNIT V: Theories of Evolution: Darwinism, Mutation theory of De Vries.

Adaptive radiation in birds.

Mimicry and Colouration.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 07.12.2017
1-L1	UNIT I: Introduction about the Developmental Zoology.
2-L2	Early development in Man: Structure of sperm and ovum.
3- L3	Fertilization – Events of fertilization.
4-L4	Cleavage – formation of 2 cell stage, 4 cell stage, 8 cell stage and so on.
5-L5	Morula – structure formation blastocoel, division micromeres and macromeres.
6-L6	Implantation – structure of uterus, endometrium, days after fertilization etc.
7-L7	Gastrulation – Formation of endoderm, formation of mesoderm and formation of ectoderm.
8- P1	Zoology Association Meeting
9- L8	Structure of gastrula – Neural plate, notochord, archenteron, dorsal lip of blastopore.
10- L9	Fate map – predetermined organ forming areas.
11-L10	Placenta in mammals – Characteristics – Functions.
12-L11	Placenta – Classification – based of foetal membrane – based on the distribution of villi. Classification – based on nature of contact – based on the types of tissue involved.

13-L12	Test tube baby – procedure – Fruity and Gift method.
14-L13	Twins – importance of twins study – Identical, Siamese, Fraternal twins.
15-L14	Amniocentesis – Procedure - Allotting portion for Internal Test-I
	Internal Test I begins
16-L15	Nuclear Transplantation in <i>Acetabularia</i> – the importance of nucleus by different experiments.
17-IT-1	Internal Test-I (22.01.2018)
18-L16	Unit II: Introduction about Ecology, Abiotic and biotic factors
19-L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Temperature – ranges – thermal stratification – biological effects and adaptations.
21- L19	Light – source – spectrum – light on water – biological effects.
22- P2	College level meeting/Cell function
23-L20	Animal relationships – Symbiosis with examples, Commensalism with examples.
24-L21	Mutualism with examples, parasitism with examples.
25-L22	Prey – predation relationship –types of parasites - parasitic adaptations.
26-L23	Desert adaptations – Characteristics of desert – adaptations – water conservation, water getting, tolerance of heat and protection.
27-L24	Ecosystem – abiotic and biotic factors of a pond ecosystem.
28-L25	Food chain – Food web – Energy flow – Pyramids – Ecological succession
29-L26	UNIT III: Introduction about animal physiology.
30-L27	Nutrition: Food constituents – Carbohydrates, Proteins and Lipids.
31-L28	Digestion: Role of enzymes in carbohydrate digestion.
32-L29	Role of enzymes in protein and lipid digestion.
33-L30	Absorption: Structure of Intestinal Villi - Absorption of carbohydrates, proteins and lipids.
34- P3	Department Seminar
35-L31	Metabolism: Glycogenesis, Glycogenolysis.
36-L32	Glycolysis – steps – the role of enzymes.
	Internal Test II begins
37- L33	Respiration: Transport and exchange of oxygen and carbon dioxide - Chloride shift.
38- IT-II	Internal Test-II (26.02.2018)
39-L34	Haemoglobin – Structure and importance.
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Excretion: Structure of Nephron - Allotting portion for Internal Test-II
42- L37	Urine formation – ultrafiltration, reabsorption and secretion – Dialysis.
43- L38	Structure of neurons – types of neurons – nerve impulse.
44- P4	College level meeting/ function
45-L39	Conduction of nerve impulse through neuron and synapse.
46-L40	Structure of human testis and ovary – Graafian follicle
47-L41	Menstrual cycle – Hormonal control of menstrual cycle.
48-L42	Unit V: Introduction about evolution
49-L43	Theories of Darwin.
50-L44	Allotting portion for Internal Test-III

	Internal Test III begins
51 L45	Mutation theory of De Vries.
52- L46	Adaptive radiation in birds.
53-IT-III	Internal Test-III (01.04.2018)
54-L47	Mimicry and colouration – types of colouration – colouration and evolution.
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 “Developmental Zoology, Ecology, Animal Physiology and Evolution”
CO1	Understand the events of fertilization.
CO2	Able to describe the patterns of cleavage.
CO3	Learn about different types of twins.
CO4	Able to know the biological effects of light and temperature.
CO5	Understand the symbiotic and mutualistic animal interactions.
CO6	Learn about the different steps of urine formation.
CO7	Understand the importance of haemoglobin for gas exchange.
Experimental Learning	
EL1	Study the types of placenta with the help of museum specimens.
EL2	Construct the model pond ecosystem and to study the interaction of abiotic and biotic factors.
EL3	Study the concept of batesian mimicry by comparing the Common cuckoo and shikra
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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Animal Diversity II – Chordata
Course Code	SMZO12
Class	I year (2017-2018)
Semester	Odd
Staff Name	P. Augustus Robince
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem	
Internal Test-3 Hrs	
Model Test-3 Hrs	
Dept. Meetings-2 Hrs	
College Meetings-2 Hrs	
Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To exemplify the intermediary position of Prochordates between invertebrates and vertebrates.
- To study the structure, functional organization, adaptations.
- To study the economic importance of lower and higher chordates.

Syllabus

UNIT I: Introduction to chordata: General characters(Diagnostic characters and additional characters)and Classification up to classes with the name of the examples. Prochordata: General characters and classification up to orders with the name of the examples. Type study: Amphioxus- External features-Digestive and Excretory system External features and biological significance of the following (a) Ascidian (b) Balanoglossus Agnatha: Petromyzon- External morphology; Ammocoetes Larva

UNIT II: Pisces: General characters and classification up to sub-classes with the names of the examples Type study: scoliodon (shark) -External characters- Placoid scales-Digestive system- Respiratory system-Receptor Organs- Urinogenital system. General topics: (i) Accessory respiratory organs in fishes (ii) Migration of fishes (iii) Parental care in fishes

UNIT III: Amphibia: General characters and classification up to orders with the name of the example. External features and biological significance of the following Examples: (a) Rhachophorus (b) Ambystoma (c) Axolotl Larva. General topic: Parental care in Amphibia Reptilia:General characters and classification up to orders with the name of the examples External features and Biological significance of the following Examples: (a) Chelone mydas (b) Chamaeleon (c) Draco (d) Cobra Page 7 of 24 General Topics: (i) Identification of poisonous and non-poisonous snakes of South India (ii) Poison apparatus- Biting mechanism- venom- First aid for snake bite-Antivenom.

UNIT IV: Aves:- General characters and classification up to subclasses with the names of the examples. Type study: Columba livia (Pigeon)-External characters-Flight muscles-Digestive systemRespiratory system-Urinogenital system General topics: (i) Migration of Birds (ii) Flight adaptations in Birds

UNIT V: Mammalia: General characters and classification up to subclasses with the names of the examples. Type study: Rabbit –External morphology – Digestive system – Respiratory system-HeartStructure of Brain- Reproductive system. General topics:(i) Egg laying mammals (ii) Adaptations of aquatic mammals (iii) Dentition in mammals

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2017
1-L1	UNIT I: Introduction to chordata: General characters(Diagnostic characters and additional characters).
2-L2	Classification up to classes with the name of the examples.
3- L3	Prochordata: General characters.

4-L4	classification up to orders with the name of the examples.
5-L5	Type study: Amphioxus-External features-Digestive system.
6-L6	Excretory system.
7-L7	External features and biological significance of the following (a) Ascidian.
8- P1	Welcoming of First year and Inauguration of Mathematics Association
9- L8	(b) Balanoglossuss Agnatha: Petromyzon.
10- L9	External morphology; Ammocoetes Larva.
11-L10	UNIT II: Pisces: General characters.
12-L11	classification up to sub-classes with the names of the examples.
13-L12	Type study: scoliodon (shark) -External characters.
14-L13	Placoid scales.
15-L14	____ - Allotting portion for Internal Test-I
	Internal Test I begins on 31.07.2017
16-L15	Digestive system.
17-IT-1	Internal Test-I
18-L16	Respiratory system.
19-L17	____ - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Receptor Organs.
21- L19	Urinogenital system.
22- P2	College level meeting/Cell function
23-L20	General topics: (i) Accessory respiratory organs in fishes.
24-L21	(ii) Migration of fishes .
25-L22	(iii) Parental care in fishes.
26-L23	UNIT III: Amphibia: General characters and classification up to orders with the name of the example.

27-L24	External features and biological significance of the following Examples: (a) Rhachophorus (b) Ambystoma (c) Axolotl Larva.
28-L25	General topic: Parental care in Amphibia.
29-L26	Reptilia:General characters.
30-L27	classification up to orders with the name of the examples External features and Biological significance of the following Examples: (a) Chelone mydas.
31-L28	(b) Chamaeleon (c) Draco (d) Cobra Page 7 of 24 .
32-L29	General Topics: (i) Identification of poisonous and non-poisonous snakes of South India.
33-L30	(ii) Poison apparatus- Biting mechanism- venom- First aid for snake bite-Antivenom.
34- P3	Department Seminar
35-L31	UNIT IV: Aves:- General characters.
36-L32	____ - Allotting portion for Internal Test-II
	Internal Test II begins on 30.08.2017
37- L33	classification up to subclasses with the names of the examples.
38- IT-II	Internal Test-II
39-L34	Type study: Columba livia (Pigeon)-External characters-Flight muscles-Digestive system.
40-L35	____ - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Respiratory system-Urinogenital system.
42- L37	General topics: (i) Migration of Birds .
43- L38	(ii) Flight adaptations in Birds.
44- P4	College level meeting/ function
45-L39	UNIT V: Mammalia: General characters .
46-L40	classification up to subclasses with the names of the examples.
47-L41	Type study: Rabbit –External morphology.
48-L42	Digestive system.

49-L43	Respiratory system.
50-L44	_____ - Allotting portion for Internal Test-III
	Internal Test III begins on 03.10.2017
51 L45	HeartStructure of Brain- Reproductive system.
52- L46	General topics:(i) Egg laying mammals.
53-IT-III	Internal Test-III
54-L47	(ii) Adaptations of aquatic mammals (iii) Dentition in mammals.
55-L48	_____ - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
56- MT	Model Test begins on 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 “Animal Diversity II – Chordata”
CO1	Observation of the diversity in chordates and their classification.
CO2	Analysis of the significant adaptive features in all classes of Chordata.
CO3	Understand physiological and anatomical peculiarities through type study.
CO4	Appreciate transitional stages and their significance in evolution.
CO5	Understand what transformations are necessary to survive in

	different adaptive zones.
CO6	Create a positive attitude towards conservation of biodiversity.
CO7	Obtain overview of economically important vertebrates.
CO8	GD on venomous snakes
CO9	Discuss the beneficial insects
Experimental Learning	
EL1	To collect and categories different chordates specimens.
EL2	Observation of external features of specimens of chordates.
EL3	Identification of venomous snakes.
EL4	Identification of fishes.
Integrated Activity	
IA1	Identification of fishes in ponds
IA2	Identification of commercial fishes.

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	AQUACULTURE
Course Code	GMZO6A
Class	III year (2017-2018)
Semester	EVEN
Staff Name	Dr.Jansi 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 promote , facilitate and influence the best possible standards of fisheries management.
- To provide the technical and general knowledge necessary for component fisheries management
- The basic ideas were studied at UG level detailed study are carried in the present course

Syllabus

Unit I

Definition, scope of aquaculture, cultural techniques, aquaculture in India – Freshwater, Coastal and marine aquaculture – Culturable organisms fin fishes, shell fishes, shell fishes and their qualities.

Unit II

Preparation of pond for fish culture.Types of fish ponds – nursery pond, rearing pond and culture pond. Fin fish culture – Culture of Indian major carp – bundh breeding, induced breeding, transport of fish seeds. Shell fish culture – culture of marine prawn – induced breeding – types of prawn culture in India. Edible Oyster culture.

Unit III

Types of cultures – Extensive, Semi – intensive and intensive culture, Monoculture, Mono sex culture, poly culture, cage culture, pen culture, Integrated fish farming – paddy cum fish culture. Animal husbandary cum fish culture, Sewage fed fish culture.

Unit IV

Fish feed – Artificial feed – Feed formulation, need, ingredients, pellets. Live feeds and their culture – Artemia, diatoms, Rotifers, Micro algae Diseases of aquaculture organisms – Ectoparasites. Bacterial, viral and Fungal diseases – Nutritional deficiency diseases.

Unit V

Government participation in aquaculture CMFRI, CIFRI, MPEDA, FFDA, Post-harvest technology in fishes – rigor mortis, fish spoilage fish preservation techniques – freezing canning, drying. Fish marketing; Co-operative marketing in fisheries. Crafts and gears. Water quality management.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 01.11.2016
1-L1	Syllabus discussion
2-L2	Introduction to aquaculture
3- L3	Definition of aquaculture
4-L4	Scope aquaculture
5-L5	Cultural Techniques
6-L6	Aquaculture in India
7-L7	Freshwater, Coastal and marine aquaculture
8- P1	Welcoming of First year and Inauguration of zoology Association
9- L8	Shell fishes, shell fishes and their qualities.
10- L9	Preparation of pond for fish culture
11-L10	Types of fish ponds
12-L11	Nursery pond
13-L12	Rearing pond and culture pond
14-L13	Fin fish culture
15-L14	Culture of Indian major carp - Allotting portion for Internal Test-I
	Internal Test I begins(24.01.2017)
16-L15	Bundh breeding
17-IT-1	Internal Test-I
18-L16	Induced breeding
19-L17	Transport of fish seeds- Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Shell fish culture
21- L19	Culture of marine prawn

22- P2	College level meeting/Cell function
23-L20	Induced breeding
24-L21	Types of prawn culture in India
25-L22	Edible Oyster culture
26-L23	Types of cultures
27-L24	Extensive, Semi – intensive culture
28-L25	Intensive Culture
29-L26	Monoculture
30-L27	Mono sex culture
31-L28	Poly culture
32-L29	Cage culture
33-L30	Pen culture
34- P3	Department Seminar
35-L31	Integrated fish farming
36-L32	Paddy cum fish culture. - Allotting portion for Internal Test-II
	Internal Test II begins(24.02.2017)
37- L33	Animal husbandry cum fish culture
38- IT-II	Internal Test-II
39-L34	Sewage fed fish culture.
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Fish feed- Artificial feed – Feed formulation
42- L37	need, ingredients, pellets
43- L38	Live feeds and their culture
44- P4	College level meeting/ function
45-L39	Artemia, diatoms, Rotifers, Micro algae
46-L40	Diseases of aquaculture organisms- Ectoparasites. Bacterial
47-L41	Viral and Fungal diseases – Nutritional deficiency diseases.
48-L42	Government participation in aquaculture CMFRI, CIFRI, MPEDA, FFDA
49-L43	Post-harvest technology in fishes- rigor mortis,
50-L44	Allotting portion for Internal Test-III
	Internal Test III begins
51 L45	fish spoilage fish preservation techniques- fish spoilage fish preservation techniques
52- L46	Fish marketing; Co-operative marketing in fisheries- Crafts and gears
53-IT-III	Internal Test-III
54-L47	Water quality management.
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 21.04.2017

Course Outcomes

Learning Outcomes	COs of the course
CO1	Basic understanding of agriculture and aquaculture and fisheries
CO2	Skills as fisheries biologist
CO3	Social outlook on pros and cons of aquaculture industry
CO4	Computer and communication based skills in aquaculture
CO5	Basics of animal biology and fish taxonomy
CO6	Types of food and feeding strategies in finfishes and shellfishes
CO7	Pond fertilization and biological food production
Experimental Learning	
EL1	To do working models to explain frog culture
EL2	To do working models to explain sea weed culture

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	IMMUNOLOGY & MICROBIOLOGY
Course Code	SMZO62
Class	III year (2017-2018)
Semester	Even
Staff Name	Dr.M.Rajakumari
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- To study the immune system and their role of our body..
- To study about Salient features of antigen- antibody reaction.
- To discuss about Humoral immune response - primary & secondary response
- To study the History & Scope of microbiology
- To learned about Industrial microbiology : production of Antibiotic penicillin.

Syllabus

UNIT I

History and Scope of Immunology.

Immunity-Type of Immunity - Innate & acquired, passive & active.

Lymphoid organs –primary & secondary (Thymus, Bone marrow, Bursa of fabricius , Spleen, Tonsil, Lymph node, Peyer’s patches) – Structure and Functions.

(15L)

UNIT II

Immunoglobulin-Structure, Function, Biological properties of Ig classes. Interaction of Antigen and antibody.

Salient features of antigen- antibody reaction. Types of antigen-antibody reaction – Agglutination, Precipitation, Opsonization, Cytolysis.

(15L)

UNIT III

Immune response-Lymphocyte as unit of immune system, stem cells - Structure and lineage, T cells, B cells & Macrophages.

Humoral immune response - primary & secondary responses - B cell activation. Cell - Mediated immune response - Type of T cells & functions.

Tumour immunology.

(15L)

UNIT IV

Introduction : History & Scope of microbiology. General structure of microbes (Bacteria, virus).

Bacterial growth : Culture media & selective media; Continuous & batch culture techniques, growth curve.

(14L)

UNIT V

Food microbiology :Food poisoning ; Food spoilage & preservation.

Industrial microbiology : production of Antibiotic penicillin.

Soil microbiology : Role of soil microbes in N₂ fixation.

Medical microbiology : Diseases caused by bacteria in different systems of man as given below :

Dermal – Streptococcal inflammation : - Tuberculosis;

Gastro-intestinal-dysentery:Reproductive – Gonorrhoea.

Viral diseases with reference to causative organisms, symptoms, impact on the host & control measures, AIDS , Rabies, Chicken pox, Measles, Influenza & polio.

(16L)

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 07.12.2017
1-L1	History and Scope of Immunology.
2-L2	Immunity-Type of Immunity
3- L3	Immunity-Innate & acquired
4-L4	Immunity- passive & active.
5-L5	Lymphoid organs –primary
6-L6	Lymphoid organs – secondary
7-L7	Structure and Functions – Thymus
8- P1	Zoology Association activities
9- L8	Structure and Functions - Bone marrow
10- L9	Structure and Functions - Bursa of fabricius
11-L10	Structure and Functions - Spleen
12-L11	Structure and Functions - Tonsil
13-L12	Structure and Functions - Lymph node
14-L13	Structure and Functions - Peyer's patches)
15-L14	Immunoglobulin-Structure
16-L15	Immunoglobulin- Function
17- L16	Biological properties of Ig classes
18- L17	Interaction of Antigen
19- L18	Interaction of antibody.
20- L19	Salient features of antigen-
21- L20	Antibody reaction. - Allotting portion for Internal Test-I
	Internal Test I begins
22- L21	Types of antigen
23- IT-1	Internal Test-I
24- L22	Antibody reaction
25- L23	Agglutination, Precipitation
26- L24	Opsonization, Cytolysis.- Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Immune response
28- L26	Lymphocyte as unit of immune system
29- L27	Stem cells
30- P2	College level meeting/Cell function
31-L28	Structure and lineage - T cells
32-L29	Structure and lineage - B cells & Macrophages.
33-L30	Humoral immune response
34- L31	Primary & secondary responses
35- L32	B cell activation.
36- L33	Cell - Mediated immune response.
37- L34	Type of T cells
38- L35	Functions of T cells
39- L36	Tumour immunology.
40- L37	Introduction : Microbiology
41- L38	History of microbiology

42-P3	Department Seminar
43- L39	Scope of microbiology
44- L40	General structure of microbes -Bacteria
45- L41	General structure of microbes -Virus.
46- L42	Bacterial growth : Culture media
47- L43	Bacterial growth :Selective media - Allotting portion for Internal Test-II
	Internal Test II begins
48- L44	Continuous & batch culture techniques
49-IT-II	Internal Test-II
50-L45	Bacterial growth :Growth curve
51- L46	Food microbiology - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Food poisoning
53- L48	Food spoilage & preservation.
54- L49	Industrial microbiology
55- L50	Production of Antibiotic penicillin
56- L51	Soil microbiology
57- L52	Role of soil microbes in N ₂ fixation
58- L53	Medical microbiology
59-P4	College level meeting/ function
60- L54	Diseases caused by bacteria in different systems of man - Dermal
61- L55	Diseases caused by bacteria in different systems of man – Streptococcal inflammation
62- L56	Diseases caused by bacteria in different systems of man - Tuberculosis
63- L57	Gastro-intestinal-dysentery:
64- L58	Reproductive – Gonorrhoea - Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Viral diseases with reference to causative organisms, symptoms,
66- L60	Impact on the host & control measures, AIDS , Rabies, Chicken pox, Measles, Influenza & polio.
67-IT-III	Internal Test-III
68- L61	Revision of I & II units
69- L62	Revision of III & IV units
70- L63	Revision of Unit V - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
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 “<IMMUNOLOGY & MICROBIOLOGY>”
CO1	The students will be able to identify the cellular and molecular basis of immune responsiveness.
CO2	The students will be able to describe the roles of the immune system in both maintaining health and contributing to disease.
CO3	The students will be able to describe immunological response and how it is triggered and regulated.
CO4	The students will be able to demonstrate a capacity for problem-solving about immune responsiveness.
CO5	The students will be able to transfer knowledge of immunology into clinical decision-making through case studies presented in class.
CO6	Understand the rationale in medium formulation & design for microbial fermentation, sterilization of medium and air
CO7	Discuss Microbial contamination/product spoilage and antimicrobial preservation of pharmaceutical formulations during production and in products
CO8	Understand various plant microbes interactions especially rhizosphere, phyllosphere and mycorrhizae and their applications especially the biofertilizers and their production techniques
CO9	Discuss the biosynthesis and the degradation pathways involved.
Experimental Learning	
EL1	Knowledge of the structure and function of the major organ systems, including the molecular, biochemical and cellular mechanisms for maintaining homeostasis
EL2	Knowledge of the pathogenesis of diseases, interventions for effective treatment, and mechanisms of health maintenance to prevent disease
EL3	A commitment to lifelong learning and independently seeking new knowledge and skills in their own recognized areas of learning deficit
EL4	Demonstrate a knowledge and understanding of microbiological assays of growth promoting and growth inhibiting substances.
Integrated Activity	
IA1	Provide students with in-depth training on the conduct and management of research from inception to completion using a wide range of techniques.
IA2	Enable students to acquire expertise in the use and application of the methods of data collection and analysis.

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology (2014-2017)
Course Name	Cell and molecular biology
Course Code	GMZO31
Class	II year
Semester	Odd(June 2017 to November 2018)
Staff Name	Dr.Jansi 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; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To provide with the core principles of molecular biology
- To gain higher level thinking skills
- To learn basic science and its applications

Syllabus

Unit I

Cell types – Prokaryotic & Eukaryotic. Microscopy – detailed study of compound microscope, phase contrast & electron microscope microscopes, Cytological techniques – Fixation & Fixatives – types of stains.

Unit II

Ultrastructure & functions of the following cell organelles: Plasma membrane, mitochondria, Golgi apparatus, endoplasmic reticulum, ribosomes, lysosomes, centriole.

Unit III

Nuclear components: Ultrastructure & functions of nucleus, nuclear membrane, nucleolus, chromosomes & their types, Cancer cell & Carcinogenesis: Definition, types, causes, properties, treatment, Oncogenes.

Unit IV

DNA: DNA as genetic material, Base pairs, constancy of DNA structure & Replication, Hybridization, Cell division – mitosis & mitotic apparatus, Meiosis & Synaptonemal complex.

Unit V

Different types of RNA, transcription, functional Unit of gene, promoter, coding sequences, processing of ribosomal RNA inhibitors of transcription various steps in protein synthesis. Genetic code – Codons. Anticodons, control of gene expression.

Reference Books :

1. Molecular Cell Biology – By Lodish H. Berk A., Zipursky S. Matsudaira P. Baltimore D. and Darnell J. WH Freeman and Co.
2. Cell and Molecular Biology By Derobertis, EDP ISE Publication
3. Molecular Biology of the Cell by Alberts et.al., Garland Publishing inc. New York
4. Cell and Molecular Biology – By Gupta PK Rastogi Publications Meerut, India
5. Cell and Molecular Biology – By Prakash & Lohar MIP Publishers, Chennai

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2015
1-L1	Syllabus discussion,
2-L2	Cell types – prokaryotic and eukaryotic .
3-L3	Microscopy – detailed study of compound microscope.
4-L4	Phase contrast and electron microscope , microscopes
5-L5	Cytological techniques – fixation and fixatives
6-L6	Types of stains
7-L7	Ultrastructure and functions of plasma membrane
8-P1	Welcoming of First year and Inauguration of zoology Association
9-L8	Ultra structure and functions of mitochondria
10-L9	Ultra structure and functions of golgi apparatus
11-L10	Ultra structure and functions of endoplasmic reticulum
12-L11	Ultra structure and functions of ribosomes
13-L12	Ultra structure and functions of lysosomes
14-L13	Ultra structure and functions of centriole
15-L14	Ultra structure and functions of centriole - Allotting portion for Internal Test-I
	Internal Test I begins (20.07.2015)
16-L15	Ultra structure and functions of nucleus
17-IT-1	Internal Test-I
18-L16	Ultra structure and functions of nuclear membrane and nucleolus

19-L17	Ultra structure and functions of nuclear membrane and nucleolus - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Chromosomes and their types
21- L19	Cancer cells
22- P2	College level meeting/Cell function
23-L20	Carcinogenesis- definition
24-L21	Types and causes of cancer
25-L22	Properties and treatment of cancer
26-L23	Oncogenes
27-L24	DNA as genetic material
28-L25	Basepairs , constancy of DNA structure
29-L26	DNA replication and hybridization
30-L27	Cell division
31-L28	Mitosis and mitotic apparatus
32-L29	Miosis and synaptonemal complex
33-L30	Different types of RNA
34- P3	Department Seminar
35-L31	Transcription
36-L32	Transcription - Allotting portion for Internal Test-II
	Internal Test II begins(31.08.2015)
37- L33	Functional unit of gene.
38- IT-II	Internal Test-II
39-L34	Promoter
40-L35	Promoter - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Coding sequences
42- L37	Processing of ribosomal RNA
43- L38	Inhibitors of transcription
44- P4	College level meeting/ function
45-L39	Steps in protein synthesis
46-L40	Genetic code
47-L41	Codons
48-L42	Anti codons
49-L43	Control gene expression
50-L44	Control gene expression - Allotting portion for Internal Test-III
	Internal Test III begins(05.10.2015)
51 L45	Revesion
52- L46	Revesion
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(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 “<course name>”
CO1	Exhibit a knowledge base in genetics, cell and molecular biology and anatomy and physiology
CO2	Demonstrate the knowledge of common and advanced laboratory practices in cell and molecular biology.
CO3	Exhibit clear and concise communication of scientific data
CO4	Engage in review of scientific literature in the areas of biomedical sciences
CO5	Critique and professionally present primary literature articles in the general biomedical sciences field.
Experimental Learning	
EL1	To do working models to explain Genetic code
EL2	To do working models to explain Coding sequences
Integrated Activity	
IA1	Prepare chart for Codons
IA2	Prepare chart for Anti Codons

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Developmental Zoology
Course Code	SMZO22
Class	I year (2017-2018)
Semester	Even
Staff Name	P. Augustus Robince
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem	
Internal Test-3 Hrs	
Model Test-3 Hrs	
Dept. Meetings-2 Hrs	
College Meetings-2 Hrs	
Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To understand the sequential changes from cellular grade of organization to organ grade of organization in the development of multicellular organisms.
- To study the hormonal control of development
- To know the mechanism of regeneration in lower animals

Syllabus

UNIT I Definition and Scope of Developmental Zoology – Gametogenesis – Spermatogenesis – Oogenesis – Vitellogenesis – Structure of Sperm and Egg in Chick. Fertilization: Pre and Post fertilization events – significance; Parthenogenesis.

UNIT II Cleavage in chick – Fate map of Chick – Gastrulation in Chick – Chick Embryo 48, 72 Hrs. Manipulations of reproduction in Human: Infertility (male and female) – IUI - Invitro fertilization – Artificial insemination - Test tube babies – Amniocentosis.

UNIT III Organogenesis : Development of brain and heart in chick. Organizer : Primary and secondary organizers. Morphogenic fields and gradient hypothesis.

UNIT IV Hormonal control of Amphibian metamorphosis. Extra-embryonic membranes in chick – Development, Types and Physiology. Placenta in Mammals – Types and Physiology.

UNIT V Nuclear Transplantation in Acetabularia - Regeneration – Types – Regeneration in Amphibians – Regeneration in Planaria. Birth control : Contraceptive devices: Surgical method – Hormonal methods – Physical barriers – IUCD

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 07.12.2017
1-L1	UNIT I Definition and Scope of Developmental Zoology.
2-L2	Gametogenesis.
3- L3	Spermatogenesis.
4-L4	Oogenesis.
5-L5	Vitellogenesis.
6-L6	Structure of Sperm and Egg in Chick.
7-L7	Fertilization: Pre and Post fertilization events .
8- P1	Welcoming of First year and Inauguration of Mathematics Association
9- L8	significance; Parthenogenesis.
10- L9	UNIT II Cleavage in chick.
11-L10	Fate map of Chick.

12-L11	Gastrulation in Chick.
13-L12	Chick Embryo 48, 72 Hrs.
14-L13	Manipulations of reproduction in Human: Infertility (male and female).
15-L14	____ - Allotting portion for Internal Test-I
	Internal Test I begins on 21.01.2018
16-L15	IUI - Invitro fertilization.
17-IT-1	Internal Test-I
18-L16	Artificial insemination.
19-L17	____ - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Test tube babies.
21- L19	Amniocentosis.
22- P2	College level meeting/Cell function
23-L20	UNIT III Organogenesis : Development of brain in chick.
24-L21	Development of heart in chick.
25-L22	Organizer : Primary.
26-L23	secondary organizers.
27-L24	Morphogentic fields.
28-L25	gradient hypothesis.
29-L26	UNIT IV Hormonal control of Amphibian metamorphosis.
30-L27	Extra-embryonic membranes in chick.
31-L28	Development.
32-L29	Types.
33-L30	Physiology.
34- P3	Department Seminar
35-L31	Placenta in Mammals.

36-L32	____ - Allotting portion for Internal Test-II
	Internal Test II begins on 26.02.2018
37- L33	Types and Physiology.
38- IT-II	Internal Test-II
39-L34	UNIT V Nuclear Transplantation in Acetabularia.
40-L35	____ - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Regeneration.
42- L37	Types.
43- L38	Regeneration in Amphibians.
44- P4	College level meeting/ function
45-L39	Regeneration in Planaria.
46-L40	Birth control.
47-L41	Contraceptive devices.
48-L42	Surgical method.
49-L43	Hormonal methods.
50-L44	____ - Allotting portion for Internal Test-III
	Internal Test III begins on 01.04.2018
51 L45	Physical barriers.
52- L46	Contraceptive devices.
53-IT-III	Internal Test-III
54-L47	IUCD.
55-L48	____ - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
56- MT	Model Test begins on 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 “Developmental Zoology”
CO1	Explain gametogenesis and parthenogenesis
CO2	Draw fate map in chick
CO3	Describe Birth control Methods
CO4	Explain the methodology of invitro fertilization
CO5	Illustrate the importance of Organizer
CO6	Explain the Nuclear transplantation
CO7	Differentiate invitro and in vivo fertilizations
CO8	Draw the structure of Sperm and ovum
CO9	Describe the development of Brain
Experimental Learning	
EL1	Observe the developmental stages in chick
EL2	Categorize birth control Methods
EL3	GD on IUDS
EL4	Collect eggs of different species of birds
Integrated Activity	
IA1	Prepare a model of sperm
IA2	Draw a flow chart of the methodology of the production of test

	tube babies
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- # 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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology (2017-2018)
Course Name	Ecology and toxicology
Course Code	SMZO22
Class	1 year
Semester	EVEN (December 2017 – May 2018)
Staff Name	D.V.SHEEBA RAJAKUMARI.
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; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To study the interaction and interdependence among environmental factors and living organisms
- To enumerate the ill- effects and the health hazards of toxic agents released to the environment
- To discern the evolutionary significance of animals, theories origin of species and significance

Syllabus

UNIT I

- i. **Abiotic factors** : Biological Effect of temperature and light.
- ii. **Biotic factors**: Producer, Consumers and Decomposers.
- iii. **Ecosystem**: Pond,Forest

UNIT II

- i. Food chain, Food web, Trophic levels, Energy flow, Ecological Pyramids
- ii. Animal Relationships: Mutualism, Commensalism, Antagonism (Antibiosis, Parasitism, Predation and Competition)

UNIT III

Population Ecology: Definition – Density – Natality – Mortality – Age – Distribution – Age pyramids – Population growth – Population fluctuations – Regulation of Population density – Animal Dispersion.

Community Ecology: Definition - Community stratification-Periodicity – Community interdependence – Ecotone - Edge effect- Ecological niche- Concept of community –Ecological Succession.

Adaptation:

- ☐ Desert Adaptation
- ☐ Cave Adaptation

UNIT IV

Wild life Conservation: Definition- Endangered Species – Causes for Depletion, Necessity for conservation – Methods of conservation – Sanctuaries – National Parks.

Remote sensing: Its application in agriculture, Fisheries, Forest management and Flood Management.

Urbanization: Reasons for urbanization, Urban problems, Methods to control urban growth.

UNIT V

Introduction to Toxicology, Definition, Outline classification of Toxicant. Toxic agents and mode of action of Pesticides, metals, solvents, carcinogens, poisons Environmental toxicology and public health.

Course Calendar

Hour allotment	Class Schedule
	ODD Semester Begin on 07.12.2017
1-L1	Syllabus discussion
2-L2	A biotic factors
3- L3	Biological effect of temperature
4-L4	Biological effect of light
5-L5	Biotic factors –producer and consumers and decomposers
6-L6	Eco system
7-L7	Pond eco system
8- P1	Welcoming of First year and Inauguration of zoology Association
9- L8	Forest eco system
10- L9	Food chain
11-L10	Food web
12-L11	Trophic levels
13-L12	Energyflow
14-L13	Ecological pyramids
15-L14	Allotting portion for Internal Test-I
	Internal Test I begins (22.01.2018)
16-L15	Animal relationship-mutualism, commensalism
17-IT-1	Internal Test-I
18-L16	Antagonism –antibiosis ,parasitism
19-L17	Test Paper distribution and result analysis

	Entering Internal Test-I Marks into University portal
20-L18	Antagonism- predation,competition
21- L19	Population ecology-definition –density
22- P2	College level meeting/Cell function
23-L20	Natality-mortality
24-L21	Age-distribution-age pyramids
25-L22	Population growth-population fluctuation
26-L23	Regulation of population density-animal density
27-L24	Community ecology-definition-community stratification
28-L25	Periodicity-community interdependence
29-L26	Ecotone-edge effects-ecological niche
30-L27	Concept of community –ecological succession
31-L28	Adaptation: desert adaptation
32-L29	Cave adaptation
33-L30	Wild life conservation-definition
34- P3	Department Seminar
35-L31	Endangered species –causes for depletion
36-L32	Allotting portion for Internal Test-II
	Internal Test II begins (26.02.2018)
37- L33	Necessity for conservation
38- IT-II	Internal Test-II
39-L34	Methods of conservation-sanctuaries and national parks
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Remote sensing
42- L37	Urbanization
43- L38	Introduction to toxicology
44- P4	College level meeting/ function
45-L39	Definition ,out line classification of toxicant
46-L40	Toxic agent and mode of action of pesticides,metals
47-L41	Continue-solvents , carcinogens, poisons
48-L42	Environmental toxicology
49-L43	Public health
50-L44	Allotting portion for Internal Test-III
	Internal Test III begins (01.04.2018)
51 L45	Revision
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(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

CO1	Describe the history, introduction and nature of ecosystem
CO2	Explain the biogeocycles and laws
CO3	Describe population and community ecology
CO4	Describe wild life conservation and management
Experimental Learning	
EL1	Prepare model for Population growth
EL2	Prepare model for periodicity
Integrated Activity	
IA1	Prepare chart for Darwinism
IA2	Prepare chart for Antagonism

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 Zoology

COURSE ACADEMIC PLAN (2014-2015)

(Prepared by staff member handling the course)

Programme Name	B.Sc Zoology
Course Name	EVS
Course Code	JEVS21
Class	I year (2017-2018)
Semester	Odd
Staff Name	Dr.(Mrs)E Ezhilmathi Sophia,.
Credits	2
L. Hours /P. Hours	2 / WK
Total 30Hrs/Semester Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 20 Hrs (5 units; $5 \times 4 = 20$; 4Hrs /unit)	

Course Objectives

- To create awareness among the students nature of Environmental Studies.
- To Analyse of forest resources, water resources etc.,
- To know about water prevention and control of pollution act

Syllabus

UNIT I: THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Definition, scope and importance Natural resources and associated problems: a) Forest resources: Use and over-exploitation, deforestation, timber extraction, dams and their effects on forests and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, dams-benefits and problems, water conservation and watershed management. c) Mineral resources: Use and exploitation, environmental effects. d) Food resources: World food problems, changes, effects of modern agriculture, fertilizer-pesticide problems. e) Energy resources: Growing energy needs, renewables and non renewable energy sources, alternate energy sources. f) Land resources: Land as a resource, land degradation, man-induced landslides, soil erosion and desertification.

UNIT II: ECOSYSTEMS

a) Forest Ecosystem b) Grassland Ecosystem c) Desert ecosystem d) Aquatic Ecosystem (Ponds, rivers, oceans, estuaries) Energy flow in the ecosystem Ecological succession Food Chains, Food Webs and Ecological Pyramids.

UNIT III: BIODIVERSITY AND ITS CONSERVATION

Introduction Definition: Genetic, species and ecosystem diversity. Biogeographical classification of India Values of Biodiversity Biodiversity at global, national and local levels India as a mega-diversity nation Hot-Spots of biodiversity Threats to biodiversity Endangered and endemic species of India Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT IV: ENVIRONMENTAL POLLUTION

Definition- Causes, effects and control measures of:- a) Air Pollution b) Water Pollution c) Soil Pollution d) Marine Pollution e) Noise Pollution. f) Thermal Pollution Solid Waste Management Disaster Management: Floods, earthquake, cyclone and landslides.

UNIT V: SOCIAL ISSUES AND THE ENVIRONMENT

Climatic change, global warming, acid rain, ozone depletion. Wasteland reclamation Consumerism and Waste products, use and through plastics Environment Protection Act Air (Prevention and Control of Pollution) Act Water (Prevention and Control of Pollution) Act Wildlife Protection Act Forest Conservation Act Population Explosion — Family Welfare Programme Human Rights.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2014 Scope and importance natural
1-L1	Multidisciplinary nature of environmental studies types of resources
2-L2	Natural resources. Man-induced landslides.
3- P1	Welcoming of First year and Inauguration of Zoology Association
4-L3	Scope and importance of natural resources Soil erosion and desertification.
5-L4	Allotting portion for Internal Test-I
	Internal Test I begins 30.07.2014
6-IT-I	Internal Test-I
7-L5	Test Paper distribution and result analysis Energy flow in the ECO system.
	Entering Internal Test-I Marks into University portal
8-L6	Eco systems
9-L7	Food chain, food wen and ecological pyramids.
10-P2	College level meeting/Cell function Genetic species and eco system diversity
11-L8	Bio diversity and its conservation. Endemic species of India conservation of biodiversity.
12-L9	Bio diversity at global, national and local levels.
13-P3	Department Seminar

14-L10	Environmental pollution disaster managements causes effect and control measures of pollution.
15-L11	Social issues and the environment
16-L12	Allotting portion for Internal Test-II
	Internal Test II begins 18.08.2014 climate change, global warming, acid rain,
17-IT-1	Internal Test-II ozone depletion.
18-L13	Test Paper distribution and result analysis waste and reclamation consumertion.
	Entering Internal Test-II Marks into University portal
19-L14	Wild life protection act forest conservation act.
20- P2	College level meeting/ function
21-L15	Population explosion-family welfare programme.
22-L16	Human rights.
23- L17	Allotting portion for Internal Test-III
	Internal Test III begins 15.09.2014
24- IT-III	Internal Test-III
25-L18	Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
26-MT	Model Test 24.10.2014
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

Learning Outcomes	COs of the course “<Environmental Studies>”
CO1	To give clear picture regarding the Causes, effects and control measures of:- a) Air Pollution b) Water Pollution c) Soil Pollution
CO2	Natural resources and associated problems: a) Forest resources: Use and over-exploitation, deforestation, timber extraction, dams and their effects on forests and tribal people.
CO3	b) Water resources: Use and over-utilization of surface and ground water, floods, drought, dams-benefits and problems, water conservation and watershed management
CO4	c) Mineral resources: Use and exploitation, environmental effects
CO5	d) Food resources: World food problems, changes, effects of modern agriculture, fertilizer-pesticide problems.
CO6	e) Energy resources: Growing energy needs, renewable and non renewable energy sources, alternate energy sources
CO7	Climatic change, global warming, acid rain, ozone depletion. Wasteland reclamation Consumerism and Waste products, use and through plastics Environment Protection Act Air (Prevention and Control of Pollution

- # 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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Poultry Science (Elective)
Course Code	GMZO5F
Class	III year (June 2017 to November 2017)
Semester	Odd
Staff Name	Dr. D. Paramanatha Swami Doss
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- To explore the scope of poultry science.
- To introduced various breeds of chicks, layers and broilers.
- To describe construction, maintenance of poultry keeping and also introduce the rearing and maintenance of poultry.
- To describe how to prevent and manage various diseases of poultry.
- To understand the role of egg in human nutrition.

Syllabus

MSU/ 2012-16 / UG-Colleges /Part-III (B.Sc. Zoology) / Semester – 5 / Elective 2

POULTRY SCIENCE

UNIT I:

Poultry industry in India – a brief introduction.

Choosing a commercial laying stock –sexing in one day old chicks.

Poultry housing – General principles of building poultry house.

Deep litter system – Droppings pit – Feeders, Waterers – Nest boxes. Laying cages – Californian cages – Management of cage birds.

UNIT II:

Poultry manure – Volume, Composition and values.

Nutritional content of eggs.

Management of Chicks, Growers, Layers and Broilers.

Lighting for Chicks, Growers, Layers and Broilers. Summer and winter management.

Debeaking –Forced moulting.

Unit III:

Poultry nutrition: Protein and Amino acid requirements for chicks, growers, layers and broilers – Symptoms of excessive dietary levels and deficiency.

Carbohydrates and Fat requirements for Chicks, Growers, Layers and Broilers– Symptoms of excessive dietary levels and deficiency.

Fiber requirement for poultry feeds.

Requirements of vitamins and inorganic minerals for Chicks, Growers and Layers – Deficiency Symptoms.

UNIT IV:

Importance of feed additives in a poultry feed.

Preparation of supplementary feed for poultry- South Indian feed ingredients in relation to M.E level, Protein level, Amino acid, Minerals (Calcium and Phosphorus) and Fiber content.

UNIT V:

Poultry diseases – Causes, Symptoms, Transmission, Treatment, Prevention and Control of the following diseases: Viral diseases - Ranikhit disease, Fowl pox, Infection and control bronchitis and Gumboro disease. Bacterial disease – Fowl typhoid, Paratyphoid, Pullorum, fowl cholera, Coryza and Mycoplasmosis. Fungal diseases – Aspergillosis and Aflatoxicosis. Parasitic disease- Coccidiosis. Nematode infections. Tape worm infections. External parasites of chicks – Ticks, mites and lice.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2017
1-L1	Unit I: Introduction
2-L2	Poultry industry in India – a brief introduction - development of poultry in India – Five year plan.
3- L3	Choosing a commercial laying stock - Characteristics of different races – selection criteria.
4-L4	Sexing in one day old chicks – Vent sexing – Feather sexing – Advantages and Disadvantages.
5-L5	Poultry housing – Selection of site – Do’s and Don’t’s.
6-L6	Layout of Broiler farm
7-L7	Layout of Layer farm - all in out – continuous farming.
8- P1	Welcoming of First year and Inauguration of Zoology Association
9- L8	Deep litter system – Litter materials – maintenance litter – advantages and disadvantages.
10- L9	Dropping pit -

11-L10	Feeders, Waterers: Tube feeder, Basin feeder, Chain feeder, Automatic feeder. Basin waterer, Nipple drinkers.
12-L11	Nest boxes – location – Size.
13-L12	Laying cages – Californian cages – Construction – M type cage
14-L13	Management of cage birds – Methods, Precautions, Advantages and disadvantages.
15-L14	Unit II: Poultry manure – Volume, Composition and values
16-L15	Nutritional content of eggs.
17- L16	General management for Chicks.
18- L17	General management for growers.
19- L18	General management for Layers.
20- L19	General management for Broilers.
21- L20	Lighting – importance Allotting portion for Internal Test-I
	Internal Test I begins
22- L21	Lighting for Chicks – Chick Guard – Duration – Effect of Chill – Lighting equipment.
23- IT-1	Internal Test-I (31.07.2017)
24- L22	Lighting for Growers – duration – effect of light for reproduction.
25- L23	Lighting for Layers and Broilers.
26- L24	Summer and winter management Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Debeaking – Need – Prevention of peck order – Debeaker – methods – Schedule of debeaking.
28- L26	Force moulting – advantages – Cycle (one and three per year) feeding grit – moulting agents.
29- L27	Unit III: Poultry nutrition - Introduction
30- P2	College level meeting/Cell function
31-L28	Protein and Amino acid requirements for chicks, growers.
32-L29	Protein and Amino acid requirements for layers and broilers.
33-L30	Symptoms of excessive dietary levels and deficiency.
34- L31	Carbohydrates and Fat requirements for Chicks and Growers.
35- L32	Carbohydrates and Fat requirements for Layers and Broilers.
36- L33	Symptoms of excessive dietary levels and deficiency.
37- L34	Fiber requirement for chicks, growers, layers and broiler feeds.
38- L35	Requirements of inorganic minerals – calcium, phosphorous, iron, copper, sodium and potassium for Chicks – Deficiency Diseases and Symptoms.
39- L36	Requirements of inorganic minerals – calcium, phosphorous, iron, copper, sodium and potassium for Growers and Layers – Deficiency Diseases and Symptoms.
40- L37	Requirements of vitamin A, K, D, E, Riboflavin, Pantothenic acid, B12 for Chicks - Deficiency Diseases and Symptoms.
41- L38	Requirements of vitamin A, K, D, E, Riboflavin, Pantothenic acid, B12 for Growers and Layers – Deficiency Diseases and Symptoms.
42-P3	Department Seminar
43- L39	Unit IV: Importance of feed additives in a poultry feed.
44- L40	Preparation of supplementary feed for poultry – Requirement – FCR – Supplementary food for chicks and growers.

45- L41	Preparation of supplementary feed for poultry – Requirement – FCR Supplementary food for layers and broilers.
46- L42	South Indian feed ingredients in relation to M.E level
47- L43	Allotting portion for Internal Test-II
	Internal Test II begins
48- L44	South Indian feed ingredients in relation to Protein level, Amino acid.
49-IT-II	Internal Test-II (30.08.2017)
50-L45	South Indian feed ingredients in relation to Minerals (Calcium and Phosphorus)
51- L46	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	South Indian feed ingredients in relation to Fiber content
53- L48	Poultry Farm Visit
54- L49	Visit to District Livestock Farm
55- L50	Revision and Group Discussion.
56- L51	Unit V: Introduction about Disease management.
57- L52	Causes, Symptoms, Transmission, Treatment, Prevention and Control of the Viral diseases - Ranikhit disease and Fowl pox.
58- L53	Causes, Symptoms, Transmission, Treatment, Prevention and Control of the Viral diseases - Infection and control bronchitis and Gumboro disease.
59-P4	College level meeting/ function
60- L54	Causes, Symptoms, Transmission, Treatment, Prevention and Control of the Bacterial disease – Fowl typhoid, Paratyphoid, Pullorum,
61- L55	Causes, Symptoms, Transmission, Treatment, Prevention and Control of the Bacterial disease - fowl cholera, Coryza and Mycoplasmosis.
62- L56	Causes, Symptoms, Transmission, Treatment, Prevention and Control of the Fungal diseases – Aspergillosis and Aflatoxicosis.
63- L57	Causes, Symptoms, Transmission, Treatment, Prevention and Control of the Parasitic disease- Coccidiosis.
64- L58	Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Causes, Symptoms, Transmission, Treatment, Prevention and Control of the Nematode infections. Tape worm infections.
66- L60	Causes, Symptoms, Transmission, Treatment, Prevention and Control of the External parasites of chicks – Ticks, mites and lice.
67-IT-III	Internal Test-III (03.10.2017)
68- L61	Materials require to formulate to control external parasites – tetrachlorvinphos, carbaryl, etc.
69- L62	Revision and Group discussion.
70- L63	Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
71-MT	Model Test (19.10.2017)
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 06.11.2017

Course Outcomes

Learning Outcomes	COs of the course "POULTRY SCIENCE"
CO1	Able to apply the concepts of nutrition, economics and management into practical and profitable production programs
CO2	Describe the importance of deep litter system.
CO3	Able to understand nutrient composition of poultry food stuffs.
CO4	Gains knowledge about the practical aspects of chick rearing.
CO5	Describe the disease management in poultry farming.
CO6	Explain the management of broilers and layers.
Experimental Learning	
EL1	Field visit to local boiler farm.
EL2	Visit to layer farm.
EL3	Field visit to district livestock farm.
EL4	Visit to hatchery unit
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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	ANIMAL DIVERSITY – I INVERTEBRATA
Course Code	SMZO11
Class	I year (2017-2018)
Semester	Odd
Staff Name	Dr.M.RAJAKUMARI
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To elucidate the importance of taxonomy
- To know the methods of nomenclature
- To realize the difference between Protozoa and Metazoa
- To study the structure, functional organizations, adaptations and the economic importance of the lower and higher Invertebrates

Syllabus

Unit – I

Introduction to Principles of taxonomy – Binominal nomenclature.

Protozoa: General Characters and classification up to classes with the examples.

Type study:- *paramecium*: morphology – nutrition – Osmoregulation – Excretion – Reproduction(binary fission and conjugation)

General structure, life cycle, Pathogeny and Control Measures of the following: (a) *Entamoeba histolytica* (b) *plasmodium*

Porifera: General Characters and classification up to classes with the names of the examples.

Type study:- *Leucosolenia* – External morphology – Body wall – Reproduction. General topic: Canal system in sponges.

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Unit – II

Coelenterata: General characters and classification up to classes with the names of the examples.

Type study:- *Obelia* – External Characters (structure of the colony) – life history.

General Topics: Corals, Coral reefs and their significance.

Platyhelminthus: General characters and classification up to classes with the names of the examples.

General topic: (i) External morphology and life cycle of *fasciola hepatica*.
(ii) Parasitic adaptations of platyhelminthes.

Unit – III

Aschelminthes (Nematoda): External morphology, life cycle, pathogeny, Parasitic adaptations and control measures of the following:

- (a) *Ascaris lumbricoides* (Round worm)
- (b) *Dracunculus medinensis* (Guinea worm)
- (c) *Wuchereria bancrofti* (Filarial worm)

Annelida: General characters and classification up to classes with the names of the examples.
External characters

General topics: (i) Metamerism in Annelida.
(ii) Biological significance of Earthworm.

Unit – IV

Arthropoda: General Characters and classification up to class with the names of the examples.

Type study: Penaeus: External characters–Appendages–compound eye -Reproductive system and Life cycle.

General topics: (i) social life in insects – Honey Bees

(ii) Beneficial insects – Honey bee, Lac insects and silk moth

(iii) External Characters, economic importance and control measures of the pests of agricultural crops (Coconut – Paddy)

(a) *Oryctes rhinoceros* (b) *Leptocorisa acuta*

Unit – V

Mollusca: General characters and classification up to classes with the names of the examples.

Type study: Pila globosa: External characters – shell – mantle cavity – Anatomy of Digestive system and reproductive system.

General topics: (i) Pearl culture and Pearl Industry in India.

(ii) Cephalopods as advanced Molluscs.

Echinodermata: General characters and classification up to classes with the names of the example.

Type study : Star fish: External Characters – Water vascular system.

General topic:- Larval forms of Echinodermata and their Phylogenetic significance.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2017
1-L1	Introduction to Principals of taxonomy – Binominal nomenclature.
2-L2	Protozoa: General characters and classifications up to classes with the examples.
3- L3	Paramecium: Morphology – Nutrition – Osmoregulation
4-L4	Paramecium: Excretion – Reproduction (Binary fission and Conjugation).
5-L5	Entamoeba histolytica: General structure, life cycle, Pathogeny and control measures
6-L6	Plasmodium.: General structure, life cycle, Pathogeny and control measures
7-L7	Porifera: General characters, classification upto Classes with the names of the examples.
8- P1	Welcoming of First year and Inauguration of Zoology Association
9- L8	Leucosolenia – External morphology - Body wall – Reproduction.
10- L9	Canal system in Sponges.
11-L10	Coelenterata: General characters
12-L11	Coelenterata: Classification up to classes with the names of the examples -
13-L12	Obelia – External Characters (structure of the colony) – life history.
14-L13	Corals
15-L14	Coral reefs and their significance Allotting portion for Internal Test-I
	Internal Test I begins
16-L15	Platyhelminthus: General characters
17-IT-1	Internal Test-I
18-L16	Platyhelminthus: Classification up to classes with the names of the examples.
19-L17	External morphology and life cycle of fasciola hepatica Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Parasitic adaptations of platyhelminthes.
21- L19	Ascaris lumbricoides (Round worm) - External morphology and Life cycle
22- P2	College level meeting/Cell function
23-L20	Ascaris lumbricoides (Round worm) - Pathogeny, Parasitic adaptations and control measures
24-L21	Dracunculus medinensis (Guinea worm) - External morphology and Life cycle
25-L22	Dracunculus medinensis (Guinea worm) - Pathogeny, Parasitic adaptations and control measures
26-L23	Wuchereria bancrofti (Filarial worm) - External morphology
27-L24	Wuchereria bancrofti (Filarial worm) - Life cycle
28-L25	Wuchereria bancrofti (Filarial worm) - Pathogeny, Parasitic adaptations and control measures
29-L26	Annelida: General characters and classification up to classes with the names of the examples. External characters
30-L27	Metamerism in Annelida
31-L28	Biological significance of Earthworm.
32-L29	Arthropoda: General Characters
33-L30	Arthropoda: Classification up to class with the names of the examples.
34- P3	Department Seminar

35-L31	Penaeus: External characters–Appendages–compound eye
36-L32	Penaeus: Reproductive system and Life cycle. - Allotting portion for Internal Test-II
	Internal Test II begins
37- L33	Social life in insects – Honey Bees
38- IT-II	Internal Test-II
39-L34	Beneficial insects – Honey bee
40-L35	Beneficial insects – Lac insects - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Beneficial insects -Silk moth
42- L37	Oryctes rhinoceros - External Characters
43- L38	Oryctes rhinoceros - Economic importance and control measures
44- P4	College level meeting/ function
45-L39	Leptocorisa acuta - External Characters, Economic importance and control measures
46-L40	Mollusca: General characters and classification up to classes with the names of the examples.
47-L41	Pila globosa: External characters – shell – mantle cavity
48-L42	Pila globosa: Anatomy of Digestive system and reproductive system.
49-L43	Pearl culture and Pearl Industry in India.
50-L44	Cephalopods as advanced Molluscs. Allotting portion for Internal Test-III
	Internal Test III begins
51 L45	Echinodermata: General characters
52- L46	Echinodermata: Classification up to classes with the names of the example.
53-IT-III	Internal Test-III
54-L47	Star fish: External Characters – Water vascular system.
55-L48	Larval forms of Echinodermata and their Phylogenetic significance. 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 06.11.2017

Course Outcomes

Learning Outcomes	COs of the course “ANIMAL DIVERSITY I – INVERTEBRATA”
CO1	Provides students with an in-depth knowledge of the diversity in form, structure and habits of invertebrates.
CO2	Learn basics of systematics and understand hierarchy of different categories.
CO3	Learn diagnostic characteristics of different phyla through brief studies of examples.
CO4	Obtain overview of economically important invertebrates
CO5	Classify all the invertebrate phyla up to class.
CO6	To identify the given Mollusca with respect to economic importance
CO7	To describe general characters of Nematelminthes and their parasitic Adaptation
CO8	To explain classification of protozoa and diseases caused by them
CO9	To explain general characters of Arthropoda and metamorphosis in insects
Experimental Learning	
EL1	Training experience in anatomy through simple dissection and mounting.
EL2	Familiarization with conventional organ system in different animals.
EL3	Identify and study preserved specimens of various economically important animals
Integrated Activity	
IA1	Prepare model for organ system of different species.
IA2	To visit a apiculture site

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology (2017-2018)
Course Name	Cell and molecular biology
Course Code	PZOM12
Class	I year
Semester	Odd(June 2017 to November 2017)
Staff Name	D.V.SHEEBA RAJAKUMARI.
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 provide with the core principles of molecular biology
- To gain higher level thinking skills
- To learn basic science and its applications

Syllabus

Unit I : Structure and functions of cell types – Prokaryotes, Eukaryotes. Plasma membrane – structure of membrane, models. Membrane transport, membrane potentials – Extracellular space – cell adhesion, intercellular recognition – intercellular junctions. Mitochondria – ultrastructure – functions – energetic – cellular respiration – Biogenesis.

Unit II : Ultrastructure of Ribosomes, Endoplasmic reticulation and Golgi complex. Biosynthesis of secretory proteins on ribosomes and rough endoplasmic reticulum- post-translational modifications of proteins both in the RER and SER. Golgi Complex- formation of disulfide bonds- glycosylation. Lysozyme – ultrastructure – enzymes– origin and functions of lysosome.

Unit III : Cell – Cell signaling – signaling mechanisms, signal molecules – signal receptors – form of intracellular signaling – cell surface receptors – signal transduction – pathways – signaling from plasma membrane to nucleus. Cell adhesion – calcium dependent hemophilic cell – cell adhesion – N-CAMs mediated calcium independent hemophilic cell – cell adhesion. Cell matrix adhesion – cell matrix adhesion proteins – integrins – Hemidesmosomes – collagen and non-collagen components.

Unit IV : Nucleus – structure and function. Nucleo-cytoplasmic interaction, Nuclear transplantation. Cell fusion – homokaryons heterokaryons, cytoplasts, karyoplasts.

Unit V : Cell division – mitosis – molecular mechanisms for regulating mitotic events cyclins and their kinases (cdks) – cell death and its regulation- Characteristics of cancer cells, causes and onset of cancer

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2017
1-L1	Structure and function of cell types –prokaryotes,eukaryotes
2-L2	Plasmamembrane-structure of membrane models
3- L3	Membrane transport
4-L4	Membrane potential ,extra cellular space- cell adhesion
5-L5	Intercellular recognition- intercellular junction
6-L6	Mitochondria – ultra structure and functions
7-L7	Energetic -cellular respiration- biogenesis
8- P1	Welcoming of First year and Inauguration of ZOOLOGY Association
9- L8	Ultra structure of ribosomes
10- L9	Ultra structure of endoplasmireticulum
11-L10	Ultra structure of golgi complex
12-L11	Biosynthesis of secretary proteins on ribosomes
13-L12	Biosynthesis of secretary protein on RER
14-L13	Golgicomplex-formation of disulphidebonds- glycosylation
15-L14	Allotting portion for Internal Test-I
	Internal Test I begins(31.07.2017)
16-L15	Lysozyme –ultra structure – enzymes –origin and functions of lysozyme
17-IT-1	Internal Test-I
18-L16	Cell –cell signalling-signaling mechanism
19-L17	- Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Signal molecules –signal receptor –form of intra cellular signaling
21- L19	Cell surface receptor
22- P2	College level meeting/Cell function
23-L20	Signal transduction –pathways
24-L21	Signalling from plasmamembrane to nucleus
25-L22	Cell adhesion –calcium dependent haemophilic cell –cell adhesion
26-L23	N –CAMs mediated calcium independent haemophilic cell-cell adhesion
27-L24	Cell matrix adhesion-cell matrix adhesion proteins -integrins
28-L25	Hemidesmosomes
29-L26	Collagen and non collagen components
30-L27	Nucleus- structure and function
31-L28	Nucleo cytoplasmic interaction
32-L29	Nuclear transplantation
33-L30	Cell fusion-homokaryons and heterokaryons
34- P3	Department Seminar

35-L31	Cytoplasm
36-L32	Allotting portion for Internal Test-II
	Internal Test II begins(30.08.2017)
37- L33	Karyoplast
38- IT-II	Internal Test-II
39-L34	Cell division
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Mitosis
42- L37	Molecular mechanism for regulating mitotic events
43- L38	Cyclins and their kinases (cdks)
44- P4	College level meeting/ function
45-L39	Cell death
46-L40	Regulation of cell death
47-L41	Characteristic of cancer cell
48-L42	Causes of cancer
49-L43	Onset of cancer
50-L44	- Allotting portion for Internal Test-III
	Internal Test III begins(03.10.2017)
51 L45	Reversion
52- L46	Reversion
53-IT-III	Internal Test-III
54-L47	Reversion
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
CO1	Exhibit a knowledge base in genetics, cell and molecular biology and anatomy and physiology
CO2	Demonstrate the knowledge of common and advanced laboratory practices in cell and molecular biology.
CO3	Exhibit clear and concise communication of scientific data
CO4	Engage in review of scientific literature in the areas of biomedical sciences
CO5	Critique and professionally present primary literature articles in the general biomedical sciences field.
Experimental	

Learning	
EL1	To do working models to explain Genetic code
EL2	To do working models to explain Coding sequences

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	Environmental biology and Bio Diversity
Course Code	PZOM22
Class	I year (2017-2018)
Semester	Even
Staff Name	P. Augustus Robince
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- Develop an appreciation of the modern scope of scientific inquiry in the field of Ecology.
- Become familiar with the variety of ways that organisms interact with both the physical and the biological environment.
- Develop an understanding of the different types of Pollution and its effect on environment
- Become familiar with the available Natural resources.
- Become familiar with Biodiversity and its importance
- Create awareness about conservation of Biological resources

Syllabus

Unit I

Ecosystem and productivity : Ecosystem – concepts, types – terrestrial and aquatic ecosystems, stability, food chain, food web and trophic levels. Energy flow in ecosystem. Primary productivity process productivity in a fresh water pond ecosystem. Methods of measurement of primary productivity Biogeochemical cycles – water cycle and nitrogen cycle

Unit II

Population growth and pollution : Human population growth, population explosion in India – Soil waste management. Air, water, soil, noise and thermal pollution – sources, effects and control measures. Nuclear hazards : non-degradable pollutants biotransformation, biomagnifications, bioremediation and soil issues. Environmental education – pollution control through laws – Environmental organization and agencies.

Unit III

Resource management : Natural resources –renewable and non-renewable resources. Concept of conservation and management of natural resources. Forest resources – Ecological and economic importance of forest - types and management –forest resources of India –deforestation and its effects sustainable forest management. Water resources : Worldwide supply • distribution Indian water resources -- river water dispute and solutions. Mineral resources – uses and exploration of mineral resources exhaustibility, status of Indian and world resources. Energy resources – world energy demand – energy resources types –solar, wind, geothermal, hydroelectricity, hydrogen, tidal energy, biomass and nuclear energy.

Unit IV

Biodiversity concept : Biodiversity – Concept and principle of biodiversity • genetic, species and ecosystem diversity. Similarity and Dominance index, Evenness index, Richness index and Association index. Sampling methods, values and use of diversity, loss of animal diversity and endangered wildlife species. Hot spots – red list – endangered and endemic species.

Unit V

Biodiversity conservation : Human impact on biological diversity – causes for the loss of biodiversity. Fragmentation of biodiversity – Biogeographic zones in India Floristic and Zoogeographical realms – Geograpy and major biomass, Wildlife of India – values of wildlife, wild life protection Act. Conservation.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 03.12.2017
1-L1	Unit I: Ecosystem and productivity : Ecosystem.
2-L2	concepts, types
3- L3	terrestrial and aquatic ecosystems
4-L4	stability
5-L5	food chain
6-L6	food web and trophic levels.
7-L7	Energy flow in ecosystem.
8- P1	Welcoming of First year and Inauguration of Mathematics Association
9- L8	Primary productivity process.
10- L9	productivity in a fresh water pond ecosystem.
11-L10	Methods of measurement of primary productivity .
12-L11	Biogeochemical cycles – water cycle and nitrogen cycle.
13-L12	Unit II: Population growth and pollution : Human population growth.
14-L13	population explosion in India.
15-L14	Soil waste management.
16-L15	Air Pollution.

17- L16	Water Pollution.
18- L17	Soil Pollution.
19- L18	noise Pollution.
20- L19	thermal pollution.
21- L20	____ - Allotting portion for Internal Test-I
	Internal Test I begins on 22.01.2018
22- L21	Sources.
23- IT-1	Internal Test-I
24- L22	Effects.
25- L23	control measures.
26- L24	____ - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Nuclear hazards.
28- L26	non-degradable pollutants.
29- L27	Biotransformation.
30- P2	College level meeting/Cell function
31-L28	biomagnifications.
32-L29	bioremediation .
33-L30	soil issues.
34- L31	Environmental education.
35- L32	pollution control through laws.
36- L33	Environmental organization and agencies.
37- L34	Unit III: Resource management : Natural resources –renewable and non-renewable resources.
38- L35	Concept of conservation and management of natural resources.

39- L36	Forest resources – Ecological and economic importance of forest - types and management –forest resources of India –deforestation and its effects sustainable forest management.
40- L37	Water resources : Worldwide supply • distribution Indian water resources – river water dispute and solutions.
41- L38	Mineral resources – uses and exploration of mineral resources exhaustibility, status of Indian and world resources.
42-P3	Department Seminar
43- L39	Energy resources – world energy demand – energy resources types –solar, wind, geothermal, hydroelectricity, hydrogen, tidal energy, biomass and nuclear energy.
44- L40	Unit IV: Biodiversity concept : Biodiversity – Concept and principle of biodiversity.
45- L41	• genetic, species and ecosystem diversity.
46- L42	Similarity and Dominance index.
47- L43	_____ - Allotting portion for Internal Test-II
	Internal Test II begins on 26.02.2018
48- L44	Evenness index.
49-IT-II	Internal Test-II
50-L45	Richness index. Association index.
51- L46	_____ - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Sampling methods, values and use of diversity.
53- L48	loss of animal diversity.
54- L49	endangered wildlife species.

55- L50	Hot spots – red list – endangered and endemic species.
56- L51	Unit V: Biodiversity conservation : Human impact on biological diversity .
57- L52	causes for the loss of biodiversity.
58- L53	Fragmentation of biodiversity.
59-P4	College level meeting/ function
60- L54	Biogeographic zones in India.
61- L55	Floristic Realms.
62- L56	Zoogeographical realms.
63- L57	Geography and major biomass.
64- L58	_____ - Allotting portion for Internal Test-III
	Internal Test III begins on 01.04.2018
65- L59	Wildlife of India.
66- L60	values of wildlife.
67-IT-III	Internal Test-III
68- L61	wild life protection Act.
69- L62	Conservation
70- L63	_____ - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
71-MT	Model Test begins on 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 “Environmental biology and Bio Diversity”
CO1	Knowledge regarding principles, applications and management of environmental science.
CO2	Describe the concept and types of ecosystem
CO3	Explain the causes and types of pollution
CO4	Describe the natural resources and its management
CO5	Explain Biodiversity
CO6	Different types of ecological niches
CO7	Methods of conservation of biodiversity
CO8	Importance of Wild life
CO9	Wild life conservation
Experimental Learning	
EL1	Visit to different ecosystems
EL2	Visit to wild life Sanctuary
EL3	Collection and reading of wild life protection act
EL4	Collection of different Pollutants
Integrated Activity	
IA1	Prepare charts of different Ecosystem
IA2	Collect the details of Hot Spots in India

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology (2017-2018)
Course Name	Evolution
Course Code	PZOM43
Class	II year
Semester	EVEN (December 2017 - May2018)
Staff Name	D.V.SHEEBA RAJAKUMARI.
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; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To develop a genomics platform dedicated to the study of eco and socio evolutionary dynamics
- To gain insight into eco evolutionary dynamics within and across trophic level

Syllabus

Unit I : Origin of cells and unicellular evolution : Origin of basic biological molecules, abiogenesis, biogenesis, Biochemical origin of life, biological evolution (protenoids and microsphere coacervates), biogeny of protein and nucleic acid ,concept of Oparin and Haldane – Experiment of Urey and Miller

Unit II : Evidences and Theories of Evolution : Evidences : From Paleontology – Geological time scales and its major events - Types of fossils and process of fossilization – Evidences from biogeography – Evidences from morphology, comparative anatomy, embryology, biochemistry and physiology. Theories of organic evolution : Lamarkism, Darwinism, Mutation theory, Modern synthetic theory.

Unit III : Mechanism of Evolution : Population genetics – population, gene pool, gene frequency ; Hardy – Weinberg law, Gene frequency and its impacts, natural selection, migration and genetic drift, variations, isolating mechanism and origin of species – Allopatric and sympatric speciation.

Unit IV : Origin of Higher Taxa : Simpson’s definition of the higher taxa, Simpson’s adaptive grid, pre-adaptations and post-adaptations, patterns of evolution : convergent evolution and parallel evolution, Micro evolution, Macro evolution (adaptive radiation), Mega evolution, Connecting link between vertebrate classes, quantum evolution. Rates of Evolution : Orthotely, Bradytely and Tachytely, Gradualism versus punctuated equilibrium, Extinction and its causes.

Unit V : Mankind evolution : Phylogenetic tree and stages of primate evolution including Homo sapiens. Place and time of origin, characteristics and ancestors of man. Evolutionary trends of man evolution, cultural evolution of man, allometry, altruism and kin and kin selection.

Reference Books

1. Moody, P. A., 1978. Introduction to evolution (Harper International).
2. Stebbins, C. L., 1979. Processes of organic evolution (Prentice – Hall India, New Delhi)

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 07.12.2017
1-L1	Syllabus discussion
2-L2	Introduction to evolution
3- L3	Origin of basic biological molecules
4-L4	Abiogenesis ,biogenesis
5-L5	Biochemical origin of life, biological evolution
6-L6	Biology of protein and nucleic acid
7-L7	Concept of oparin and Haldane
8- P1	Welcoming of First year and Inauguration of zoology Association
9- L8	Experiment of urey and miller
10- L9	Evidences : from paleontology
11-L10	Geological time scale and it major events
12-L11	Types of fossils and process of fossilization
13-L12	Evidences from biogeography
14-L13	Evidences from morphology,comparative anatomy, embryology

15-L14	Allotting portion for Internal Test-I
	Internal Test I begins
16-L15	Continue- evidences from biochemistry and physiology
17-IT-1	Internal Test-I(22.01.2018)
18-L16	Theories of organic evolution- lamarkism ,Darwinism
19-L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Continue- mutation and modern synthetic theory
21- L19	Mechanism of evolution –population genetics- population ,genepool, gene frequency
22- P2	College level meeting/Cell function
23-L20	Hardy-weinberg law, gene frequency and its impacts
24-L21	Natural selection, migration and genetic drift
25-L22	Continue – variation ,isolating mechanism and origin of species
26-L23	Allopatric and sympatric speciation
27-L24	Origin of higher taxa: simpson’s definition of the higher taxa, simpson’s adaptive grid
28-L25	Preadaptation and post adaptation
29-L26	Patterns of evolution: convergent and parallel evolution
30-L27	Micro and macro evolution, and mega evolution
31-L28	Connecting link between vertebrate classes
32-L29	Quantum evolution
33-L30	Rates of evolution: horotely , bradetely, and tachytely
34- P3	Department Seminar
35-L31	Graduation versus punctuated equilibrium
36-L32	Allotting portion for Internal Test-II
	Internal Test II begins(26.02.2018)
37- L33	Extinction and its causes
38- IT-II	Internal Test-II
39-L34	Man kind evolution: phylogenetic tree
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Stages of primate evolution including homo sapiens
42- L37	Place of origin
43- L38	Time of origin
44- P4	College level meeting/ function
45-L39	Characteristics and ancestors of man
46-L40	Evolutionary trends of man evolution
47-L41	Cultural evolution of man
48-L42	Allometry
49-L43	Altruism
50-L44	Allotting portion for Internal Test-III
	Internal Test III begins(01.04.2018)
51 L45	Kith and kin selection
52- L46	Revesion
53-IT-III	Internal Test-III
54-L47	Revesion
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 “<course name>”
CO1	To develop a genomics platform dedicated to the study of eco and socio evolutionary dynamics
CO2	To gain insight into eco evolutionary dynamics within and across trophic level
Experimental Learning	
EL1	Prepare a model for Geological time scale
Integrated Activity	
IA1	Prepare a chart for Quantum evolution
IA2	Prepare a chart for Rates of evolution: horotely , bradetely, and tachytely

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	Genetics
Course Code	KZOM42
Class	II year (December 2017 to April 2018)
Semester	Even
Staff Name	Dr. D. Paramanatha Swami Doss
Credits	4
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; $5 \times 16 = 80$; 16Hrs /unit)	

Course Objectives

- To study basic concepts of mendelian principles.
- To evaluate the gene expression in prokaryotes and eukaryotes.
- To understand the importance of eugenics and euthenics.
- To study the population genetics.
- Better understand about the human genetics including genetics and social behaviour.

Syllabus

MSU / 2016-17 / PG –Colleges / M.Sc. (Zoology) / Semester –IV / Ppr.no.18 / Core-11

GENETICS

Unit I: Genetic Transmission: Concepts and definitions. Mendelian principles – Allelic and non-allelic interactions – Pleiotropy – Penetrance and Expressivity – Phenocopies – Multiple alleles – polygenic inheritance.

Unit II: Gene Fine Structure: Simple and split genes – Cistran, recon, muton, intro and exon – Gene Expressions: Genes on protein synthesis – Genetic code: redundancy and wobble hypothesis – works of Khorana and Kornberg – Regulation of gene action.

Unit III: Chemistry of DNA – DNA damage and repairing mechanisms – Transposable elements – Inbreeding and outbreeding: Inbreeding depression, Heterosis – Somatic cell hybridization – Eugenics, Euthenics, Euphenics – Extra chromosomal inheritance: Kappa particle and shell ceiling – Estimation of Heritability.

Unit IV: Population Genetics: Mendelian population – Gene pool and gene frequency – Hardyt Weinberg law, Applications of Hardy-Weinberg law in calculating gene frequencies in a population – Calculation of gene frequencies for sex linked genes – Factors affecting Hardy – Weinberg equilibrium.

Unit V: Human Genetics: Pedigree analysis – Aminocentesis – Inborn errors metabolism – Sickle cell anemia – Karyotype – Twins – Chromosomal abnormalities – Genetic Pregnosis – Genetic Counselling – Gene Therapy – Drugs on Human heredity – simple Mendelian traits in man – genetic analysis of complex traits – Threshold traits – DNA finger printing and dermatoglyphics – Genetics and social behavior.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 07.12.2017
1-L1	Unit I: Genetic Transmission – General Introduction
2-L2	Concepts and definitions – Mendel and his work.
3- L3	Mendelian principles – Law of segregation, law of dominance and law of independent assortment.
4-L4	Allelic Interactions – Complementary, supplementary, duplicate and lethal genes.
5-L5	Non-allelic interactions – Complete and incomplete dominance, co-dominance.
6-L6	Pleiotropy – Penetrance and Expressivity – Phenocopies
7-L7	Multiple alleles – ABO Blood Group, Rh Blood group, Coat colour in rabbits.
8- P1	Zoology Association Meeting
9- L8	Polygenic inheritance – Skin Colour in man, eye colour in Drossophila.
10- L9	Revision
11-L10	Unit II: Gene Fine Structure - Introduction
12-L11	Simple and split genes – Cistran, recon, muton, intro and exon
13-L12	Gene Expressions: Genes on protein synthesis.
14-L13	Genetic code: redundancy and wobble hypothesis.
15-L14	Allotting portion for Internal Test-I
	Internal Test I begins
16-L15	Works of Khorana and Kornberg – Regulation of gene action.
17-IT-1	Internal Test-I (22.01.2018)
18-L16	Revision and Group Discussion
19-L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal

20-L18	Unit III: Chemistry of DNA - Introduction
21- L19	Chemical Structure of DNA DNA.
22- P2	College level meeting/Cell function
23-L20	Student Seminar - DNA damage and repairing mechanisms.
24-L21	Transposable elements – Types, Classifications, Examples and Applications
25-L22	Inbreeding and outbreeding: Inbreeding depression, Heterosis.
26-L23	Somatic cell hybridization – Fusion of Protoplasts, Selection of Hybrid Cells and Identification of Hybrid Plants.
27-L24	Eugenics – Positive and Negative.
28-L25	Euthenics – Pollution control, Creation of Superior Students – Euphenics.
29-L26	Extra chromosomal inheritance: Kappa particle and shell ceiling – Estimation of Heritability.
30-L27	Revision and Group discussion
31-L28	Unit IV: Population Genetics - Mendelian population – Gene pool and gene frequency.
32-L29	Hardy Weinberg law, Applications of Hardy-Weinberg law in calculating gene frequencies in a population.
33-L30	Calculation of gene frequencies for sex linked genes
34- P3	Department Seminar
35-L31	Student Seminar - Factors affecting Hardy – Weinberg equilibrium.
36-L32	Revision - Allotting portion for Internal Test-II
	Internal Test II begins
37- L33	Unit V: Human Genetics – General Introduction
38- IT-II	Internal Test-II (26.02.2018)
39-L34	Pedigree analysis – Importance – Symbols used in pedigree chart.
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Aminocentesis – purpose and precautions.
42- L37	Inborn errors metabolism – Phenylketonuria, Sickle cell anaemia.
43- L38	Karyotype – Twins – Identical and Siamese twins.
44- P4	College level meeting/ function
45-L39	Chromosomal abnormalities – Structure, autosomal and allosomal chromosomal abnormalities, Syndromes.
46-L40	Genetic Pregnosis – Genetic Counselling- aim, pedigree chart.
47-L41	Student Seminar - Gene Therapy – Drugs on Human heredity.
48-L42	Simple Mendelian traits in man – albinism, Taste Blindness, Eye Colour - genetic analysis of complex traits
49-L43	Threshold traits – DNA finger printing and dermatoglyphics
50-L44	Allotting portion for Internal Test-III
	Internal Test III begins
51 L45	Student Seminar - Genetics and social behavior
52- L46	Revision and Group Discussion

53-IT-III	Internal Test-III (01.04.2018)
54-L47	Revision and Group Discussion
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 “Genetics”
CO1	Perform monohybrid and dihybrid crosses.
CO2	Solving problems in incomplete dominance, multiple alleles, sex-linkage and epistasis using Punnett Squares and/or pedigree analysis.
CO3	Describe the processes of gene mutations and DNA repair.
CO4	Solve problems in population genetics using allelic and genotypic frequencies and use the Hardy-Weinberg Law to demonstrate the evolution of populations.
CO5	Gains knowledge about the importance of genetic counselling.
CO6	Describe the simple mendelian traits in man.
CO7	Analyze the chromosome variation, including rearrangements, aneuploidy and polyploidy.

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	Research Methodology
Course Code	KZOE31
Class	II year (June 2017 to December 2017)
Semester	Odd
Staff Name	Dr. D. Paramanatha Swami Doss
Credits	5
L. Hours /P. Hours	5 / 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; $5 \times 16 = 80$; 16Hrs /unit)	

Course Objectives

- To familiarize the students with basic of research and the research process.
- To enable the students in conducting research work and formulating research synopsis and report.
- To study the fundamental principles and functions of Chromatography.
- To understand the principle and working mechanism of electrophoresis.

Syllabus

MSU / 2016-17 / PG –Colleges / M.Sc. (Zoology) / Semester –III / Elective – III (a)

RESEARCH METHODOLOGY

Unit I: Research – Characteristics – types of research – steps in research – objectives of research – research report formatting and typing – laboratory safety – intellectual property rights.

Unit II: Microscopy – Principles – types of light microscopes – bright field – dark field – phase contrast – fluorescence – scanning – micrometry. Electron microscopes and types – atomic force and magnetic force microscopes.

Unit III: Centrifuge – types – principles and applications. pH meter – types – principles and applications. Colorimeter – principles and applications. Cryopreservation and its applications. Freezing and freeze drying microtomes. Cytotechniques.

Unit IV: Chromatography – paper – thin layer – column – gas liquid chromatography – affinity chromatography. Electrophoresis – paper – cellulose acetate – gel – immune electrophoresis. Blotting techniques – southern – northern – western. Radioactive counters – autoradiography – labeling studies.

Unit V: Spectrophotometer - Spectrofluorimeter – ESR –NMR Spectrophotometer – Flame Emission Photometry.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2017
1-L1	Unit I: Introduction about the Research
2-L2	Characteristics of Research, forms of research and objectives.
3- L3	Types of Research – Application oriented, Objective oriented, Inquiry mode etc.
4-L4	Empirical, One time, Longitudinal research.
5-L5	Steps in research – objectives of research.
6-L6	Research Approaches - Qualitative, Quantitative and Mixed research.
7-L7	Research Process and Criteria of research.
8- P1	Welcoming of First year and Inauguration of Zoology Association
9- L8	Research report formatting and typing - Scientific report – types and structure.
10- L9	Structure of review article, short communications, journal articles.
11-L10	Principle of thesis writing – steps, layout of the thesis, structure, language, illustrations, tables, foot note, references.
12-L11	Typing, proof reading, typing different forms of references.
13-L12	Laboratory safety – Physical, Chemical and Biological hazards, Precautions, transport of chemicals and biological samples.
14-L13	Visit to University Lab.
15-L14	Intellectual Property Rights – Patent.
16-L15	Review and Group Discussion.
17- L16	Unit II: Microscopy
18- L17	Introduction about magnification, resolving power, types of microscope.
19- L18	Principle, structure and uses of light microscope.
20- L19	Principle, structure and uses of bright field microscope.
21- L20	Allotting portion for Internal Test-I
	Internal Test I begins
22- L21	Principle, structure and uses of dark field microscope.
23- IT-1	Internal Test-I (31.07.2017)
24- L22	Principle, structure and uses of phase contrast microscope.

25- L23	Principle, structure and uses of fluorescence microscope.
26- L24	Test Paper distribution and result analysis
	Entering Internal Test-I Marks
27- L25	Electron microscope – principle, structure and components.
28- L26	Principle, components and applications of TEM.
29- L27	Principle, components and applications of SEM.
30- P2	College level meeting/Cell function
31-L28	Student Seminar – Micrometry – Stage and Ocular, work flow.
32-L29	Student Seminar - atomic force microscope
33-L30	Principle, components and applications of magnetic force microscopes.
34- L31	Visit to Biotechnology lab
35- L32	Review and group discussion.
36- L33	Unit III: Centrifugation
37- L34	Introduction and methods of centrifugation – differential and density gradient.
38- L35	Structure of centrifuge – motor, rotor, angle type, swinging bucket type. Types of centrifuge - Preparative and Analytical.
39- L36	Principle, structure and applications of ordinary centrifuge & ultra centrifuge.
40- L37	pH meter – applications – measurements titration curve.
41- L38	Students Seminar - Colorimeter – principles and applications.
42-P3	Department Seminar
43- L39	Cryopreservation and its applications.
44- L40	Cryotechniques – In vivo, role of fixatives for microscopic observation.
45- L41	Students Seminar - Freezing and freeze drying microtomes.
46- L42	Unit IV: Chromatography
47- L43	Allotting portion for Internal Test-II
	Internal Test II begins
48- L44	Paper Chromatography – types.
49-IT-II	Internal Test-II (30.08.2017)
50-L45	Thin layer – affinity chromatography
51- L46	Test Paper distribution and result analysis
	Entering Internal Test-II Marks
52- L47	Column chromatography & gas liquid chromatography – principle - mobile and stationary phase – procedure.
53- L48	Electrophoresis – principle – kinds of electrophoresis media.
54- L49	Principle, instrument, working procedure of Paper and Cellulose Acetate electrophoresis.
55- L50	Principle, instrumentation, working procedure of Agarose and SDS PAGE gel electrophoresis.
56- L51	Students Seminar – Immunoelectrophoresis.
57- L52	Blotting techniques – southern – northern – western.
58- L53	Radioactive counters – Types of counters – Geiger- Muller tube – Scintillation counters.

59-P4	College level meeting/ function
60- L54	Students Seminar - Autoradiography – Principle, method – micro-autoradiography.
61- L55	Labelling studies
62- L56	Unit V: Spectrophotometer – Spectrum of light, UV and IR radiation, Beer's and Lambert's Law
63- L57	Principle, instrumentation and applications of Nuclear Magnetic Resonance spectroscopy.
64- L58	Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Principle, instrumentation and applications of Electron Spin Resonance spectroscopy.
66- L60	Students Seminar – Flame emission spectroscopy
67-IT-III	Internal Test-III (03.10.2017)
68- L61	Revision and Group Discussion
69- L62	Revision and Group Discussion
70- L63	Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
71-MT	Model Test (19.10.2017)
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 06.11.2017

Course Outcomes

Learning Outcomes	COs of the course “Research Methodology”
CO1	Understanding the various kinds of research, objectives of doing research, research process, research designs and sampling.
CO2	Able to define appropriate research problem and parameters.
CO3	Able to prepare a project proposal (to undertake a project).
CO4	Describe the types and working principles of microscopes.
CO5	Able to apply intellectual property law principles (including copyright, patents, designs and trademarks) to real problems and analyse the social impact of intellectual property law and policy.
CO6	Gains knowledge about the cryopreservation and its application.
CO7	Study the mechanism and application of various kinds of blotting techniques.
CO8	Understand the principles and types of PCR.
CO9	Describe histological and histochemical details of tissues.
Experimental Learning	
EL1	Visit to biotechnology labs.

EL2	Hands on training on molecular biology.
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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Department of Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Phil. Zoology
Course Name	ADVANCE IN ANIUMAL BIOTECHNOLOGY & NANO TECHNOLOGY
Course Code	HZOC12
Class	M.Phil (2017-2018)
Semester	Odd
Staff Name	Dr.M.Rajakumari
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- To learned about Cell dynamics, recombinant DNA technology
- To study the Ethical issues in animal biotechnology
- To discuss about Biotechaology and genetic engineering
- To study about Nanotechnology
- To learned about health and environmental impacts of nanotechnology

Syllabus

Unit I :

Cell dynamics, recombinant DNA technology, Introducing DNA into animal cells: Injection., electrophoration, viral vectors Allitic exchange, vector less mode of gene transfer Tissue culture in biomedical and biochemical research; regulatory proteins, blood products vaccines and hormones.

Unit II :

Transgenic animals, fertilization and embryo transfer, foreign gene expressions -- IPM -• Mapping and sequencing the Human genome, The human genome project & ethical, legal and social issues. Ethical issues in animal biotechnology - Genetically modified organisms, phylogenetics using mitogenomes.

Unit III :

Utility of Biotechnaology and genetic engineering. Genomics and proteomics DNA fingerprinting - diagnostic and forensics -- Gene therapy, probes - monoclonal antibodies • detection to genetic diseases, DNA bar-coding of animals.

Unit IV :

Nanotechnology basics - Introduction to nanoworld, classification of nano materials, application ct nano crystals, nano factories, mechano chemistry, nano biosensors -optical bioscnsors -- DNA sensors Quantum dots - application in biotechnology - Is nanotechnology

Unit V :

Nanotechnology in bi-medical applications nanomedicines and drug delivery systems, health and environmental impacts of nanotechnology.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2017
1-L1	Cell dynamics
2-L2	Recombinant DNA technology
3- L3	Introducing DNA into animal cells:
4-L4	Injection., electrophoration
5-L5	viral vectors
6-L6	Allitic exchange
7-L7	vector less mode of gene transfer
8- P1	Welcoming of First year and Inauguration of Zoology Association
9- L8	Tissue culture in biomedical
10- L9	Tissue culture in biochemical research
11-L10	Regulatory proteins
12-L11	Blood products
13-L12	Vaccines and hormones.
14-L13	Transgenic animals
15-L14	Fertilization and embryo transfer
16-L15	Foreign gene expressions
17- L16	IPM -• Mapping and sequencing the Human genome
18- L17	IPM -• Mapping and sequencing the Human genome
19- L18	The human genome project ðical
20- L19	legal and social issues
21- L20	Ethical issues in animal biotechnology - Allotting portion for Internal Test-I
	Internal Test I begins
22- L21	Ethical issues in animal biotechnology
23- IT-1	Internal Test-I
24- L22	Genetically modified organisms
25- L23	Phylogenetics using mitogenomes
26- L24	Phylogenetics using mitogenomes- Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Utility of Biotechnology
28- L26	Utility of Genetic engineering.
29- L27	Genomics
30- P2	College level meeting/Cell function
31-L28	Proteomics
32-L29	DNA fingerprinting
33-L30	Diagnostic and forensics
34- L31	Gene therapy
35- L32	Gene therapy, probes
36- L33	Monoclonal antibodies
37- L34	Detection to genetic diseases
38- L35	Detection to genetic diseases
39- L36	DNA bar-coding of animals
40- L37	Nanotechnology basics
41- L38	Introduction to nanoworld

42-P3	Department Seminar
43- L39	Classification of nano materials,
44- L40	Application of nano crystals
45- L41	Nano factories
46- L42	Mechano chemistry
47- L43	Nano biosensors - Allotting portion for Internal Test-II
	Internal Test II begins
48- L44	Optical biosensors
49-IT-II	Internal Test-II
50-L45	DNA sensors
51- L46	_ Quantum dots - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Application in biotechnology
53- L48	Is nanotechnology bad or good?
54- L49	Nanotechnology in bi~medical applications
55- L50	Nanotechnology in bi~medical applications
56- L51	Nanotechnology in bi~medical applications
57- L52	Nanotechnology in bi~medical applications
58- L53	Nanomedicines
59-P4	College level meeting/ function
60- L54	Nanomedicines
61- L55	Drug delivery systems
62- L56	Drug delivery systems
63- L57	Health and environmental impacts of nanotechnology
64- L58	Nanomedicines - Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Health and environmental impacts of nanotechnology
66- L60	Health and environmental impacts of nanotechnology
67-IT-III	Internal Test-III
68- L61	Revision of Unit I & II
69- L62	Revision of Unit III & IV
70- L63	Revision of Unit V - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
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 “<ADVANCE IN ANIMAL BIOTECHNOLOGY & NANOTECHNOLOGY>”
CO1	Be able to describe the structure of animal genes and genomes.
CO2	Be able to describe how genes are expressed and what regulatory mechanisms contribute to control of gene expression.
CO3	Be able to describe basic principles and techniques in genetic manipulation and genetic engineering.
CO4	Be able to describe gene transfer technologies for animals and animal cell lines.
CO5	Be able to describe techniques and problems both technical and ethical in animal cloning.
CO6	Be able to describe the contribution 'functional genomics' is making and is likely to make in animal biotechnology now and in the future.
CO7	Determine the nanotechnology and actual working areas and applications.
CO8	Determine the characterization techniques for nanomaterials and nano thin films
CO9	Determine nanomedicine technologies
Experimental Learning	
EL1	Evaluate and discuss public and ethical concerns over the use of animal biotechnology
EL2	Describe the various biotechnologies available to the animal related fields
EL3	Understand the synthesis of nanomaterials and their application and the impact of nanomaterials on environment
EL4	To impart understanding on Nanoparticle based Drug Delivery.
Integrated Activity	
IA1	Locate and critically evaluate scientific literature and experimental studies relating to animal biotechnology and be able to effectively communicate the findings in oral and written form.
IA2	Conduct workshop on Nano materials in present technology

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Phil Zoology
Course Name	RESEARCH METHODOLOGY
Course Code	HZOC11
Class	M.Phil (2017-2018)
Semester	Odd
Staff Name	Dr.M.Rajakumari
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- Overview of Research and its Methodologies .
- Students should know why educational research is undertaken, and the audiences that profit from research studies
- To be able to describe the method of chromatography and its applications
- Knowledge of the structure and function of the major organ systems, including the molecular, biochemical and cellular mechanisms for maintaining homeostasis
- Provide an introduction to what bioinformatics is and why it is important
- Provide an overview of the application areas of bioinformatics, with a focus on the topics that will be taught in the course

Syllabus

Unit I :

Sources of research data- methods of collection, analysis and interpretation. organization of research paper, web based literature survey, citation index, impact factor, copy right, plagiarism.

Unit II :

High Performance Liquid Chromatography (HPLC) and its applications; SOS PAGE and Gradient Gel Electrophoresis, separation of nucleic acids; Gel Documentation, isoelectric focussing, Southern, Northern and Western blotting techniques; Polymerase Chain Reaction (PCR), Microscopy- SEM, TEM, Fluorescence.

Unit III :

Immunology: Radio Immuno Assay (RIA), ELISA & Hybridoma technology and their applications: Rapid Immunodiagnostic procedures - Microbiology; Colony Forming Unit (CFU); Evaluation of antimicrobial activity - Kirby- Bauer procedure; Minimal Inhibitory Concentration (MIC): Qualitative analysis of water; Most Probable Number (MPN) index and Membrane filter technique; Cultivation of anaerobic microorganisms: GasPak system and Minimal Inhibitory Concentration (MIC).

Unit IV :

Diversity indices; using of softwares for calculating Biodiversity methods.

Unit V :

Bioinformatics-definition: Biological databases; Sequence comparison; Multiple sequence alignment; Profiles, motifs and feature identification; Phylogenetic data analysis, Bioinformatics in genomes; Bioinformatics software.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2017
1-L1	Primary Data Collection Methods
2-L2	Quantitative Methods
3- L3	Qualitative Methods
4-L4	Secondary Data Collection Methods
5-L5	Data analysis and interpretation
6-L6	Organization of research paper
7-L7	Design and Development of a Process for Web-based Survey Research
8- P1	Welcoming of First year and Inauguration of Zoology Association
9- L8	Citation Indexing
10- L9	Web of Science database
11-L10	Limitations of WoS Data base
12-L11	Indian Citation Index (ICI)
13-L12	The impact factor
14-L13	Tools for Impact analysis
15-L14	Copy right, plagiarism.
16-L15	High Performance Liquid Chromatography (HPLC) and its applications
17- L16	SOS PAGE
18- L17	Gradient Gel Electrophoresis
19- L18	Separation of nucleic acids
20- L19	Gel Documentation
21- L20	isoelectric focussing - Allotting portion for Internal Test-I
	Internal Test I begins
22- L21	Southern,Northern and Western blotting techniques
23- IT-1	Internal Test-I
24- L22	Polymerase Chain Reaction (PCR)
25- L23	Study of Transmission Electron Microscopy (TEM)
26- L24	Study of Scanning Electron Microscopy (SEM) - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Fluorescence
28- L26	Immunology
29- L27	Radio Immuno Assay (RIA)
30- P2	College level meeting/Cell function
31-L28	ELISA&Hybridoma technology and their applications
32-L29	Rapid Immunodiagnostic procedures
33-L30	Microbiology; Colony Forming Unit (CU)
34- L31	Evaluation of antimicrobial activity
35- L32	Kirby- Bauer procedure
36- L33	Minimal Inhibitory Concentration (MIC)
37- L34	Qualitative analysis of water
38- L35	Most Probable Number (MPN) index and Membrane filter technique
39- L36	Cultivation of anaerobic microorganisms
40- L37	GasPak system
41- L38	Minimal Inhibitory Concentration (MIC).

42-P3	Department Seminar
43- L39	Why quantify biodiversity?
44- L40	How do we measure biodiversity?
45- L41	Alpha diversity, Beta diversity, Gamma diversity,
46- L42	Describing Communities
47- L43	Biodiversity - Allotting portion for Internal Test-II
	Internal Test II begins
48- L44	Species Richness
49-IT-II	Internal Test-II
50-L45	Species diversity
51- L46	Diversity indices - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Simpson Diversity Index
53- L48	Shannon – Weiner Index
54- L49	Evenness
55- L50	What is bioinformatics?
56- L51	Why bioinformatics is necessary?
57- L52	Field of Bioinformatics
58- L53	Bioinformatics key areas
59-P4	College level meeting/ function
60- L54	Structural bioinformatics
61- L55	Basis of sequence alignment
62- L56	Scoring a sequence alignment
63- L57	Protein sequence alignment (DNA alignment)
64- L58	Biological databanks and databases - Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Primary and secondary Database
66- L60	Applications of Bioinformatics
67-IT-III	Internal Test-III
68- L61	Revision of Units I & II
69- L62	Revision of Units III & IV
70- L63	Revision of Unit V - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
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 “<RESEARCH METHODOLOGY>”
CO1	understand some basic concepts of research and its methodologies
CO2	select and define appropriate research problem and parameters
CO3	To be able to describe the method of chromatography and its applications
CO4	The students will be able to identify the cellular and molecular basis of immune responsiveness.
CO5	The students will be able to describe the roles of the immune system in both maintaining health and contributing to disease.
CO6	Know and understand the main principles and practices of collecting data in the field.
CO7	Locate and use the main databases at the NCBI and EBI resources
CO8	Know the difference between databases, tools, repositories and be able to use each one to extract specific information
CO9	Extract data from specific databases using accessions numbers, gene names etc.
Experimental Learning	
EL1	organize and conduct research (advanced project) in a more appropriate manner
EL2	Know the main principles and methods for surveying resource use
EL3	Be able to conduct a threat assessment for a site.
EL4	Use selected tools at NCBI and EBI to run simple analyses on genomic sequences
Integrated Activity	
IA1	write a research report and thesis
IA2	Design a model of Immunoglobulins

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Phil. Zoology
Course Name	SERICULTURE
Course Code	HZOO24
Class	M.Phil(2017-2018)
Semester	Odd
Staff Name	Dr.M.Rajakumari
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- Train the students in identifying the diseases and pests of the mulberry plant.
- It also involves giving students a thorough knowledge about the cultivation of mulberry, maintenance of the farm, seed technology, silkworm rearing and silk reeling.
- Students get to learn about the quality of various things like leaf, seed cocoon, commercial cocoon and fibre so that they can get maximum return when actually practiced.
- We get to learn about the various skills that are necessary for self employment in the mulberry and seed production.
- To develop highly qualified professional manpower in Silk and Sericulture sector
- In Sericulture the basic requirement lies on systematic quality based coaching and training
- To train and provide expert human resource to Silk industry and expected to bring direct benefits to Rural development and sericulture farming community.

Syllabus

Unit I :

Introduction – definition – Scope – State of the art of silk industries in china, Japan and India. Mulberry and Non mulberry silk Industry in India.

Mulberry silkworm races – classification on the basis of the origin and voltinism characteristics features. Seed organization – seed Cocoon production – silkworm egg production – pure, Hybrid.

Non mulberry silkworms – different species – habit and habitats: Food plants (a) Tasar food plants – terminal species – shorea robusta (b) Muga food plants – Listsea polyantha – Guercus sp, (c) Eri food plants – Castor, Tapioca.

Unit II :

Mulberry growth and nutrition. Importance of oil in mulberry cultivation – Sources of nutrients in soil – Role of essential elements in plant growth of Mulberry. Propagation (a) Seedlings – Methods of raising seedlings. (b) Saplings – selection of plants for cutting. (c) grafting. Selection of stock and scion – physiological features – grafting types – stem, root, ind bud techniques. (d) layering, types – techniques. Nursery raising, layout bed size – oil composition.

Mulberry Forms, bush, middlings and low trees, monocrop and mixed crop pattern. Suitable variety for cultivation – measuring. Planting system: Row and pit system – advantages and disadvantages – Intercultivation – Time and type of initial harvests.

Unit III :

Silkworm – Systematic position – Order Lepidoptera – Family Bombycidae, life history of Bolyx mori – morphology of egg, larva, pupa and adult. Morphology and anatomy of the organ systems in silkworm. Digestive system including mouth parts – excretory, respiratory, circulatory, muscular, nervous and reproductive systems – Silk gland structure silk proteins moulting and hormonal control of meta morphosis.

Rearing: Selection of model house, Rearing appliances, Disinfection; Types of disinfection – concentration of disinfectants – Selection of races for rearing Bievoltine and multivoltine their advantages and disadvantages. Incubation – influence of environmental conditions on egg development – black boxing. Chawki rearing: Brushing different types – loose eggs and sheet eggs. Cellular and mass brushing – Selection of leaf for brushing – Time of transportation and storage of leaf for Chawki worms – environmental conditions – leaf requirements – different Chawki rearing methods – Gox rearing – Cellular rearing – bed cleaning with neg – feeding schedule spacing – Symptoms and care during moulting periods. Late age rearing: Spacing – leaf requirements – environmental conditions – feeding and bed cleaning schedules – methods of rearing. Shelf shoot and floor rearing – advantages and disadvantages – Bed cleaning schedules: Mounting: Types of mountings – bamboo – plastic, evolving – rotary – bottle brush – advantages and disadvantages – Spinning environmental conditions for spinning. Harvesting of cocoons: Time of harvest – setting of cocoons – preservation, transportation of cocoons – leaf cocoon ratio – cost of cocoon production.

Unit IV :

/Diseases of Silkworm - Introduction and Classification of different types of Silkworm diseases, Protozoan diseases - pebrine - symptom - and mode of infection - prevention and control. Bacterial disease -- Flacherie- Symptoms -- Causative agents -- factors influencing Flacherie - Sources and mode of infection - prevention and control, viral diseases - grasserie - Symptoms mode of infection- defection, prevention and control Fungal diseases •

Muscardine - Symptoms of different types of fungal diseases -- Causative agents mode of infection -- Prevention and control. Aspergillus diseases symptoms - Causative agents • mode of infection -- prevention and control, General account of disinfection and relative efficiencies of different disinfections. /

/Disease of mulberry: Classification of diseases of mulberry. Fungal diseases of Mulberry and their occurrence - Symptoms and control, a) leaf spot, b) leaf rust, c) powdery mildew, d) Leaf blight, e) Root rot bacterial - viral and mycoplasma diseases of mulberry • control measures.

Root knot nematode diseases of mulberry - its occurrence - Symptoms and control. Mineral deficiency Symptoms mulberry and reclamation, Fungicide formulations and method of applications.

Unit V :

Cocoon marketing - Cocoon markets - Transport of Cocoons -- Composition of cocoon -- Physical characters of Cocoon considered for commercial purposes -- Defective Cocoons.

Silk reeling: Stifling - Storage of Cocoons - Sorting of Cocoon -- Deflossing - Cocoon riddling - Cocoon mixing or blending - Cocoon boiling and brushing - Brushing - Reeling operations -- Reeling Appliances - Re-reeling - finishing - Raw silk Testing - Silk wastes.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2017
1-L1	Introduction - Sericulture
2-L2	State of the art of silk industries in China, Japan and India
3- L3	Mulberry and Non Mulberry Silk Industry in India.
4-L4	Mulberry Silkworm races
5-L5	Classification on the basis of the origin and voltinism characteristic features
6-L6	Seed organization
7-L7	seed Cocoon production
8- P1	Welcoming of First year and Inauguration of Mathematics Association
9- L8	Silkworm egg production -- Pure, hybrid.
10- L9	Non mulberry silkworms -- different species - habit and habitats
11-L10	Food plants (a) Tassar food plants Terminalia species - <i>Shorea robusta</i>
12-L11	(b) Muga food plants - <i>Listsea polyantha</i> - <i>Guercus sp</i>
13-L12	. (c) Eri food plants - Castor, Tapioca.
14-L13	Mulberry growth and nutrition
15-L14	Importance of soil in Mulberry cultivation
16-L15	Sources of nutrients in soil
17- L16	Role of essential elements in plant growth of Mulberry
18- L17	Seedlings - Methods of raising seedlings
19- L18	Saplings - selection of plants for cutting
20- L19	Grafting: Selection of stock and scion physiological features - grafting types-

	stem. root, ind bud techniques
21- L20	layering: types - techniques. Nursery raising: layout: bed size - soil composition. - Allotting portion for Internal Test-I
	Internal Test I begins
22- L21	Mulberry Forms: bush, middlings and low trees, monocrop and mixed crop pattern
23- IT-1	Internal Test-I
24- L22	Suitable variety for cultivation - manuring
25- L23	Planting system: Row and pit system - advantages and disadvantages
26- L24	Intercultivation - Time and type of initial harvests - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Silk worm -- Systematic position - Order Lepidoptera - Family Bombycidae. Life history of <i>Bolyx mori</i> - morphology of egg, larva, pupa and adult
28- L26	Morphology and anatomy of the organ systems in silkworm
29- L27	Digestive System including mouth parts -• excretory, respiratory, circulatory, muscular, nervous and reproductive Systems
30- P2	College level meeting/Cell function
31-L28	Silk gland structure silk proteins. moulting and hormonal control of metamorphosis.
32-L29	Rearing: Selection of site model house, Rearing appliances
33-L30	Disinfection: Types of disinfection - concentration of disinfectants
34- L31	Selection of races for rearing Bievoltine and multivoltine their advantages and disadvantages
35- L32	Incubation - influence of environmental conditions on egg development - black boxing
36- L33	Chawki rearing: Brushing different types-• loose eggs and sheet eggs
37- L34	Late age rearing: Spacing- leaf requirement- environmental conditions -- feeding and cleaning schedules - methods of rearing: Shelf, shoot and floor rearing- advantage and disadvantage
38- L35	Bed cleaning schedules. Mounting: Types of mountages - bamboo - plastic, evolving - rotary- bottle brush- advantages and disadvantages
39- L36	Spinning- environmental conditions for spinning.
40- L37	Harvesting of cocoons; Time of harvest - Sorting of cocoons
41- L38	Preservation. transportation of cocoons - leaf cocoon ratio - cost of cocoon production
42-P3	Department Seminar
43- L39	Introduction and Classification of different types of Silkworm diseases
44- L40	Protozoan diseases - pebrine - symptom - and mode of infection - prevention and control.
45- L41	Bacterial disease -- Flacherie- Symptoms -- Causative agents -- factors influencing Flacherie
46- L42	Sources and mode of infection - prevention and control, viral diseases - grasserie
47- L43	Symptoms mode of infection - Allotting portion for Internal Test-II
	Internal Test II begins
48- L44	Fungal diseases - Muscardine - Symptoms of different types of fungal diseases
49-IT-II	Internal Test-II
50-L45	Causative agents - mode of infection -- prevention and control

51- L46	General account of disinfection and relative efficiencies of different disinfections. - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Disease of mulberry: Classification of diseases of mulberry
53- L48	Fungal diseases of Mulberry and their occurrence
54- L49	Symptoms and control, a) leaf spot, b) leaf rust, c) powdery mildew
55- L50	Symptoms and control, d) Leaf blight, e) Root rot bacterial
56- L51	Viral and mycoplasmal diseases of mulberry control measures.
57- L52	Root knot nematode diseases of mulberry - its occurrence
58- L53	Mineral deficiency Symptoms mulberry and reclamation
59-P4	College level meeting/ function
60- L54	Fungicide formulations and method of applications.
61- L55	Cocoon marketing - Cocoon markets - Transport of Cocoons -- Compositin of cocoon
62- L56	Physical characters of Cocoon considered for commercial purposes
63- L57	Defective Cocoons.
64- L58	Silk reeling: Stifling - Storage of Cocoons - Sorting of Cocoon -- Deflossing - Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Cocoon riddling - Cocoon mixing or blending - Cocoon boiling and brushing - Brushing
66- L60	Reeling operations -- Reeling Appliances - Re-reeling - finishing - Raw silk Testing - Silk wastes.
67-IT-III	Internal Test-III
68- L61	Revision of Unit I & II
69- L62	Revision of Unit III & IV
70- L63	Revision of Unit V - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
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 “<SERICULTURE>”
CO1	Learned about Indian Silk Industry
CO2	Understood the process of Mulberry cultivation
CO3	Watch the life cycle of silkworm stage by stage
CO4	Practice the rearing methods
CO5	Select the rear model
CO6	Learned about silkworm diseases
CO7	Learned about Mulberry plants infections
Experimental Learning	
EL1	To develop an expert manpower to handle the own sericulture units/ entrepreneurship/ Corporate sector units.
EL2	To give scientific knowledge about mulberry cultivation , silkworm rearing techniques to the students.
EL3	To make the student aware about Soil to Silk concept, Sericulture Extension and innovative technology /techniques etc.
EL4	To train the students in compressive Silk production techniques .
Integrated Activity	
IA1	Form a Mulberry Garden
IA2	Prepare a silkworm rearing house

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Developmental Zoology, Ecology, Animal Physiology and Evolution
Course Code	SAZO21
Class	I year (December 2018 to April 2019)
Semester	Even
Staff Name	Dr. D. Paramanatha Swami Doss
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 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 the sequential changes from cellular grade of organization to organ grade of organization in the development of multicellular organisms.
- To study the interaction and the interdependence among environmental factors and living organisms.
- To understand the functional significance of various organs and organ systems of animals.
- To discern the evolutionary significance of the animals, origin of species, effects of mutation.

Syllabus

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

DEVELOPMENTAL ZOOLOGY, ECOLOGY, ANIMAL PHYSIOLOGY AND EVOLUTION

UNIT I: Early development in Man: Structure of sperm and ovum; Fertilization – Cleavage, Morula, Blastocyst, Implantation and gastrulation – Fate map. Placenta in mammals – types and functions. Test tube babies – Twins – Amniocentesis.

Nuclear Transplantation in *Acetabularia*.

UNIT II: Abiotic factors: Biological effects of Temperature and Light; Biotic factors: Symbiosis, Commensalism, Mutualism, Parasitism, Prey-predator Relationship.

Adaptations: Desert adaptations.

Community: Ecosystem – Structure and dynamics of a pond.

UNIT III: Nutrition: Food constituents – Carbohydrates, Proteins and Fats.

Digestion: Role of enzymes in carbohydrate, protein and fat digestion.

Absorption: Absorption of digested food.

Metabolism: Carbohydrate metabolism: Glycogenesis, Glycogenolysis, Glycolysis.

Respiration: Transport and exchange of oxygen and carbon dioxide. Haemoglobin.

UNIT IV: Excretion: Structure of Nephron – Urine formation – Dialysis Nervous Co-ordination: Structure and types of neurons – Nerve impulse, conduction of nerve impulse through neuron and synapse.

Reproduction: Structure of human testis and ovary, Graffian follicle, Menstrual cycle and its hormonal control.

UNIT V: Theories of Evolution: Darwinism, Mutation theory of De Vries.

Adaptive radiation in birds.

Mimicry and Colouration.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 03.12.2018
1-L1	UNIT I: Introduction about the Developmental Zoology.
2-L2	Early development in Man: Structure of sperm and ovum.
3- L3	Fertilization – Events of fertilization.
4-L4	Cleavage – formation of 2 cell stage, 4 cell stage, 8 cell stage and so on.
5-L5	Morula – structure formation blastocoel, division micromeres and macromeres.
6-L6	Implantation – structure of uterus, endometrium, days after fertilization etc.
7-L7	Gastrulation – Formation of endoderm, formation of mesoderm and formation of ectoderm.
8- P1	Zoology Association Meeting
9- L8	Structure of gastrula – Neural plate, notochord, archenteron, dorsal lip of blastopore.
10- L9	Fate map – predetermined organ forming areas.
11-L10	Placenta in mammals – Characteristics – Functions.
12-L11	Placenta – Classification – based of foetal membrane – based on the distribution of villi. Classification – based on nature of contact – based on the types of tissue involved.

13-L12	Test tube baby – procedure – Fruity and Gift method.
14-L13	Twins – importance of twins study – Identical, Siamese, Fraternal twins.
15-L14	Amniocentesis – Procedure - Allotting portion for Internal Test-I
	Internal Test I begins
16-L15	Nuclear Transplantation in <i>Acetabularia</i> – the importance of nucleus by different experiments.
17-IT-1	Internal Test-I (18.01.2019)
18-L16	Unit II: Introduction about Ecology, Abiotic and biotic factors
19-L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Temperature – ranges – thermal stratification – biological effects and adaptations.
21- L19	Light – source – spectrum – light on water – biological effects.
22- P2	College level meeting/Cell function
23-L20	Animal relationships – Symbiosis with examples, Commensalism with examples.
24-L21	Mutualism with examples, parasitism with examples.
25-L22	Prey – predation relationship –types of parasites - parasitic adaptations.
26-L23	Desert adaptations – Characteristics of desert – adaptations – water conservation, water getting, tolerance of heat and protection.
27-L24	Ecosystem – abiotic and biotic factors of a pond ecosystem.
28-L25	Food chain – Food web – Energy flow – Pyramids – Ecological succession
29-L26	UNIT III: Introduction about animal physiology.
30-L27	Nutrition: Food constituents – Carbohydrates, Proteins and Lipids.
31-L28	Digestion: Role of enzymes in carbohydrate digestion.
32-L29	Role of enzymes in protein and lipid digestion.
33-L30	Absorption: Structure of Intestinal Villi - Absorption of carbohydrates, proteins and lipids.
34- P3	Department Seminar
35-L31	Metabolism: Glycogenesis, Glycogenolysis.
36-L32	Glycolysis – steps – the role of enzymes.
	Internal Test II begins
37- L33	Respiration: Transport and exchange of oxygen and carbon dioxide - Chloride shift.
38- IT-II	Internal Test-II (25.02.2019)
39-L34	Haemoglobin – Structure and importance.
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Excretion: Structure of Nephron - Allotting portion for Internal Test-II
42- L37	Urine formation – ultrafiltration, reabsorption and secretion – Dialysis.
43- L38	Structure of neurons – types of neurons – nerve impulse.
44- P4	College level meeting/ function
45-L39	Conduction of nerve impulse through neuron and synapse.
46-L40	Structure of human testis and ovary – Graafian follicle
47-L41	Menstrual cycle – Hormonal control of menstrual cycle.
48-L42	Unit V: Introduction about evolution
49-L43	Theories of Darwin.
50-L44	Allotting portion for Internal Test-III

	Internal Test III begins
51 L45	Mutation theory of De Vries.
52- L46	Adaptive radiation in birds.
53-IT-III	Internal Test-III (22.03.2019)
54-L47	Mimicry and colouration – types of colouration – colouration and evolution.
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 “Developmental Zoology, Ecology, Animal Physiology and Evolution”
CO1	Understand the events of fertilization.
CO2	Able to describe the patterns of cleavage.
CO3	Learn about different types of twins.
CO4	Able to know the biological effects of light and temperature.
CO5	Understand the symbiotic and mutualistic animal interactions.
CO6	Learn about the different steps of urine formation.
CO7	Understand the importance of haemoglobin for gas exchange.
Experimental Learning	
EL1	Study the types of placenta with the help of museum specimens.
EL2	Construct the model pond ecosystem and to study the interaction of abiotic and biotic factors.
EL3	Study the concept of batesian mimicry by comparing the Common cuckoo and shikra
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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	AQUACULTURE
Course Code	GMZO6A
Class	III year (2018-2019)
Semester	EVEN
Staff Name	Dr.Jansi 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 promote , facilitate and influence the best possible standards of fisheries management.
- To provide the technical and general knowledge necessary for component fisheries management
- The basic ideas were studied at UG level detailed study are carried in the present course

Syllabus

Unit I

Definition, scope of aquaculture, cultural techniques, aquaculture in India – Freshwater, Coastal and marine aquaculture – Culturable organisms fin fishes, shell fishes, shell fishes and their qualities.

Unit II

Preparation of pond for fish culture.Types of fish ponds – nursery pond, rearing pond and culture pond. Fin fish culture – Culture of Indian major carp – bundh breeding, induced breeding, transport of fish seeds. Shell fish culture – culture of marine prawn – induced breeding – types of prawn culture in India. Edible Oyster culture.

Unit III

Types of cultures – Extensive, Semi – intensive and intensive culture, Monoculture, Mono sex culture, poly culture, cage culture, pen culture, Integrated fish farming – paddy cum fish culture. Animal husbandary cum fish culture, Sewage fed fish culture.

Unit IV

Fish feed – Artificial feed – Feed formulation, need, ingredients, pellets. Live feeds and their culture – Artemia, diatoms, Rotifers, Micro algae Diseases of aquaculture organisms – Ectoparasites. Bacterial, viral and Fungal diseases – Nutritional deficiency diseases.

Unit V

Government participation in aquaculture CMFRI, CIFRI, MPEDA, FFDA, Post-harvest technology in fishes – rigor mortis, fish spoilage fish preservation techniques – freezing canning, drying. Fish marketing; Co-operative marketing in fisheries. Crafts and gears. Water quality management.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 01.11.2016
1-L1	Syllabus discussion
2-L2	Introduction to aquaculture
3- L3	Definition of aquaculture
4-L4	Scope aquaculture
5-L5	Cultural Techniques
6-L6	Aquaculture in India
7-L7	Freshwater, Coastal and marine aquaculture
8- P1	Welcoming of First year and Inauguration of zoology Association
9- L8	Shell fishes, shell fishes and their qualities.
10- L9	Preparation of pond for fish culture
11-L10	Types of fish ponds
12-L11	Nursery pond
13-L12	Rearing pond and culture pond
14-L13	Fin fish culture
15-L14	Culture of Indian major carp - Allotting portion for Internal Test-I
	Internal Test I begins(24.01.2017)
16-L15	Bundh breeding
17-IT-1	Internal Test-I
18-L16	Induced breeding
19-L17	Transport of fish seeds- Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Shell fish culture
21- L19	Culture of marine prawn

22- P2	College level meeting/Cell function
23-L20	Induced breeding
24-L21	Types of prawn culture in India
25-L22	Edible Oyster culture
26-L23	Types of cultures
27-L24	Extensive, Semi – intensive culture
28-L25	Intensive Culture
29-L26	Monoculture
30-L27	Mono sex culture
31-L28	Poly culture
32-L29	Cage culture
33-L30	Pen culture
34- P3	Department Seminar
35-L31	Integrated fish farming
36-L32	Paddy cum fish culture. - Allotting portion for Internal Test-II
	Internal Test II begins(24.02.2017)
37- L33	Animal husbandry cum fish culture
38- IT-II	Internal Test-II
39-L34	Sewage fed fish culture.
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Fish feed- Artificial feed – Feed formulation
42- L37	need, ingredients, pellets
43- L38	Live feeds and their culture
44- P4	College level meeting/ function
45-L39	Artemia, diatoms, Rotifers, Micro algae
46-L40	Diseases of aquaculture organisms- Ectoparasites. Bacterial
47-L41	Viral and Fungal diseases – Nutritional deficiency diseases.
48-L42	Government participation in aquaculture CMFRI, CIFRI, MPEDA, FFDA
49-L43	Post-harvest technology in fishes- rigor mortis,
50-L44	Allotting portion for Internal Test-III
	Internal Test III begins
51 L45	fish spoilage fish preservation techniques- fish spoilage fish preservation techniques
52- L46	Fish marketing; Co-operative marketing in fisheries- Crafts and gears
53-IT-III	Internal Test-III
54-L47	Water quality management.
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 21.04.2017

Course Outcomes

Learning Outcomes	COs of the course
CO1	Basic understanding of agriculture and aquaculture and fisheries
CO2	Skills as fisheries biologist
CO3	Social outlook on pros and cons of aquaculture industry
CO4	Computer and communication based skills in aquaculture
CO5	Basics of animal biology and fish taxonomy
CO6	Types of food and feeding strategies in finfishes and shellfishes
CO7	Pond fertilization and biological food production
Experimental Learning	
EL1	To do working models to explain frog culture
EL2	To do working models to explain sea weed culture

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	AQUACULTURE
Course Code	GMZO6A
Class	III year (2018-2019)
Semester	EVEN
Staff Name	D.V.SHEEBA RAJAKUMARI.
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; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To promote, facilitate and influence the best possible standards of fisheries management.
- To provide the technical and general knowledge necessary for component fisheries management
- The basic ideas were studied at UG level detailed study are carried in the present course

Syllabus

Unit I:

Definition, scope of aquaculture, cultural techniques, aquaculture in India – Freshwater, Coastal and marine aquaculture – Culturable organisms fin fishes, shell fishes, shell fishes and their qualities.

Unit II:

Preparation of pond for fish culture. Types of fish ponds – nursery pond, rearing pond and culture pond. Fin fish culture – Culture of Indian major carp – bundh breeding, induced breeding, transport of fish seeds. Shell fish culture – culture of marine prawn – induced breeding – types of prawn culture in India. Edible Oyster culture.

Unit III:

Types of cultures – Extensive, Semi – intensive and intensive culture, Monoculture, Mono sex culture, poly culture, cage culture, pen culture, Integrated fish farming – paddy cum fish culture. Animal husbandary cum fish culture, Sewage fed fish culture.

Unit IV:

Fish feed – Artificial feed – Feed formulation, need, ingredients, pellets. Live feeds and their culture – Artemia, diatoms, Rotifers, Micro algae Diseases of aquaculture organisms – Ectoparasites. Bacterial, viral and Fungal diseases – Nutritional deficiency diseases.

Unit V:

Government participation in aquaculture CMFRI, CIFRI, MPEDA, FFDA, Post-harvest technology in fishes – rigor mortis, fish spoilage fish preservation techniques – freezing canning, drying. Fish marketing; Co-operative marketing in fisheries. Crafts and gears. Water quality management.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 03.12.2018
1-L1	Syllabus discussion
2-L2	Introduction to aquaculture
3- L3	Definition of aquaculture
4-L4	Scope aquaculture
5-L5	Cultural Techniques
6-L6	Aquaculture in India
7-L7	Freshwater, Coastal and marine aquaculture
8- P1	Welcoming of First year and Inauguration of zoology Association
9- L8	Shell fishes, shell fishes and their qualities.
10- L9	Preparation of pond for fish culture
11-L10	Types of fish ponds
12-L11	Nursery pond
13-L12	Rearing pond and culture pond
14-L13	Fin fish culture
15-L14	Culture of Indian major carp - Allotting portion for Internal Test-I
	Internal Test I begins(18.01.2019)
16-L15	Bundh breeding
17-IT-1	Internal Test-I
18-L16	Induced breeding
19-L17	Transport of fish seeds - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Shell fish culture
21- L19	Culture of marine prawn
22- P2	College level meeting/Cell function

23-L20	Induced breeding
24-L21	Types of prawn culture in India
25-L22	Edible Oyster culture
26-L23	Types of cultures
27-L24	Extensive, Semi – intensive culture
28-L25	Intensive Culture
29-L26	Monoculture
30-L27	Mono sex culture
31-L28	Poly culture
32-L29	Cage culture
33-L30	Pen culture
34- P3	Department Seminar
35-L31	Integrated fish farming
36-L32	Paddy cum fish culture. - Allotting portion for Internal Test-II
	Internal Test II begins(25.02.2019)
37- L33	Animal husbandry cum fish culture
38- IT-II	Internal Test-II
39-L34	Sewage fed fish culture.
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Fish feed- Artificial feed – Feed formulation
42- L37	need, ingredients, pellets
43- L38	Live feeds and their culture
44- P4	College level meeting/ function
45-L39	Artemia, diatoms, Rotifers, Micro algae
46-L40	Diseases of aquaculture organisms- Ectoparasites. Bacterial
47-L41	Viral and Fungal diseases – Nutritional deficiency diseases.
48-L42	Government participation in aquaculture CMFRI, CIFRI, MPEDA, FFDA
49-L43	Post-harvest technology in fishes- rigor mortis,
50-L44	Allotting portion for Internal Test-III
	Internal Test III begins (22.03.2019)
51 L45	fish spoilage fish preservation techniques- fish spoilage fish preservation techniques
52- L46	Fish marketing; Co-operative marketing in fisheries- Crafts and gears
53-IT-III	Internal Test-III
54-L47	Water quality management.
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
CO1	Basic understanding of agriculture and aquaculture and fisheries
CO2	Skills as fisheries biologist
CO3	Social outlook on pros and cons of aquaculture industry
CO4	Computer and communication based skills in aquaculture
CO5	Basics of animal biology and fish taxonomy
CO6	Types of food and feeding strategies in finfishes and shellfishes
CO7	Pond fertilization and biological food production
Experimental Learning	
EL1	To do working models to explain frog culture
EL2	To do working models to explain sea weed culture

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	IMMUNOLOGY & MICROBIOLOGY
Course Code	SMZO62
Class	III year (2018-2019)
Semester	Even
Staff Name	L.Jansi Rani
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- To study the immune system and their role of our body..
- To study about Salient features of antigen- antibody reaction.
- To discuss about Humoral immune response - primary & secondary response
- To study the History & Scope of microbiology
- To learned about Industrial microbiology : production of Antibiotic penicillin.

Syllabus

UNIT I

History and Scope of Immunology.

Immunity-Type of Immunity - Innate & acquired, passive & active.

Lymphoid organs –primary & secondary (Thymus, Bone marrow, Bursa of fabricius , Spleen, Tonsil, Lymph node, Peyer's patches) – Structure and Functions.

(15L)

UNIT II

Immunoglobulin-Structure, Function, Biological properties of Ig classes. Interaction of Antigen and antibody.

Salient features of antigen- antibody reaction. Types of antigen-antibody reaction – Agglutination, Precipitation, Opsonization, Cytolysis.

(15L)

UNIT III

Immune response-Lymphocyte as unit of immune system, stem cells - Structure and lineage, T cells, B cells & Macrophages.

Humoral immune response - primary & secondary responses - B cell activation. Cell - Mediated immune response - Type of T cells & functions.

Tumour immunology.

(15L)

UNIT IV

Introduction : History & Scope of microbiology. General structure of microbes (Bacteria, virus). Bacterial growth : Culture media & selective media; Continuous & batch culture techniques, growth curve.

(14L)

UNIT V

Food microbiology :Food poisoning ; Food spoilage & preservation.

Industrial microbiology : production of Antibiotic penicillin.

Soil microbiology : Role of soil microbes in N₂ fixation.

Medical microbiology : Diseases caused by bacteria in different systems of man as given below: Dermal – Streptococcal inflammation : - Tuberculosis;

Gastro-intestinal-dysentery:Reproductive – Gonorrhoea.

Viral diseases with reference to causative organisms, symptoms, impact on the host & control measures, AIDS , Rabies, Chicken pox, Measles, Influenza & polio.

(16L)

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 07.12.2017
1-L1	History and Scope of Immunology.

2-L2	Immunity-Type of Immunity
3- L3	Immunity-Innate & acquired
4-L4	Immunity-passive & active.
5-L5	Lymphoid organs –primary
6-L6	Lymphoid organs – secondary
7-L7	Structure and Functions–Thymus
8- P1	Zoology Association activities
9- L8	Structure and Functions - Bone marrow
10- L9	Structure and Functions - Bursa of fabricius
11-L10	Structure and Functions - Spleen
12-L11	Structure and Functions - Tonsil
13-L12	Structure and Functions - Lymph node
14-L13	Structure and Functions - Peyer's patches)
15-L14	Immunoglobulin-Structure
16-L15	Immunoglobulin- Function
17- L16	Biological properties of Ig classes
18- L17	Interaction of Antigen
19- L18	Interaction of antibody.
20- L19	Salient features of antigen-
21- L20	Antibody reaction. - Allotting portion for Internal Test-I
	Internal Test I begins
22- L21	Types of antigen
23- IT-1	Internal Test-I
24- L22	Antibody reaction
25- L23	Agglutination, Precipitation
26- L24	Opsonization, Cytolysis.- Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Immune response
28- L26	Lymphocyte as unit of immune system
29- L27	Stem cells
30- P2	College level meeting/Cell function
31-L28	Structure and lineage - T cells
32-L29	Structure and lineage - B cells & Macrophages.
33-L30	Humoral immune response
34- L31	Primary & secondary responses
35- L32	B cell activation.
36- L33	Cell - Mediated immune response.
37- L34	Type of T cells
38- L35	Functions of T cells
39- L36	Tumour immunology.
40- L37	Introduction : Microbiology
41- L38	History of microbiology
42-P3	Department Seminar
43- L39	Scope of microbiology
44- L40	General structure of microbes -Bacteria
45- L41	General structure of microbes -Virus.
46- L42	Bacterial growth : Culture media
47- L43	Bacterial growth :Selective media - Allotting portion for Internal Test-II

	Internal Test II begins
48- L44	Continuous & batch culture techniques
49-IT-II	Internal Test-II
50-L45	Bacterial growth :Growth curve
51- L46	Food microbiology - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Food poisoning
53- L48	Food spoilage & preservation.
54- L49	Industrial microbiology
55- L50	Production of Antibiotic penicillin
56- L51	Soil microbiology
57- L52	Role of soil microbes in N ₂ fixation
58- L53	Medical microbiology
59-P4	College level meeting/ function
60- L54	Diseases caused by bacteria in different systems of man - Dermal
61- L55	Diseases caused by bacteria in different systems of man – Streptococcal inflammation
62- L56	Diseases caused by bacteria in different systems of man - Tuberculosis
63- L57	Gastro-intestinal-dysentery:
64- L58	Reproductive – Gonorrhoea- Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Viral diseases with reference to causative organisms, symptoms,
66- L60	Impact on the host & control measures, AIDS , Rabies, Chicken pox, Measles, Influenza & polio.
67-IT-III	Internal Test-III
68- L61	Revision of I & II units
69- L62	Revision of III & IV units
70- L63	Revision of Unit V - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
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 “<IMMUNOLOGY & MICROBIOLOGY>”
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CO1	The students will be able to identify the cellular and molecular basis of immune responsiveness.
CO2	The students will be able to describe the roles of the immune system in both maintaining health and contributing to disease.
CO3	The students will be able to describe immunological response and how it is triggered and regulated.
CO4	The students will be able to demonstrate a capacity for problem-solving about immune responsiveness.
CO5	The students will be able to transfer knowledge of immunology into clinical decision-making through case studies presented in class.
CO6	Understand the rationale in medium formulation & design for microbial fermentation, sterilization of medium and air
CO7	Discuss Microbial contamination/product spoilage and antimicrobial preservation of pharmaceutical formulations during production and in products
CO8	Understand various plant microbes interactions especially rhizosphere, phyllosphere and mycorrhizae and their applications especially the biofertilizers and their production techniques
CO9	Discuss the biosynthesis and the degradation pathways involved.
Experimental Learning	
EL1	Knowledge of the structure and function of the major organ systems, including the molecular, biochemical and cellular mechanisms for maintaining homeostasis
EL2	Knowledge of the pathogenesis of diseases, interventions for effective treatment, and mechanisms of health maintenance to prevent disease
EL3	A commitment to lifelong learning and independently seeking new knowledge and skills in their own recognized areas of learning deficit
EL4	Demonstrate a knowledge and understanding of microbiological assays of growth promoting and growth inhibiting substances.
Integrated Activity	
IA1	Provide students with in-depth training on the conduct and management of research from inception to completion using a wide range of techniques.
IA2	Enable students to acquire expertise in the use and application of the methods of data collection and analysis.

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Developmental Zoology
Course Code	SMZO22
Class	I year (2018-2019)
Semester	Even
Staff Name	P. Augustus Robince
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem	
Internal Test-3 Hrs	
Model Test-3 Hrs	
Dept. Meetings-2 Hrs	
College Meetings-2 Hrs	
Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To understand the sequential changes from cellular grade of organization to organ grade of organization in the development of multicellular organisms.
- To study the hormonal control of development
- To know the mechanism of regeneration in lower animals

Syllabus

UNIT I Definition and Scope of Developmental Zoology – Gametogenesis – Spermatogenesis – Oogenesis – Vitellogenesis – Structure of Sperm and Egg in Chick. Fertilization: Pre and Post fertilization events – significance; Parthenogenesis.

UNIT II Cleavage in chick – Fate map of Chick – Gastrulation in Chick – Chick Embryo 48, 72 Hrs. Manipulations of reproduction in Human: Infertility (male and female) – IUI - Invitro fertilization – Artificial insemination - Test tube babies – Amniocentosis.

UNIT III Organogenesis : Development of brain and heart in chick. Organizer : Primary and secondary organizers. Morphogenic fields and gradient hypothesis.

UNIT IV Hormonal control of Amphibian metamorphosis. Extra-embryonic membranes in chick – Development, Types and Physiology. Placenta in Mammals – Types and Physiology.

UNIT V Nuclear Transplantation in Acetabularia - Regeneration – Types – Regeneration in Amphibians – Regeneration in Planaria. Birth control : Contraceptive devices: Surgical method – Hormonal methods – Physical barriers – IUCD

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 03.12.2018
1-L1	UNIT I Definition and Scope of Developmental Zoology.
2-L2	Gametogenesis.
3- L3	Spermatogenesis.
4-L4	Oogenesis.
5-L5	Vitellogenesis.
6-L6	Structure of Sperm and Egg in Chick.
7-L7	Fertilization: Pre and Post fertilization events .
8- P1	Welcoming of First year and Inauguration of Mathematics Association
9- L8	significance; Parthenogenesis.
10- L9	UNIT II Cleavage in chick.
11-L10	Fate map of Chick.

12-L11	Gastrulation in Chick.
13-L12	Chick Embryo 48, 72 Hrs.
14-L13	Manipulations of reproduction in Human: Infertility (male and female).
15-L14	____ - Allotting portion for Internal Test-I
	Internal Test I begins on 18.01.2019
16-L15	IUI - Invitro fertilization.
17-IT-1	Internal Test-I
18-L16	Artificial insemination.
19-L17	____ - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Test tube babies.
21- L19	Amniocentosis.
22- P2	College level meeting/Cell function
23-L20	UNIT III Organogenesis : Development of brain in chick.
24-L21	Development of heart in chick.
25-L22	Organizer : Primary.
26-L23	secondary organizers.
27-L24	Morphogentic fields.
28-L25	gradient hypothesis.
29-L26	UNIT IV Hormonal control of Amphibian metamorphosis.
30-L27	Extra-embryonic membranes in chick.
31-L28	Development.
32-L29	Types.
33-L30	Physiology.
34- P3	Department Seminar
35-L31	Placenta in Mammals.

36-L32	____ - Allotting portion for Internal Test-II
	Internal Test II begins on 25.02.2019
37- L33	Types and Physiology.
38- IT-II	Internal Test-II
39-L34	UNIT V Nuclear Transplantation in Acetabularia.
40-L35	____ - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Regeneration.
42- L37	Types.
43- L38	Regeneration in Amphibians.
44- P4	College level meeting/ function
45-L39	Regeneration in Planaria.
46-L40	Birth control.
47-L41	Contraceptive devices.
48-L42	Surgical method.
49-L43	Hormonal methods.
50-L44	____ - Allotting portion for Internal Test-III
	Internal Test III begins on 22.03.2019
51 L45	Physical barriers.
52- L46	Contraceptive devices.
53-IT-III	Internal Test-III
54-L47	IUCD.
55-L48	____ - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
56- MT	Model Test begins on 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 "Developmental Zoology"
CO1	Explain gametogenesis and parthenogenesis
CO2	Draw fate map in chick
CO3	Describe Birth control Methods
CO4	Explain the methodology of invitro fertilization
CO5	Illustrate the importance of Organizer
CO6	Explain the Nuclear transplantation
CO7	Differentiate invitro and in vivo fertilizations
CO8	Draw the structure of Sperm and ovum
CO9	Describe the development of Brain
Experimental Learning	
EL1	Observe the developmental stages in chick
EL2	Categorize birth control Methods
EL3	GD on IUDS
EL4	Collect eggs of different species of birds
Integrated Activity	
IA1	Prepare a model of sperm
IA2	Draw a flow chart of the methodology of the production of test tube

	babies
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- # 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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology (2018-2019)
Course Name	Ecology and toxicology
Course Code	SMZO22
Class	1 year
Semester	EVEN (December 2018-May 2019)
Staff Name	D.V.SHEEBA RAJAKUMARI.
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; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To study the interaction and interdependence among environmental factors and living organisms
- To enumerate the ill- effects and the health hazards of toxic agents released to the environment
- To discern the evolutionary significance of animals, theories origin of species and significance

Syllabus

UNIT I

- i. **Abiotic factors** : Biological Effect of temperature and light.
- ii. **Biotic factors**: Producer, Consumers and Decomposers.
- iii. **Ecosystem**: Pond,Forest

UNIT II

- i. Food chain, Food web, Trophic levels, Energy flow, Ecological Pyramids
- ii. Animal Relationships: Mutualism, Commensalism, Antagonism (Antibiosis, Parasitism, Predation and Competition)

UNIT III

Population Ecology: Definition – Density – Natality – Mortality – Age – Distribution – Age pyramids –Population growth – Population fluctuations – Regulation of Population density - Animal Dispersion.

Community Ecology: Definition - Community stratification-Periodicity – Community interdependence – Ecotone - Edge effect- Ecological niche- Concept of community –Ecological Succession.

Adaptation:

- ☐ Desert Adaptation
- ☐ Cave Adaptation

UNIT IV

Wild life Conservation: Definition- Endangered Species – Causes for Depletion, Necessity for conservation – Methods of conservation – Sanctuaries – National Parks.

Remote sensing: Its application in agriculture, Fisheries, Forest management and Flood Management.

Urbanization: Reasons for urbanization, Urban problems, Methods to control urban growth.

UNIT V

Introduction to Toxicology, Definition, Outline classification of Toxicant. Toxic agents and mode of action of Pesticides, metals, solvents, carcinogens, poisons Environmental toxicology and public health.

Course Calendar

Hour allotment	Class Schedule
	EVEN Semester Begin on 03.12.2018
1-L1	Syllabus discussion
2-L2	A biotic factors
3- L3	Biological effect of temperature
4-L4	Biological effect of light
5-L5	Biotic factors –producer and consumers and decomposters
6-L6	Eco system
7-L7	Pond eco system
8- P1	Welcoming of First year and Inauguration of zoology Association
9- L8	Forest eco system
10- L9	Food chain
11-L10	Food web
12-L11	Trophic levels
13-L12	Energyflow
14-L13	Ecological pyramids
15-L14	Allotting portion for Internal Test-I
	Internal Test I begins(18.01.2019)
16-L15	Animal relationship-mutualism, commensalism
17-IT-1	Internal Test-I
18-L16	Antagonism –antibiosis ,parasitism
19-L17	Test Paper distribution and result analysis

	Entering Internal Test-I Marks into University portal
20-L18	Antagonism- predation,competition
21- L19	Population ecology-definition –density
22- P2	College level meeting/Cell function
23-L20	Natality-mortality
24-L21	Age-distribution-age pyramids
25-L22	Population growth-population fluctuation
26-L23	Regulation of population density-animal density
27-L24	Community ecology-definition-community stratification
28-L25	Periodicity-community interdependence
29-L26	Ecotone-edge effects-ecological niche
30-L27	Concept of community –ecological succession
31-L28	Adaptation: desert adaptation
32-L29	Cave adaptation
33-L30	Wild life conservation-definition
34- P3	Department Seminar
35-L31	Endangered species –causes for depletion
36-L32	Allotting portion for Internal Test-II
	Internal Test II begins(25.02.2019)
37- L33	Necessity for conservation
38- IT-II	Internal Test-II
39-L34	Methods of conservation-sanctuaries and national parks
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Remote sensing
42- L37	Urbanization
43- L38	Introduction to toxicology
44- P4	College level meeting/ function
45-L39	Definition ,out line classification of toxicant
46-L40	Toxic agent and mode of action of pesticides,metals
47-L41	Continue-solvents , carcinogens, poisons
48-L42	Environmental toxicology
49-L43	Public health
50-L44	Allotting portion for Internal Test-III
	Internal Test III begins(22.03.2019)
51 L45	Revision
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 (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

	CO1	Describe the history, introduction and nature of ecosystem
	CO2	Explain the biogeocycles and laws
	CO3	Describe population and community ecology
	CO4	Describe wild life conservation and management
Experimental Learning		
	EL1	Prepare model for Population growth
	EL2	Prepare model for periodicity
Integrated Activity		
	IA1	Prepare chart for Darwinism
	IA2	Prepare chart for Antagonism

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Poultry Science (Elective)
Course Code	JMZO5F
Class	III year (June 2018 to December 2018)
Semester	Odd
Staff Name	Dr. D. Paramanatha Swami Doss
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- To explore the scope of poultry science.
- To introduced various breeds of chicks, layers and broilers.
- To describe construction, maintenance of poultry keeping and also introduce the rearing and maintenance of poultry.
- To describe how to prevent and manage various diseases of poultry.
- To understand the role of egg in human nutrition.

Syllabus

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc. Zoology) / Semester – 5 / Elective 2

POULTRY SCIENCE

UNIT I:

Poultry industry in India – a brief introduction. Choosing a commercial laying stock –sexing in one day old chicks. Poultry housing – General principles of building poultry house. Deep litter system – Droppings pit – Feeders, Waterers – Nest boxes. Laying cages – Californian cages – Management of cage birds.

UNIT II:

Poultry manure – Volume, Composition and values. Nutritional content of eggs. Management of Chicks, Growers, Layers and Broilers. Lighting for Chicks, Growers, Layers and Broilers. Summer and winter management. Debeaking –Forced moulting.

Unit III:

Poultry nutrition: Protein and Amino acid requirements for chicks, growers, layers and broilers – Symptoms of excessive dietary levels and deficiency. Carbohydrates and Fat requirements for Chicks, Growers, Layers and Broilers– Symptoms of excessive dietary levels and deficiency. Fiber requirement for poultry feeds. Requirements of vitamins and inorganic minerals for Chicks, Growers and Layers – Deficiency Symptoms.

UNIT IV:

Importance of feed additives in a poultry feed. Preparation of supplementary feed for poultry- South Indian feed ingredients in relation to M.E level, Protein level, Amino acid, Minerals (Calcium and Phosphorus) and Fiber content.

UNIT V:

Poultry diseases – Causes, Symptoms, Transmission, Treatment, Prevention and Control of the following diseases: Viral diseases - Ranikhit disease, Fowl pox, Infection and control bronchitis and Gumboro disease. Bacterial disease – Fowl typhoid, Paratyphoid, Pullorum, fowl cholera, Coryza and Mycoplasmosis. Fungal diseases – Aspergillosis and Aflatoxicosis. Parasitic disease- Coccidiosis. Nematode infections. Tape worm infections. External parasites of chicks – Ticks, mites and lice.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2018
1-L1	Unit I: Introduction
2-L2	Poultry industry in India – a brief introduction - development of poultry in India – Five year plan.
3- L3	Choosing a commercial laying stock - Characteristics of different races – selection criteria.
4-L4	Sexing in one day old chicks – Vent sexing – Feather sexing – Advantages and Disadvantages.
5-L5	Poultry housing – Selection of site – Do's and Don't's.
6-L6	Layout of Broiler farm
7-L7	Layout of Layer farm - all in out – continuous farming.
8- P1	Welcoming of First year and Inauguration of Zoology Association
9- L8	Deep litter system – Litter materials – maintenance litter – advantages and disadvantages.
10- L9	Dropping pit -
11-L10	Feeders, Waterers: Tube feeder, Basin feeder, Chain feeder, Automatic feeder.

	Basin waterer, Nipple drinkers.
12-L11	Nest boxes – location – Size.
13-L12	Laying cages – Californian cages – Construction – M type cage
14-L13	Management of cage birds – Methods, Precautions, Advantages and disadvantages.
15-L14	Unit II: Poultry manure – Volume, Composition and values
16-L15	Nutritional content of eggs.
17- L16	General management for Chicks.
18- L17	General management for growers.
19- L18	General management for Layers.
20- L19	General management for Broilers.
21- L20	Lighting – importance Allotting portion for Internal Test-I
	Internal Test I begins
22- L21	Lighting for Chicks – Chick Guard – Duration – Effect of Chill – Lighting equipment.
23- IT-1	Internal Test-I (30.07.2018)
24- L22	Lighting for Growers – duration – effect of light for reproduction.
25- L23	Lighting for Layers and Broilers.
26- L24	Summer and winter management Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Debeaking – Need – Prevention of peck order – Debeaker – methods – Schedule of debeaking.
28- L26	Force moulting – advantages – Cycle (one and three per year) feeding grit – moulting agents.
29- L27	Unit III: Poultry nutrition - Introduction
30- P2	College level meeting/Cell function
31-L28	Protein and Amino acid requirements for chicks, growers.
32-L29	Protein and Amino acid requirements for layers and broilers.
33-L30	Symptoms of excessive dietary levels and deficiency.
34- L31	Carbohydrates and Fat requirements for Chicks and Growers.
35- L32	Carbohydrates and Fat requirements for Layers and Broilers.
36- L33	Symptoms of excessive dietary levels and deficiency.
37- L34	Fiber requirement for chicks, growers, layers and broiler feeds.
38- L35	Requirements of inorganic minerals – calcium, phosphorous, iron, copper, sodium and potassium for Chicks – Deficiency Diseases and Symptoms.
39- L36	Requirements of inorganic minerals – calcium, phosphorous, iron, copper, sodium and potassium for Growers and Layers – Deficiency Diseases and Symptoms.
40- L37	Requirements of vitamin A, K, D, E, Riboflavin, Pantothenic acid, B12 for Chicks - Deficiency Diseases and Symptoms.
41- L38	Requirements of vitamin A, K, D, E, Riboflavin, Pantothenic acid, B12 for Growers and Layers – Deficiency Diseases and Symptoms.
42-P3	Department Seminar
43- L39	Unit IV: Importance of feed additives in a poultry feed.
44- L40	Preparation of supplementary feed for poultry – Requirement – FCR – Supplementary food for chicks and growers.
45- L41	Preparation of supplementary feed for poultry – Requirement – FCR

	Supplementary food for layers and broilers.
46- L42	South Indian feed ingredients in relation to M.E level
47- L43	Allotting portion for Internal Test-II
	Internal Test II begins
48- L44	South Indian feed ingredients in relation to Protein level, Amino acid.
49-IT-II	Internal Test-II (03.09.2018)
50-L45	South Indian feed ingredients in relation to Minerals (Calcium and Phosphorus)
51- L46	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	South Indian feed ingredients in relation to Fiber content
53- L48	Revision and Group Discussion.
54- L49	Unit V: Introduction about Disease management.
55- L50	Causes, Symptoms, Transmission, Treatment, Prevention and Control of the Viral diseases - Ranikhit disease and Fowl pox.
56- L51	Poultry farm visit.
57- L52	District Livestock Farm visit
58- L53	Causes, Symptoms, Transmission, Treatment, Prevention and Control of the Viral diseases - Infection and control bronchitis and Gumboro disease.
59-P4	College level meeting/ function
60- L54	Causes, Symptoms, Transmission, Treatment, Prevention and Control of the Bacterial disease – Fowl typhoid, Paratyphoid, Pullorum,
61- L55	Causes, Symptoms, Transmission, Treatment, Prevention and Control of the Bacterial disease - fowl cholera, Coryza and Mycoplasmosis.
62- L56	Causes, Symptoms, Transmission, Treatment, Prevention and Control of the Fungal diseases – Aspergillosis and Aflatoxicosis.
63- L57	Causes, Symptoms, Transmission, Treatment, Prevention and Control of the Parasitic disease- Coccidiosis.
64- L58	Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Causes, Symptoms, Transmission, Treatment, Prevention and Control of the Nematode infections. Tape worm infections.
66- L60	Causes, Symptoms, Transmission, Treatment, Prevention and Control of the External parasites of chicks – Ticks, mites and lice.
67-IT-III	Internal Test-III (08.10.2018)
68- L61	Materials require to formulate to control external parasites – tetrachlorvinphos, carbaryl, etc.
69- L62	Revision and Group discussion.
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 23.11.2018

Course Outcomes

Learning Outcomes	COs of the course “POULTRY SCIENCE”
CO1	Gains knowledge about scope of poultry sciences
CO2	Students can get self-employed after their graduation.
CO3	Describe how to sexing the day old chicks.
CO4	Illustrate the management of broilers and layers.
CO5	Gains knowledge about the practical aspects of chick rearing.
CO6	Understand the role of nutrition for successful poultry farming.
Experimental Learning	
EL1	Field visit to local boiler farm.
EL2	Visit to layer farm.
EL3	Field visit to district livestock farm.
EL4	Visit to hatchery unit
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

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Department of Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology (2018-2019)
Course Name	AQUACULTURE
Course Code	PZOE43
Class	2 year
Semester	EVEN (December 2018- May 2019)
Staff Name	D.V.SHEEBA RAJAKUMARI.
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 promote , facilitate and influence the best possible standards of fisheries management.
- To provide the technical and general knowledge necessary for component fisheries management
- The basic ideas were studied at UG level detailed study are carried in the present course

Syllabus

Unit I : Aquaculture: history, definition, scope & importance, fishery resources of India in general & Tamil Nadu in particular, a biotic and biotic factors of water necessary for fish life, ecological characteristics of lakes & rivers, general ecological characteristics of reservoirs of India.

Unit II : Fish culture: mono, poly, mixed & composite fish culture, fresh water and marine prawn culture and its prospects in India, culture of mussels, clams, oysters and pearl culture, sewage fed fish culture, paddy cum fish culture, frog culture, sea weed culture.

Unit III : Fish breeding in natural conditions, bundh breeding, hypophysation & stripping, transport of live fish and seed, different types of crafts and gears used for fish catching, plankton – its definition, culture & identification, common weeds of fish ponds& methods of their eradication,

production of mono sex and sterile fishes, transgenic fishes, hybridization , polyploidy , role of bio technology in conservation of fishes.

Unit IV : Fresh water fish farm: selection of site, construction of fish farm and soil chemistry, designing layout and construction of different types of fish ponds, setting and management of fresh water aquarium, preservation and processing of fish, fish by products industry and their utility.

Unit V : Water pollution, its effects on fisheries and methods of its abatement, common fish diseases (bacterial, viral, fungal and nutritional deficiency diseases), biochemical composition and nutritional value of fish, fisheries economics and marketing, fisheries managements and extension.

Reference Books (latest editions):

1. T.V.R.Pillay & Dill: Advances in Aquaculture
2. Agarwal & S.C.Narendra: A Hand Book of Fish Farming
3. R.K.Rath: Fresh water Aquaculture
4. Schonder: Hypophysation in Indian Major Carp
5. C.B.Hall: Ponds & Fish Culture
6. C.B.L.Srivastava: Fishes of India
7. Jhingaran: Fish and Fisheries of India

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 03.12.2018
1-L1	Syllabus discussion
2-L2	Introduction to aquaculture
3- L3	History and definition of aquaculture
4-L4	Scope and important of aquaculture
5-L5	Fishery resources of india in general and tamilnadu in particular
6-L6	Abiotic and biotic factors of water necessary for fish life
7-L7	Ecological characteristics of lakes and rivers
8- P1	Welcoming of First year and Inauguration of zoology Association
9- L8	General characteristics of reservoirs of india
10- L9	Fish culture-mono and poly culature
11-L10	Mixed and composite fish culture
12-L11	Fresh water and marine prawn culture and it prospects in india
13-L12	Culture of mussels, clams
14-L13	Oysters and pearls culture
15-L14	Oysters and pearls culture - Allotting portion for Internal Test-I
	Internal Test I begins(18.01.2019)
16-L15	Sewage fed fish culture ,paddy cum fish culture
17-IT-1	Internal Test-I
18-L16	Frog culture, sea weed culture
19-L17	sea weed culture - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Fish breeding in natural conditions , bundh breeding

21- L19	Hypophysation and stripping
22- P2	College level meeting/Cell function
23-L20	Transport of live fish and seed
24-L21	Different types of crafts and gears used for fish catching
25-L22	Plankton –its definition ,culture and identification
26-L23	Common weeds of fish ponds and methods of their eradication
27-L24	Production of monosex and sterile fish , transgenic fishes
28-L25	Hybridization,polyploidy,role of biotechnology in conservation of fishes
29-L26	Freshwater fish farm: selection of site,construction of fish farm and soil chemistry
30-L27	Continue-designing layout and construction of different types of fish ponds
31-L28	Setting and management of fresh water aquarium
32-L29	Preservation and processing of fish
33-L30	Fish by products industry and their utility
34- P3	Department Seminar
35-L31	Water pollution,
36-L32	Water pollution - Allotting portion for Internal Test-II
	Internal Test II begins(25.02.2019)
37- L33	Continue –its effects on fisheries and methods of its abatement
38- IT-II	Internal Test-II
39-L34	Common fish diseases – bacterial , viral
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Fungal and nutritional deficiency diseases
42- L37	Biochemical composition of fish
43- L38	Nutritional value of fish
44- P4	College level meeting/ function
45-L39	Fisheries economic
46-L40	Fisheries marketing
47-L41	Fisheries management
48-L42	Fisheries extension
49-L43	Revesion
50-L44	Allotting portion for Internal Test-III
	Internal Test III begins(22.03.2019)
51 L45	Revesion
52- L46	Revesion
53-IT-III	Internal Test-III
54-L47	Revesion
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
CO1	Basic understanding of agriculture and aquaculture and fisheries
CO2	Skills as fisheries biologist
CO3	Social outlook on pros and cons of aquaculture industry
CO4	Computer and communication based skills in aquaculture
CO5	Basics of animal biology and fish taxonomy
CO6	Types of food and feeding strategies in finfishes and shellfishes
CO7	Pond fertilization and biological food production
Experimental Learning	
EL1	To do working models to explain frog culture
EL2	To do working models to explain sea weed culture

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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Staff Signature

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St. John's College, Palayamkottai

Department of Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	Bio Chemistry.
Course Code	PZOM11
Class	I year (2017-2018)
Semester	Odd.
Staff Name	P. Augustus Robince
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- To study the Structure of an atom, molecule-chemical bonds.
- To identify the structural elements of proteins, the basic features of enzyme catalysis and regulation.
- To understand the metabolic processes by which energy is produced in cells and amino acids, lipids, purines and carbohydrates are synthesized
- To be able to describe the roles of vitamins in metabolic processes and enzyme activity.

Syllabus

Unit 1

Atom and molecules : Structure of an atom, molecule-chemical bonds-water and electrolytic dissociation-pH-acid-base balance-Henderson and Hasselbalch equation-acidosis and alkalosis, Buffers-physiological buffers• thermodynamic laws.

Unit II

Carbohydrates and metabolism : Classification, structure, properties, function and reactions-metabolism - glycolysis, Kreb's cycle, electron transport and oxidative phosphorylation, oxidative shunt, glycogenolysis, glycogenesis and gluconeogenesis - regulation of blood sugar-glycosuria• glucose tolerance test-diabetes.

Unit III

Proteins and metabolism : Classification, structure, properties, functions and reactions, aminoacids-classification, structure, properties, functions and reactions aminoacid separation - paper chromatography-metabolism of protein-metabolism of tryptophan, phenylalanine, tyrosine- and haemoglobin.

Unit IV

Lipids and metabolism: Classification, structure, properties, functions and reactions of fatty acids, triglycerides, sterols, phospholipids and prostaglandins-metabolism-P-oxidation of different types of fatty acids. Ketogenesis-Biosynthesis of fatty acids, tryglycerides and phospholipids-role of liver in fat metabolism- metabolism of cholesterol.

Unit V

Enzymes and vitamins: Enzymes and coenzymes –classifications, functions, mechanism of enzyme action, factors influencing the enzyme action – isoenzymes, allosteric enzymes-Enzyme inhibition – vitamin types, physiological role, deficiency and its role on metabolism.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 16.06.2017
1-L1	Unit I Atom and molecules : Structure of an atom.
2-L2	molecule-chemical bonds.
3- L3	water and electrolytic dissociation.
4-L4	pH-acid-base balance.
5-L5	Henderson Equation.
6-L6	Hasselbalch equation.
7-L7	Acidosis.
8- P1	Welcoming of First year and Inauguration of Mathematics Association
9- L8	Alkalosis.
10- L9	Buffers-physiological buffers.
11-L10	thermodynamic laws.
12-L11	Unit II Carbohydrates and metabolism : Classification.
13-L12	Structure.
14-L13	Properties.
15-L14	Function.
16-L15	reactions-metabolism.
17- L16	Glycolysis.
18- L17	Kreb's cycle.
19- L18	electron transport.
20- L19	oxidative phosphorylation.
21- L20	_____ - Allotting portion for Internal Test-I

	Internal Test I begins on 31.07.2017
22- L21	oxidative shunt.
23- IT-1	Internal Test-I
24- L22	Glycogenolysis.
25- L23	glycogenesis and gluconeogenesis.
26- L24	_____ - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	regulation of blood sugar-glycosuria.
28- L26	glucose tolerance test-diabetes
29- L27	Unit III Proteins and metabolism : Classification.
30- P2	College level meeting/Cell function
31-L28	Structure.
32-L29	Properties.
33-L30	functions and reactions.
34- L31	Arminoacid.
35- L32	classification, structure.
36- L33	Properties.
37- L34	functions and reactions.
38- L35	aminoacid separation.
39- L36	paper chromatography.
40- L37	metabolism of protein.
41- L38	metabolism of tryptophan.
42-P3	Department Seminar

43- L39	Phenylalanine.
44- L40	tyrosine- and haemoglobin.
45- L41	
46- L42	Unit IV Lipids and metabolism: Classification.
47- L43	_____ - Allotting portion for Internal Test-II
	Internal Test II begins on 30.08.2017
48- L44	Structure.
49-IT-II	Internal Test-II
50-L45	Properties.
51- L46	_____ - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	functions and reactions of fatty acids.
53- L48	triglycerides, sterols.
54- L49	phospholipids and prostaglandins-metabolism.
55- L50	-P-oxidation of different types of fatty acids.
56- L51	Ketogenesis-Biosynthesis of fatty acids.
57- L52	tryglycerides and phospholipids.
58- L53	role of liver in fat metabolism.
59-P4	College level meeting/ function
60- L54	metabolism of cholesterol.
61- L55	Unit V Enzymes and vitamins: Enzymes and coenzymes.
62- L56	classifications, functions.
63- L57	mechanism of enzyme action.

64- L58	_____ - Allotting portion for Internal Test-III
	Internal Test III begins on 03.10.2017
65- L59	factors influencing the enzyme action.
66- L60	Isoenzymes.
67-IT-III	Internal Test-III
68- L61	allosteric enzymes-Enzyme inhibition – vitamin types.
69- L62	physiological role, deficiency and its role on metabolism.
70- L63	_____ - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
71-MT	Model Test begins 19.10.2017
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 06.11.2017

Course Outcomes

Learning Outcomes	COs of the course “Bio Chemistry”
CO1	Form a perspective of health and biology through the study of Biochemistry.
CO2	Familiar with basic structure of atoms and molecules
CO3	Learn the structure and functions of bio-molecules and their role in metabolism.

CO4	Learn mechanism of enzyme action and other related information.
CO5	Studied the Structure and functions of carbohydrates in metabolism
CO6	Learn the Mechanism of enzyme action
CO7	Describe the pathway of energy production
CO8	Studied the importance of neurotransmitters
CO9	Understand the important source and role of vitamins in metabolism
Experimental Learning	
EL1	To do models of Atoms
EL2	Categorize major food materials
EL3	Collect different vitamin sources
EL4	GD on food Materials
Integrated Activity	
IA1	To do models of Atoms
IA2	Collection of details of diseases caused by metabolic disorders

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc .Zoology(2018-2019)
Course Name	BIOTECHNOLOGY
Course Code	PZOM32
Class	2 year
Semester	Odd(June 2018 to November 2018)
Staff Name	D.V.SHEEBA RAJAKUMARI
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 conservation of resources via the recycling of waste material and the recoveries of more valuable products

Syllabus

UNIT I : Genetic engineering

Gene cloning -the basic steps, types of restriction enzymes, ligases - linkers and adaptors, C DNA, selection of recombinants. Hybridization techniques, chemical synthesis of oligonucleotides, PCR and DNA sequencing techniques.

UNIT II : Gene cloning vectors

Cloning vector based on pBR322 and bacteriophage, cloning vector for yeast. Cloning vector for Agrobacterium tumefaciens, Simian virus 40. Gene transfer technology- Particle bombardment, micro injection techniques, electrophoresis, liposome fusion.

UNIT III : Animal Biotechnology

Cell culture : Organ culture, whole embryo culture, embryo transfer - in-vitro fertilization (IVF) technology. Dolly- in vitro fertilization and embryo transfer in human. Transgenic animals. Human gene therapy. Cryobiology.

UNIT IV : Microbial Biotechnology

Fermentation: Bioreactor. Microbial products: primary and secondary metabolites. Protein engineering. Bioremediation of hydrocarbons, industrial wastes and heavy metals. Single cell

protein, biopolymers, bio pesticides and bio fertilizers. Xenobiotics , bio-leaching, bio-mining and bio-fuel.

UNIT V : Medical Biotechnology

Drug development : production of pharmaceuticals by genetically engineered cells (hormones, interferons), microbial transformation for production of important pharmaceutical (steroids and semi-synthetic antibiotics), drug design and targeting. Diagnostic kit development for micro analysis.

Reference books:

Satyanarayana, U.2007. Biotechnology. Uppala author-publisher interlinks,Vijayawada, Andhra Pradesh, India. Old,R.W and Primrose, S.B.1993.Principles of Gene manipulation: An introduction to Genetic Engineering.Blackwell Science Publication. Ignacimuthu, S.2008. Biotechnology: An introduction, Narosa Publishing house, New Delhi. Purohit, S.S.2008. Biotechnology. Student Edition, Jodhpur. Lee and Savage, L.M. Biological Molecules in Nanotechnology. Biological Molecules in Nanotechnology – By Ratner M and Ratner D – Nerosha Publishing house, New Delhi.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2019
1-L1	Syllabus discussion
2-L2	Gene cloning- introduction
3-L3	The basic steps of gene cloning
4-L4	Types of restriction enzymes
5-L5	Ligases
6-L6	Linkers and adaptors
7-L7	C DNA
8-L8	Selection of recombinants
9-L9	Hybridization techniques
10-P1	Welcoming of First year and Inauguration of zoology Association
11-L10	Chemical synthesis of oligo nucleotides
12-L11	PCR
13-L12	DNA sequencing techniques
14-L13	Gene cloning vectors introduction
15-L14	cloning vectors based on PBR 322
16-L15	Bacteriophage
17-L16	Cloning vector for yeast
18-L17	Cloning vector for agrobacterium tumefaciens
19-L18	Simian virus 40
20-L19	Gene transfer technology
21-L20	Particle bombardment
22-L21	Micro injection -techniques
23-L22	Micro injection -techniques - Allotting portion for Internal Test-I

	Internal Test I begins(30.07.2018)
24-L23	Electrophoresis
25-L24	Liposome fusion
26-IT-1	Internal Test-I
27-L25	Cell culture- introduction
28-L26	Organ culture
29-L27	Whole embryo culture
30-L28	Whole embryo culture - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
31- L29	embryo transfer- IVF
32- L30	Dolly-IVF
33- L31	Embryo transfer in human
34-P2	College level meeting/Cell function
35- L32	Transgenic animals
36- L33	Transgenic animals
37- L34	Human gene therapy
38- L35	Cryobiology
39- L36	Fermentation
40- L37	Bio reactor
41- L38	Microbial products-primary metabolites
42- L39	Secondary metabolites
43- L40	Protein engineering
44- L41	Bio remediation of hydro carbons
45- L42	Bio remediation of industrial waste
46- L43	Bio remediation of heavy metals
47- L44	Single cell proteins
48- L45	Bio polymers
49- L46	Bio pesticides
50- L47	Bio fertilizers
51- P3	Department Seminar
52- L48	Xenobiotics
53- L49	Bio leaching
54- L50	Bio mining
55- L51	Bio fuel
56-L52	Bio fuel - Allotting portion for Internal Test-II
	Internal Test II begins(03.09.2018)
57-L53	Drug development- introduction
58-L54	Production of pharmaceuticals by genetically engineered cells-hormones
59-IT-II	Internal Test-II
60- L55	Continue- interferons
61- L56	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
62- L57	Microbial transformation for production important pharmaceuticals –steroids
63- L58	Continue- semi synthetic anti biotics
64- L59	Drug designing
65- L60	Drug targeting
66- L61	Diagnostic kit development for micro analysis
67- L62	Continue the topic

68- L63	Revision
69- L64	Revision
70- L65	Revision
71- L66	Revision
72- L67	revision
73- L68	Revision
74-P4	College level meeting/ function
75- L69	Revision
76- L70	revision
77- L71	Revision
78- L72	Revision
79- L73	Allotting portion for Internal Test-III
	Internal Test III begins(08.10.2018)
80- L74	Revision
81- L75	Revision
82-IT-III	Internal Test-III
83- L76	Revision
84- L77	Test Paper distribution and result analysis
85- L78	Revision
	Entering Internal Test-III Marks into University portal
86- L79	Model Test(22.10.2018)
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 23.11.2018

Course Outcomes

Learning Outcomes	COs of the course
CO1	Familiarization with biological database
CO2	Principles and procedure on genetic selection of fish
CO3	Biotechnological approach in genetic studies in fishes
CO4	Studies of new techniques of gene manipulation
CO5	Knowledge on biotechnological tools in aquaculture
CO6	Role of genetics in species identification
Experimental Learning	
EL1	To do working models to explain C DNA
Integrated Activity	
IA1	Prepare chart for bio mining
IA2	Prepare chart for bio fuel

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	BIostatistics AND BIOinformatics
Course Code	PZOM33
Class	II year (2018-2019)
Semester	Even
Staff Name	Dr.M.Rajakumari
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- To advance statistical science and its application..
- The role of biostatistics is an important one in designing studies and analysing data from research problems
- Computer study operate a variety of advanced spreadsheet, operating system and word processing function.

Syllabus

Unit 1 : Collection of Data : Primary and Secondary data –Methods of collecting primary data –sources of secondary data. **Sampling and Sample Designs** : Essentials of sampling –Methods of sampling –Random sampling methods –Non random sampling methods –Merits and Limitations of sampling. Classification and tabulation of data –Diagrammatic and graphic presentation of data. (10L)

Unit II : Measures of Central Tendency : Mean- Arithmetic mean –Weighted arithmetic mean – Median – Mode. **Measures of Dispersion** : Quartile deviation – Mean deviation – Standard deviation – Lorenz curve. **Skewness Moments and Kurtosis** : Measure of skewness –Absolute measure of skewness -Relative measure of skewness -Karl Pearson's coefficient of skewness- Bowley's coefficient of skewness. Moments. Measures of kurtosis. **Correlation analysis** : Types of Correlation –Methods of studying correlation Karl Pearson's coefficient of correlation –Regression Analysis –Regression line, Regression equations. (20L)

Unit III : Probability and Expected Value : Concepts of probability –Types of events - Theorems of probability - conditional probability –Bayes' Theorem. **Theoretical Distribution** : Binomial distribution -Poisson distribution - Normal distribution. **Statistical Inference** : Test of hypothesis -procedure of testing hypothesis. **Estimation** : Test of significance for large sample - Test of significance for small samples –Student's t- distribution. (15L)

Unit IV : Chi square test and a Goodness of fit –Yates correction F-Test and Analysis of Variance – one way classification and two way classification .Experimental design – Randomized block design –Latin squares – The Sign Test – A rank sum test (The Mann-Whitney U Test). (10L)

Unit V : Bioinformatics : Information Technology in Biology - Types of sequences used in bioinformatics – Application of Bioinformatics. **Biological Database** : Objectives –Properties of Database –database retrieval system –Symbols used in data base –Nomenclature of DNA sequences Nomenclature of protein sequences –NCBI .SWISS-PROT. **Data Base Similarity Search Tools** : BLAST –FASTA –Application of bioinformatics tools –Homology search tools –Protein functional analysis tools – Sequences analysis tools –Structural analysis tools - Molecular modeling and visualizing tools - Polygenetic analysis tools . (20L)

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 03.12.2018
1-L1	Primary and Secondary Data
2-L2	Methods of collecting primary data
3- L3	Sources of secondary data.
4-L4	Essentials of sampling
5-L5	Methods of sampling
6-L6	Random sampling methods
7-L7	Non random sampling methods
8- P1	Zoology Association activities
9- L8	Merits and Limitations of sampling
10- L9	Classification and tabulation of data
11-L10	Diagrammatic presentation of data.
12-L11	Graphic presentation of data.
13-L12	Measures of Central Tendency : Mean
14-L13	Arithmetic mean –Weighted arithmetic mean
15-L14	Median – Mode
16-L15	Measures of Dispersion : Quartile deviation
17- L16	Mean deviation
18- L17	Standard deviation – Lorenz curve
19- L18	Skewness Moments and Kurtosis
20- L19	Measure of skewness
21- L20	Absolute measure of skewness - Allotting portion for Internal Test-I
	Internal Test I begins
22- L21	Relative measure of skewness
23- IT-1	Internal Test-I
24- L22	Karl Pearson's coefficient of skewness
25- L23	Bowley's coefficient of skewness.
26- L24	Moments. Measures of kurtosis - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Correlation analysis : Types of Correlation
28- L26	Methods of studying correlation
29- L27	Karl Pearson's coefficient of correlation
30- P2	College level meeting/Cell function
31-L28	Regression Analysis
32-L29	Regression line
33-L30	Regression equation
34- L31	Probability and Expected Value
35- L32	Concepts of probability
36- L33	Types of events
37- L34	Theorems of probability
38- L35	Conditional probability –Bayes' Theorem
39- L36	Theoretical Distributio
40- L37	Binomial distribution -Poisson distribution
41- L38	Normal distribution

42-P3	Department Seminar
43- L39	Statistical Inference
44- L40	Test of hypothesis -procedure of testing hypothesis.
45- L41	Estimation : Test of significance for large sample
46- L42	Test of significance for small samples
47- L43	Student's t- distribution. - Allotting portion for Internal Test-II
	Internal Test II begins
48- L44	Chi square test and a Goodness of fit
49-IT-II	Internal Test-II
50-L45	Yates correction F-Test and Analysis of Variance
51- L46	One way classification - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Two way classification
53- L48	.Experimental design – Randomized block design –Latin squares
54- L49	The Sign Test
55- L50	A rank sum test (The Mann-Whitney U Test).
56- L51	Information Technology in Biology
57- L52	Types of sequences used in bioinformatics
58- L53	Application of Bioinformatics.
59-P4	College level meeting/ function
60- L54	Biological Database : Objectives –Properties of Database –database retrieval system
61- L55	Symbols used in data base
62- L56	Nomenclature of DNA sequences - Nomenclature of protein sequences
63- L57	Application of bioinformatics tools –Homology search tools –Protein functional analysis tools
64- L58	NCBI .SWISS-PROT. Data Base Similarity Search Tools : BLAST –FASTA - Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Sequences analysis tools –Structural analysis tools
66- L60	Molecular modeling and visualizing tools –Polygenetic analysis tools .
67-IT-III	Internal Test-III
68- L61	Revision of Unit I & II
69- L62	Revision of Units III & IV
70- L63	Revision of Unit V - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
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 23.04.2019

Course Outcomes

Learning Outcomes	COs of the course “<BIOSTATISTICS & BIOINFORMATICS>”
CO1	Recognize the importance of data collection and its role in determining scope of inference.
CO2	Demonstrate a solid understanding of interval estimation and hypothesis testing.
CO3	Choose and apply appropriate statistical methods for analyzing one or two variables.
CO4	Use technology to perform descriptive and inferential data analysis for one or two variables.
CO5	Interpret statistical results correctly, effectively, and in context.
CO6	Understand and critique data-based claims.
CO7	collect data relating to variable/variables which will be examined and calculate descriptive statistics from these data.
CO8	knowledge and awareness of the basic principles and concepts of biology, computer science and mathematics
CO9	existing software effectively to extract information from large databases and to use this information in computer modeling
Experimental Learning	
EL1	Use technology to find the regression line for two quantitative variables, giving the equation and plotting the line on a scatterplot.
EL2	Calculate predicted values from a regression equation.
EL3	Check a scatterplot for obvious violations of the assumptions of simple linear regression.
EL4	Classify different types of Biological Databases.
Integrated Activity	
IA1	Use technology to generate a randomization distribution, and realize that it will be centered around the null parameter value.
IA2	Conduct a workshop on “BIOINFORMATICS”

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology (2018-2019)
Course Name	Cell and molecular biology
Course Code	PZOM12
Class	I year
Semester	Odd(June 2018-November 2018)
Staff Name	D.V.SHEEBA RAJAKUMARI.
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 provide with the core principles of molecular biology
- To gain higher level thinking skills
- To learn basic science and its applications

Syllabus

Unit I : Structure and functions of cell types – Prokaryotes, Eukaryotes. Plasma membrane structure of membrane, models. Membrane transport, membrane potentials – Extracellular space – cell adhesion, intercellular recognition – intercellular junctions. Mitochondria – ultrastructure – functions – energetic – cellular respiration – Biogenesis.

Unit II : Ultrastructure of Ribosomes, Endoplasmic reticulation and Golgi complex. Biosynthesis of secretory proteins on ribosomes and rough endoplasmic reticulum- post translational modifications of proteins both in the RER and SER. Golgi Complex- formation of disulfide bonds- glycosylation. Lysozyme – ultrastructure – enzymes– origin and functions of lysosome.

Unit III : Cell – Cell signaling – signaling mechanisms, signal molecules – signal receptors – form of intracellular signaling – cell surface receptors – signal transduction – pathways – signaling from plasma membrane to nucleus. Cell adhesion – calcium dependent hemophilic cell – cell adhesion – N-CAMs mediated calcium independent hemophilic cell – cell

adhesion. Cell matrix adhesion – cell matrix adhesion proteins – integrins – Hemidesmosomes – collagen and non-collagen components.

Unit IV : Nucleus – structure and function. Nucleo-cytoplasmic interaction, Nuclear transplantation. Cell fusion – homokaryons heterokaryons, cytoplasts, karyoplasts.

Unit V : Cell division – mitosis – molecular mechanisms for regulating mitotic events – cyclins and their kinases (cdks) – cell death and its regulation- Characteristics of cancer cells, causes and onset of cancer

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2018
1-L1	Structure and function of cell types –prokaryotes,eukaryotes
2-L2	Plasmamembrane-structure of membrane models
3- L3	Membrane transport
4-L4	Membrane potential ,extra cellular space- cell adhesion
5-L5	Intercellular recognition- intercellular junction
6-L6	Mitochondria – ultra structure and functions
7-L7	Energetic -cellular respiration- biogenesis
8- P1	Welcoming of First year and Inauguration of ZOOLOGY Association
9- L8	Ultra structure of ribosomes
10- L9	Ultra structure of endoplasmireticulum
11-L10	Ultra structure of golgi complex
12-L11	Biosynthesis of secretary proteins on ribosomes
13-L12	Biosynthesis of secretary protein on RER
14-L13	Golgicomplex-formation of disulphidebonds- glycosylation
15-L14	Allotting portion for Internal Test-I
	Internal Test I begins(30.07.2018)
16-L15	Lysozyme –ultra structure – enzymes –origin and functions of lysozyme
17-IT-1	Internal Test-I
18-L16	Cell –cell signalling-signaling mechanism
19-L17	- Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Signal molecules –signal receptor –form of intra cellular signaling
21- L19	Cell surface receptor
22- P2	College level meeting/Cell function
23-L20	Signal transduction –pathways
24-L21	Signalling from plasmamembrane to nucleus
25-L22	Cell adhesion –calcium dependent haemophilic cell –cell adhesion
26-L23	N –CAMs mediated calcium independent haemophilic cell-cell adhesion
27-L24	Cell matrix adhesion-cell matrix adhesion proteins -integrins
28-L25	Hemidesmosomes
29-L26	Collagen and non collagen components
30-L27	Nucleus- structure and function
31-L28	Nucleo cytoplasmic interaction

32-L29	Nuclear transplantation
33-L30	Cell fusion-homokaryons and heterokaryons
34- P3	Department Seminar
35-L31	Cytoplast
36-L32	Allotting portion for Internal Test-II
	Internal Test II begins(03.09.2018)
37- L33	Karyoplast
38- IT-II	Internal Test-II
39-L34	Cell division
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Mitosis
42- L37	Molecular mechanism for regulating mitotic events
43- L38	Cyclins and their kinases (cdks)
44- P4	College level meeting/ function
45-L39	Cell death
46-L40	Regulation of cell death
47-L41	Characteristic of cancer cell
48-L42	Causes of cancer
49-L43	Onset of cancer
50-L44	- Allotting portion for Internal Test-III
	Internal Test III begins(08.10.2018)
51 L45	Reversion
52- L46	Reversion
53-IT-III	Internal Test-III
54-L47	Reversion
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
CO1	Exhibit a knowledge base in genetics, cell and molecular biology and anatomy and physiology
CO2	Demonstrate the knowledge of common and advanced laboratory practices in cell and molecular biology.
CO3	Exhibit clear and concise communication of scientific data
CO4	Engage in review of scientific literature in the areas of biomedical sciences

CO5	Critique and professionally present primary literature articles in the general biomedical sciences field.
Experimental Learning	
EL1	To do working models to explain Genetic code
EL2	To do working models to explain Coding sequences

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	ENDOCRINOLOGY
Course Code	PZOM14
Class	I year (2018-2019)
Semester	Odd
Staff Name	Dr.M.Rajakumari
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- To study about Scope of Endocrinology
- To Discuss about Endocrine glands
- To learned about Hormones and reproduction : Ovary and Testis
- To study about Gastrointestinal hormones and its function
- To understand Hormones regulation on migration

Syllabus

Unit I : Scope of Endocrinology – Hormones – Chemical structure – Synthesis –

classification – Characteristic features of hormones –General and principles of hormone action, Cell signaling and hormonal action – Cyclic AMP.

Unit II : Functional organization of hormones of Endocrine glands – pituitary (hypophysis) : Adenohypophysial and Neurohypophysial hormones – Thyroid – Pancreas – Adrenal – Pineal gland (Epiphysis).

Unit III : Hormones and reproduction : Ovary and Testis – Hormonal control of mammary glands, ovarian cycles, pregnancy and Lactation – Placenta and its endocrine function.

Unit IV : Gastrointestinal hormones and its function – regulation of hormone metabolism and mineral metabolism – carbohydrate metabolism . Influence of hormones on growth and development – Hormones and calcium – phosphate homeostasis

Unit V : Hormonal regulation of osmoregulation – Thermoregulation – Hormones and behavior – Hormones regulation on migration – Regeneration – Metamorphosis – Environmental endocrinology.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2018
1-L1	Scope of Endocrinology
2-L2	Concept of Secretion
3- L3	Hormones as messengers
4-L4	Classification of hormones
5-L5	Steroid Hormones
6-L6	Amino acid derivatives
7-L7	Characteristic features of hormone
8- P1	Welcoming of First year and Inauguration of Zoology Association
9- L8	Discovery of Hormones
10- L9	General and principles of hormone action - Mechanism of Hormone action
11-L10	Cell signaling
12-L11	Hormonal action
13-L12	Cyclic AMP.
14-L13	Functional organization of hormones of Endocrine glands
15-L14	Pituitary gland - Anatomy
16-L15	Hormones of adenohypophysis
17- L16	Neurohypophysial hormones
18- L17	Thyroid stimulating hormones TSH
19- L18	Thyroid Gland
20- L19	Endocrine Pancreas
21- L20	Pancreactemy - Allotting portion for Internal Test-I
	Internal Test I begins
22- L21	Adrenal gland or Suprarenals
23- IT-1	Internal Test-I
24- L22	Pineal gland (Epiphysis).
25- L23	Hormones and reproduction
26- L24	Ovary- Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Testis
28- L26	Hormonal control of mammary glands,
29- L27	Hormonal control of mammary glands,
30- P2	College level meeting/Cell function
31-L28	ovarian cycles,
32-L29	pregnancy
33-L30	Lactation
34- L31	Placenta and its endocrine function.
35- L32	Placenta and its endocrine function.
36- L33	Gastrointestinal hormones
37- L34	Function of Gastrointestinal hormones
38- L35	Regulation of hormone metabolism
39- L36	Regulation of hormone metabolism
40- L37	Mineral metabolism
41- L38	Mineral metabolism

42-P3	Department Seminar
43- L39	Carbohydrate metabolism
44- L40	Carbohydrate metabolism
45- L41	Influence of hormones on growth
46- L42	Influence of hormones on growth
47- L43	Influence of hormones on growth and development - Allotting portion for Internal Test-II
	Internal Test II begins
48- L44	Influence of hormones on growth and development
49-IT-II	Internal Test-II
50-L45	Hormones and calcium
51- L46	Hormones and calcium - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Phosphate homeostasis
53- L48	Phosphate homeostasis
54- L49	Hormonal regulation of osmoregulation
55- L50	Hormonal regulation of osmoregulation
56- L51	Thermoregulation
57- L52	Thermoregulation
58- L53	Hormones and behavior
59-P4	College level meeting/ function
60- L54	Hormones and behavior
61- L55	Hormones regulation on migration
62- L56	Hormones regulation on migration
63- L57	Regeneration
64- L58	_Regeneration - Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Metamorphosis
66- L60	Environmental endocrinology.
67-IT-III	Internal Test-III
68- L61	Revision of Unit I & II
69- L62	Revision of Unit III & IV
70- L63	Revision of Unit V - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
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 23.11.2018

Course Outcomes

Learning Outcomes	COs of the course “<ENDOCRINOLOGY>”
CO1	know the properties of polypeptide structure hormones.
CO2	know the properties of steroid structure hormones.
CO3	relate the membrane receptor and the hormones.
CO4	relate the stoplasm receptor and the hormones.
CO5	illustrate what kind of hormone is synthesised in what kind of endocrine gland.
CO6	explain what kind of hormone is released from what kind of endocrine gland.
CO7	list the interior hypopyhse lobe hormones.
CO8	list the posterior hypopyhse lobe hormones.
Experimental Learning	
EL1	make experiments to understand living organisms, and analyse and interpret the results
EL2	explain the systems of living organisms and their functioning
EL3	define biological problems
EL4	make experiment, application and analysis to solve biological problems
Integrated Activity	
IA1	Arrange a workshop on “Thyroid Gland”
IA2	Make a slide share of Mechanism of Hormone action

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	Environmental biology
Course Code	PZOM22
Class	I year (2018-2019)
Semester	Even
Staff Name	P. Augustus Robince
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- Develop an appreciation of the modern scope of scientific inquiry in the field of Ecology.
- Become familiar with the variety of ways that organisms interact with both the physical and the biological environment.
- Develop an understanding of the different types of Pollution and its effect on environment
- Become familiar with the available Natural resources.
- Become familiar with Biodiversity and its importance
- Create awareness about conservation of Biological resources

Syllabus

Unit I

Ecosystem and productivity : Ecosystem – concepts, types – terrestrial and aquatic ecosystems, stability, food chain, food web and trophic levels. Energy flow in ecosystem. Primary productivity process productivity in a fresh water pond ecosystem. Methods of measurement of primary productivity Biogeochemical cycles – water cycle and nitrogen cycle

Unit II

Population growth and pollution : Human population growth, population explosion in India – Soil waste management. Air, water, soil, noise and thermal pollution – sources, effects and control measures. Nuclear hazards : non-degradable pollutants biotransformation, biomagnifications, bioremediation and soil issues. Environmental education – pollution control through laws – Environmental organization and agencies.

Unit III

Resource management : Natural resources – renewable and non-renewable resources. Concept of conservation and management of natural resources. Forest resources – Ecological and economic importance of forest - types and management – forest resources of India – deforestation and its effects sustainable forest management. Water resources : Worldwide supply • distribution Indian water resources – river water dispute and solutions. Mineral resources – uses and exploration of mineral resources exhaustibility, status of Indian and world resources. Energy resources – world energy demand – energy resources types – solar, wind, geothermal, hydroelectricity, hydrogen, tidal energy, biomass and nuclear energy.

Unit IV

Biodiversity concept : Biodiversity – Concept and principle of biodiversity • genetic, species and ecosystem diversity. Similarity and Dominance index, Evenness index, Richness index and Association index. Sampling methods, values and use of diversity, loss of animal diversity and endangered wildlife species. Hot spots – red list – endangered and endemic species.

Unit V

Biodiversity conservation : Human impact on biological diversity – causes for the loss of biodiversity. Fragmentation of biodiversity – Biogeographic zones in India Floristic and Zoogeographical realms – Geograpy and major biomass, Wildlife of India – values of wildlife, wild life protection Act. Conservation

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 03.12.2018
1-L1	Unit I: Ecosystem and productivity : Ecosystem.
2-L2	concepts, types
3- L3	terrestrial and aquatic ecosystems
4-L4	stability
5-L5	food chain
6-L6	food web and trophic levels.
7-L7	Energy flow in ecosystem.
8- P1	Welcoming of First year and Inauguration of Mathematics Association
9- L8	Primary productivity process.
10- L9	productivity in a fresh water pond ecosystem.

11-L10	Methods of measurement of primary productivity .
12-L11	Biogeochemical cycles – water cycle and nitrogen cycle.
13-L12	Unit II: Population growth and pollution : Human population growth.
14-L13	population explosion in India.
15-L14	Soil waste management.
16-L15	Air Pollution.
17- L16	Water Pollution.
18- L17	Soil Pollution.
19- L18	noise Pollution.
20- L19	thermal pollution.
21- L20	_____ - Allotting portion for Internal Test-I
	Internal Test I begins on 18.01.2019
22- L21	Sources.
23- IT-1	Internal Test-I
24- L22	Effects.
25- L23	control measures.
26- L24	_____ - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Nuclear hazards.
28- L26	non-degradable pollutants.
29- L27	Biotransformation.
30- P2	College level meeting/Cell function
31-L28	biomagnifications.
32-L29	bioremediation .

33-L30	soil issues.
34- L31	Environmental education.
35- L32	pollution control through laws.
36- L33	Environmental organization and agencies.
37- L34	Unit III: Resource management : Natural resources –renewable and non-renewable resources.
38- L35	Concept of conservation and management of natural resources.
39- L36	Forest resources - Ecological and economic importance of forest - types and management -forest resources of India –deforestation and its effects sustainable forest management.
40- L37	Water resources : Worldwide supply • distribution Indian water resources - river water dispute and solutions.
41- L38	Mineral resources - uses and exploration of mineral resources exhaustibility, status of Indian and world resources.
42-P3	Department Seminar
43- L39	Energy resources - world energy demand - energy resources types –solar, wind, geothermal, hydroelectricity, hydrogen, tidal energy, biomass and nuclear energy.
44- L40	Unit IV: Biodiversity concept : Biodiversity - Concept and principle of biodiversity.
45- L41	• genetic, species and ecosystem diversity.
46- L42	Similarity and Dominance index.
47- L43	_____ - Allotting portion for Internal Test-II
	Internal Test II begins on 25.02.2019
48- L44	Evenness index.
49-IT-II	Internal Test-II

50-L45	Richness index. Association index.
51- L46	_____ - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Sampling methods, values and use of diversity.
53- L48	loss of animal diversity.
54- L49	endangered wildlife species.
55- L50	Hot spots - red list - endangered and endemic species.
56- L51	Unit V: Biodiversity conservation : Human impact on biological diversity .
57- L52	causes for the loss of biodiversity.
58- L53	Fragmentation of biodiversity.
59-P4	College level meeting/ function
60- L54	Biogeographic zones in India.
61- L55	Floristic Realms.
62- L56	Zoogeographical realms.
63- L57	Geography and major biomass.
64- L58	_____ - Allotting portion for Internal Test-III
	Internal Test III begins on 22.03.2019
65- L59	Wildlife of India.
66- L60	values of wildlife.
67-IT-III	Internal Test-III
68- L61	wild life protection Act.
69- L62	Conservation
70- L63	_____ - Test Paper distribution and result analysis

	Entering Internal Test-III Marks into University portal
71-MT	Model Test begins on 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 "Environmental biology"
CO1	Knowledge regarding principles, applications and management of environmental science.
CO2	Describe the concept and types of ecosystem
CO3	Explain the causes and types of pollution
CO4	Describe the natural resources and its management
CO5	Explain Biodiversity
CO6	Different types of ecological niches
CO7	Methods of conservation of biodiversity
CO8	Importance of Wild life
CO9	Wild life conservation
Experimental Learning	
EL1	Visit to different ecosystems
EL2	Visit to wild life Sanctuary
EL3	Collection and reading of wild life protection act

EL4	Collection of different Pollutants
Integrated Activity	
IA1	Prepare charts of different Ecosystem
IA2	Collect the details of Hot Spots in India

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology (2018-2019)
Course Name	Evolution
Course Code	PZOM23
Class	1 year
Semester	EVEN(December 2018-May 2019)
Staff Name	D.V.SHEEBA RAJAKUMARI.
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 develop a genomics platform dedicated to the study of eco and socio evolutionary dynamics
- To gain insight into eco evolutionary dynamics within and across trophic level

Syllabus

Unit I : Origin of cells and unicellular evolution : Origin of basic biological molecules, abiogenesis, biogenesis, Biochemical origin of life, biological evolution (protenoids and microsphere coacervates), biogeny of protein and nucleic acid ,concept of Oparin and Haldane – Experiment of Urey and Miller

Unit II : Evidences and Theories of Evolution : Evidences : From Paleontology – Geological time scales and its major events - Types of fossils and process of fossilization – Evidences from biogeography – Evidences from morphology, comparative anatomy, embryology, biochemistry and physiology. Theories of organic evolution : Lamarkism, Darwinism, Mutation theory, Modern synthetic theory.

Unit III : Mechanism of Evolution : Population genetics – population, gene pool, gene

frequency ; Hardy – Weinberg law, Gene frequency and its impacts, natural selection, migration and genetic drift, variations, isolating mechanism and origin of species – Allopatric and sympatric speciation.

Unit IV : Origin of Higher Taxa : Simpson’s definition of the higher taxa, Simpson’s adaptive grid, pre-adaptations and post-adaptations, patterns of evolution : convergent evolution and parallel evolution, Micro evolution, Macro evolution (adaptive radiation), Mega evolution, Connecting link between vertebrate classes, quantum evolution. Rates of Evolution : Homotely, Bradytely and Tachytely, Graduation versus punctuated equilibrium, Extinction and its causes.

Unit V : Mankind evolution : Phylogenetic tree and stages of primate evolution including Homo sapiens. Place and time of origin, characteristics and ancestors of man. Evolutionary trends of man evolution, cultural evolution of man, allometry, altruism and kith and kin selection.

Reference Books

1. Moody, P. A., 1978. Introduction to evolution (Harper International).
2. Stebbins, C. L., 1979. Processes of organic evolution (Prentice – Hall India, New Delhi)

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 03.12.2018
1-L1	Syllabus discussion
2-L2	Introduction to evolution
3- L3	Origin of basic biological molecules
4-L4	Abiogenesis ,biogenesis
5-L5	Biochemical origin of life, biological evolution
6-L6	Biology of protein and nucleic acid
7-L7	Concept of oparin and Haldane
8- P1	Welcoming of First year and Inauguration of zoology Association
9- L8	Experiment of urey and miller
10- L9	Evidences : from paleontology
11-L10	Geological time scale and it major events
12-L11	Types of fossils and process of fossilization
13-L12	Evidences from biogeography
14-L13	Evidences from morphology,comparative anatomy, embryology
15-L14	Allotting portion for Internal Test-I
	Internal Test I begins(18.01.2019)

16-L15	Continue- evidences from biochemistry and physiology
17-IT-1	Internal Test-I
18-L16	Theories of organic evolution-lamarckism ,Darwinism
19-L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Continue- mutation and modern synthetic theory
21- L19	Mechanism of evolution –population genetics- population ,genepool, gene frequency
22- P2	College level meeting/Cell function
23-L20	Hardy-weinberg law, gene frequency and its impacts
24-L21	Natural selection, migration and genetic drift
25-L22	Continue – variation ,isolating mechanism and origin of species
26-L23	Allopatric and sympatric speciation
27-L24	Origin of higher taxa: simpson’s definition of the higher taxa, simpson’s adaptive grid
28-L25	Preadaptation and post adaptation
29-L26	Patterns of evolution: convergent and parallel evolution
30-L27	Micro and macro evolution, and mega evolution
31-L28	Connecting link between vertebrate classes
32-L29	Quantum evolution
33-L30	Rates of evolution: horotely , bradetely, and tachytely
34- P3	Department Seminar
35-L31	Graduation versus punctuated equilibrium
36-L32	Allotting portion for Internal Test-II
	Internal Test II begins(25.02.2019)
37- L33	Extinction and its causes
38- IT-II	Internal Test-II
39-L34	Man kind evolution: phylogenetic tree
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Stages of primate evolution including homo sapiens
42- L37	Place of origin
43- L38	Time of origin
44- P4	College level meeting/ function
45-L39	Characteristics and ancestors of man
46-L40	Evolutionary trends of man evolution
47-L41	Cultural evolution of man
48-L42	Allometry
49-L43	Altruism
50-L44	Allotting portion for Internal Test-III
	Internal Test III begins(22.03.2019)
51 L45	Kith and kin selection
52- L46	Revesion
53-IT-III	Internal Test-III
54-L47	Revesion
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 “<course name>”
CO1	To develop a genomics platform dedicated to the study of eco and socio evolutionary dynamics
CO2	To gain insight into eco evolutionary dynamics within and across trophic level
Experimental Learning	
EL1	Prepare a model for Geological time scale
Integrated Activity	
IA1	Prepare a chart for Quantum evolution
IA2	Prepare a chart for Rates of evolution: horotely , bradetely,and tachytely

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	Microbiology
Course Code	PZOM21
Class	I year (December 2018 to April 2019)
Semester	Even
Staff Name	Dr. D. Paramanatha Swami Doss
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- An education on microbiology will impart extensive knowledge to the students with basic concepts that occur within all microorganisms.
- To know the theoretical and practical aspects of microbial growth.
- To better understand the morphology and physiological characteristics of different groups of microorganisms.
- To enable the students to understand the techniques for bacterial culture.

Syllabus

MSU / 2017-18 / PG –Colleges / M.Sc. (Zoology) / Semester -II / Ppr.no.5 / Core-5

MICROBIOLOGY

Unit I: Historical perspectives in Microbiology – Scope of microbiology – Classification of microorganisms – protozoa – algae – fungi – bacteria (Gram Negative and Gram Positive) and virus –Whittaker's five kingdom concept. Ultra structure of bacteria – capsule, cell wall – Gram negative and Gram positive, Cytoplasmic inclusion.

Unit II: Microbial growth and nutrition – requirements – culture media –Microbiological media, enrichment media, enriched media, transport media, selective media and pure culture techniques – growth curve – kinetics of growth – Batch culture – Synchronous growth –

Measurement of growth and enumeration of cells. Cultivation of microorganisms – Methods of preservation and maintenance of cultures – Role of disinfectants.

Unit III: Dairy, Food and Industrial Microbiology: Microbiology of milk – Pasteurization, Dairy product and fermentation technology. Microbiology of food: Food spoilage – spoilage of meat – bread – food poisoning and food preservation. Industrial production of Penicillin, amino acid and wine.

Unit IV: Microbial diseases and their control: Bacterial diseases, Air borne disease, Diphtheria – Pertusis – Tuberculosis. Food borne and water borne diseases: Cholera, Typhoid, Salmonellosis. Soil borne diseases: Tetanus and Anthrax, sexually transmitted and contact diseases: Gonorrhoea, Syphilis and Leprosy. Viral diseases – Air borne diseases: Measles, Mumps, Chicken pox. Insect borne diseases: Dengue fever, chikungunya. Food and water borne diseases: Polio, Hepatitis – A Direct Contact Diseases: Viral Hepatitis – Hepatitis B, Rabies, AIDS.

Unit V: Environmental and Agriculture Microbiology Potable water: Microbial analysis of water, purification of water. Organic compost, Biogas, mechanism of methane formation, Sewage treatment, treatment of industrial effluents. Microbial leaching: Copper and uranium. Biodegradation – Petroleum and xenobiotic. Nutrient cycling (Carbon cycle, phosphorus cycle, Sulphur cycle and nitrogen cycle). Microbial herbicides: Bacterial insecticides - *Pseudomonas* and *Bacillus* as insecticides. Viral insecticides, Entomopathogenic fungi.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 03.12.2018
1-L1	Unit I: General introduction about the world of microbes.
2-L2	Historical perspectives in Microbiology – Contributions of Pioneers - Scope of microbiology.
3- L3	Classification of microorganisms - 3 kingdom classification, 5 kingdom classification, 8 kingdom classification and molecular classification.
4-L4	General characters and classification of protozoa – algae – fungi.
5-L5	Ultra structure of bacteria – Detailed about Cytoplasm, the Cell Envelope, the Cytoplasmic Membrane, the Cell Wall.
6-L6	Cytoplasmic inclusions – ribosomes, glycogen, lipid and pigments
7-L7	Student Seminar – Gram positive and gram negative bacteria.
8- P1	Zoology Association Meeting
9- L8	Revision and Group discussion
10- L9	Unit II: Introduction
11-L10	Microbial growth and nutrition – requirements for microbial culture.
12-L11	Preparation of different kinds of culture media and their features.
13-L12	Microbiological media, enrichment media, enriched media, transport media, selective media.
14-L13	Culture techniques – pure culture and batch culture.
15-L14	Allotting portion for Internal Test-I

	Internal Test I begins
16-L15	Growth curve – Lag, Log, Stationary and Decline phases - kinetics of growth. Synchronous growth – conditions required for bacterial growth.
17- IT1	Internal Test-I (18.01.2019)
18- L16	Measurement of growth and enumeration of cells – viable plate count, by turbidity, by using colony counter etc.
19- L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20- L18	Cultivation of microorganisms - Broth cultures, Agar plates, Stab cultures, Culture collections and Solid plate culture of thermophilic microorganisms
21- L19	Students Seminar - Methods of preservation and maintenance of cultures.
22-P2	College level meeting/Cell function
23- L20	Students Seminar - – Role of disinfectants.
23- IT-1	Unit III: Introduction &
24- L21	Microbiology of milk – Pasteurization.
25- L22	Dairy product and fermentation technology
26-L23	Microbial Food spoilage – spoilage of meat – bread
27-L24	Food poisoning by harmful bacteria and role of beneficial bacteria for food preservation.
28-L25	Students Seminar - Industrial production of Penicillin.
29-L26	Students Seminar – Microbial production of Wine.
30-L27	Students Seminar – Microbial production of Amino acids.
31-L28	Revision
32-L29	Revision and Class test
33-L30	Unit IV: Introduction about the microbes and disease.
34- P3	Department Seminar
35-L31	Bacterial Diseases – Causative agent, Symptoms, Causes and Treatment of Air borne disease - Diphtheria – Pertusis – Tuberculosis
36-L32	Bacterial Diseases – Causative agent, Symptoms, Causes and Treatment of Food borne and water borne diseases: Cholera, Typhoid, Salmonellosis. Allotting portion for Internal Test-II.
	Internal Test II begins
37- L33	Bacterial Diseases – Causative agent, Symptoms, Causes and Treatment of Soil borne diseases: Tetanus and Anthrox.
38- IT-II	Internal Test-II (25.02.2019)
39-L34	Bacterial Diseases – Causative agent, Symptoms, Causes and Treatment of Sexually transmitted and contact diseases: Gonorrhoea, Syphilis and Leprosy.
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Viral diseases - Causative agent, Symptoms, Causes and Treatment of Air borne diseases: Measles, Mumps, Chicken pox.
42-L37	Viral diseases - Causative agent, Symptoms, Causes and Treatment of Insect borne diseases: Dengue fever, Chikungunya.
43- L38	Viral diseases - Causative agent, Symptoms, Causes and Treatment of Food and water borne diseases: Polio, Hepatitis – A
44- P4	College level meeting/ function

45-L39	Student seminar -Direct Conduct Diseases: Viral Hepatitis – Hepatitis B, Rabies, AIDS.
46-L40	Unit V: Environmental and Agriculture Microbiology Potable water: Microbial analysis of water, purification of water.
47-L41	Organic compost, Biogas, mechanism of methane formation, Sewage treatment, treatment of industrial effluents.
48-L42	Microbial leaching: Copper and uranium. Biodegradation – Petroleum and xenobiotic.
49-L43	Nutrient cycling (Carbon cycle, phosphorus cycle)
50-L44	Allotting portion for Internal Test-III
	Internal Test III begins
51 L45	Students Seminar - Sulphur cycle and nitrogen cycle.
52- L46	Microbial herbicides: Bacterial insecticides - <i>Pseudomonas</i> and <i>Bacillus</i> as insecticides.
53-IT-III	Internal Test-III (22.03.2019)
54-L47	Viral insecticides, Entomopathogenic fungi.
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 “Microbiology”
CO1	Acquire an idea about the historical events in microbiology.
CO2	Able to differentiate gram positive and gram negative bacteria.
CO3	Cultivate bacteria with different cultivation technique.
CO4	Understand various specialized techniques such as pasteurization.
CO5	Get an idea regarding microbes and their relation with environment.
CO6	Know the microbial techniques used in milk industry.
CO7	Understand the use of microbes in food industry.
CO8	Learn about various viral disease, their causative agent, mode of infection, epidemiology and treatment.
CO9	Know about various fungal disease, their causative agent, mode of infection, epidemiology and treatment.
Experimental Learning	
EL1	Visit to microbiology lab.
EL2	Hands on training on microbial plating techniques.
EL3	Visit to nearest sewage treatment plant.

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	Microbiology
Course Code	HZOM21
Class	I year 2018-2019
Semester	Even
Staff Name	Dr. P. Elizmathi Sophia
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- An education on microbiology will impart extensive knowledge to the students with basic concepts that occur within all microorganisms.
- To know the theoretical and practical aspects of microbial growth.
- To better understand the morphology and physiological characteristics of different groups of microorganisms.
- To enable the students to understand the techniques for bacterial culture.

Syllabus

MSU / 2017-18 / PG –Colleges / M.Sc. (Zoology) / Semester -II / Ppr.no.5 / Core-5

MICROBIOLOGY

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Unit II: Microbial growth and nutrition – requirements – culture media –Microbiological media, enrichment media, enriched media, transport media, selective media and pure culture techniques – growth curve – kinetics of growth – Batch culture – Synchronous growth –

Measurement of growth and enumeration of cells. Cultivation of microorganisms – Methods of preservation and maintenance of cultures – Role of disinfectants.

Unit III: Dairy, Food and Industrial Microbiology: Microbiology of milk – Pasteurization, Dairy product and fermentation technology. Microbiology of food: Food spoilage – spoilage of meat – bread – food poisoning and food preservation. Industrial production of Penicillin, amino acid and wine.

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Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 03.12.2018
1-L1	Unit I: General introduction about the world of microbes.
2-L2	Historical perspectives in Microbiology – Contributions of Pioneers - Scope of microbiology.
3- L3	Classification of microorganisms - 3 kingdom classification, 5 kingdom classification, 8 kingdom classification and molecular classification.
4-L4	General characters and classification of protozoa – algae – fungi.
5-L5	Ultra structure of bacteria – Detailed about Cytoplasm, the Cell Envelope, the Cytoplasmic Membrane, the Cell Wall.
6-L6	Cytoplasmic inclusions – ribosomes, glycogen, lipid and pigments
7-L7	Student Seminar – Gram positive and gram negative bacteria.
8- P1	Zoology Association Meeting
9- L8	Revision and Group discussion
10- L9	Unit II: Introduction
11-L10	Microbial growth and nutrition – requirements for microbial culture.
12-L11	Preparation of different kinds of culture media and their features.
13-L12	Microbiological media, enrichment media, enriched media, transport media, selective media.
14-L13	Culture techniques – pure culture and batch culture.
15-L14	Allotting portion for Internal Test-I

	Internal Test I begins
16-L15	Growth curve – Lag, Log, Stationary and Decline phases - kinetics of growth. Synchronous growth – conditions required for bacterial growth.
17- IT1	Internal Test-I (18.01.2019)
18- L16	Measurement of growth and enumeration of cells – viable plate count, by turbidity, by using colony counter etc.
19- L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20- L18	Cultivation of microorganisms - Broth cultures, Agar plates, Stab cultures, Culture collections and Solid plate culture of thermophilic microorganisms
21- L19	Students Seminar - Methods of preservation and maintenance of cultures.
22-P2	College level meeting/Cell function
23- L20	Students Seminar - – Role of disinfectants.
23- IT-1	Unit III: Introduction &
24- L21	Microbiology of milk – Pasteurization.
25- L22	Dairy product and fermentation technology
26-L23	Microbial Food spoilage – spoilage of meat – bread
27-L24	Food poisoning by harmful bacteria and role of beneficial bacteria for food preservation.
28-L25	Students Seminar - Industrial production of Penicillin.
29-L26	Students Seminar – Microbial production of Wine.
30-L27	Students Seminar – Microbial production of Amino acids.
31-L28	Revision
32-L29	Revision and Class test
33-L30	Unit IV: Introduction about the microbes and disease.
34- P3	Department Seminar
35-L31	Bacterial Diseases – Causative agent, Symptoms, Causes and Treatment of Air borne disease - Diphtheria – Pertusis – Tuberculosis
36-L32	Bacterial Diseases – Causative agent, Symptoms, Causes and Treatment of Food borne and water borne diseases: Cholera, Typhoid, Salmonellosis. Allotting portion for Internal Test-II.
	Internal Test II begins
37- L33	Bacterial Diseases – Causative agent, Symptoms, Causes and Treatment of Soil borne diseases: Tetanus and Anthrox.
38- IT-II	Internal Test-II (25.02.2019)
39-L34	Bacterial Diseases – Causative agent, Symptoms, Causes and Treatment of Sexually transmitted and contact diseases: Gonorrhoea, Syphilis and Leprosy.
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Viral diseases - Causative agent, Symptoms, Causes and Treatment of Air borne diseases: Measles, Mumps, Chicken pox.
42-L37	Viral diseases - Causative agent, Symptoms, Causes and Treatment of Insect borne diseases: Dengue fever, Chikungunya.
43- L38	Viral diseases - Causative agent, Symptoms, Causes and Treatment of Food and water borne diseases: Polio, Hepatitis – A
44- P4	College level meeting/ function

45-L39	Student seminar -Direct Conduct Diseases: Viral Hepatitis – Hepatitis B, Rabies, AIDS.
46-L40	Unit V: Environmental and Agriculture Microbiology Potable water: Microbial analysis of water, purification of water.
47-L41	Organic compost, Biogas, mechanism of methane formation, Sewage treatment, treatment of industrial effluents.
48-L42	Microbial leaching: Copper and uranium. Biodegradation – Petroleum and xenobiotic.
49-L43	Nutrient cycling (Carbon cycle, phosphorus cycle)
50-L44	Allotting portion for Internal Test-III
	Internal Test III begins
51 L45	Students Seminar - Sulphur cycle and nitrogen cycle.
52- L46	Microbial herbicides: Bacterial insecticides - <i>Pseudomonas</i> and <i>Bacillus</i> as insecticides.
53-IT-III	Internal Test-III (22.03.2019)
54-L47	Viral insecticides, Entomopathogenic fungi.
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 “Microbiology”
CO1	Acquire an idea about the historical events in microbiology.
CO2	Able to differentiate gram positive and gram negative bacteria.
CO3	Cultivate bacteria with different cultivation technique.
CO4	Understand various specialized techniques such as pasteurization.
CO5	Get an idea regarding microbes and their relation with environment.
CO6	Know the microbial techniques used in milk industry.
CO7	Understand the use of microbes in food industry.
CO8	Learn about various viral disease, their causative agent, mode of infection, epidemiology and treatment.
CO9	Know about various fungal disease, their causative agent, mode of infection, epidemiology and treatment.
Experimental Learning	
EL1	Visit to microbiology lab.
EL2	Hands on training on microbial plating techniques.
EL3	Visit to nearest sewage treatment plant.

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	Research Methodology
Course Code	PZOM34
Class	II year (June 2018 to December 2018)
Semester	Odd
Staff Name	Dr. D. Paramanatha Swami Doss
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- To familiarize the students with basic of research and the research process.
- To enable the students in conducting research work and formulating research synopsis and report.
- To study the fundamental principles and functions of Chromatography.
- To understand the principle and working mechanism of electrophoresis.

Syllabus

MSU / 2017-18 / PG –Colleges / M.Sc. (Zoology) / Semester -III / Ppr.no.17 / Core-16

RESEARCH METHODOLOGY

Unit I: Research – Characteristics – types of research – steps in research – objectives of research – research report formatting and typing – laboratory safety – intellectual property rights.

Unit II: Microscopy – Principles – types of light microscopes – bright field – dark field – phase contrast – fluorescence – scanning – micrometry. Electron microscopes and types – atomic force and magnetic force microscopes.

Unit III: Centrifuge – types – principles and applications. pH meter – types – principles and applications. Colorimeter – principles and applications. Cryopreservation and its applications. Freezing and freeze drying microtomes. Cytotechniques.

Unit IV: Chromatography – paper – thin layer – column – gas liquid chromatography – affinity chromatography. Electrophoresis – paper – cellulose acetate – gel – immune electrophoresis. Blotting techniques – southern – northern – western. Radioactive counters – autoradiography – labeling studies.

Unit V: Spectrophotometer - Spectrofluorimeter – ESR –NMR Spectrophotometer – Flame Emission Photometry.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 18.06.2018
1-L1	Unit I: Introduction about the Research
2-L2	Characteristics of Research, forms of research and objectives.
3- L3	Types of Research – Application oriented, Objective oriented, Inquiry mode etc.
4-L4	Empirical, One time, Longitudinal research.
5-L5	Steps in research – objectives of research.
6-L6	Research Approaches - Qualitative, Quantitative and Mixed research.
7-L7	Research Process and Criteria of research.
8- P1	Welcoming of First year and Inauguration of Zoology Association
9- L8	Research report formatting and typing - Scientific report – types and structure.
10- L9	Structure of review article, short communications, journal articles.
11-L10	Principle of thesis writing – steps, layout of the thesis, structure, language, illustrations, tables, foot note, references.
12-L11	Typing, proof reading, typing different forms of references.
13-L12	Laboratory safety – Physical, Chemical and Biological hazards, Precautions, transport of chemicals and biological samples.
14-L13	Intellectual Property Rights – Patent.
15-L14	Review and Group Discussion.
16-L15	Visit to University Lab
17- L16	Unit II: Microscopy
18- L17	Introduction about magnification, resolving power, types of microscope.
19- L18	Principle, structure and uses of light microscope.
20- L19	Principle, structure and uses of bright field microscope.
21- L20	Allotting portion for Internal Test-I
	Internal Test I begins
22- L21	Principle, structure and uses of dark field microscope.
23- IT-1	Internal Test-I (30.07.2018)
24- L22	Principle, structure and uses of phase contrast microscope.
25- L23	Principle, structure and uses of fluorescence microscope.
26- L24	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Electron microscope – principle, structure and components.

28- L26	Seminar - Principle, components and applications of TEM.
29- L27	Seminar - Principle, components and applications of SEM.
30- P2	College level meeting/Cell function
31-L28	Micrometry – Stage and Ocular, work flow.
32-L29	Atomic force microscope
33-L30	Principle, components and applications of magnetic force microscopes.
34- L31	Visit to Biotechnology lab
35- L32	Review and group discussion.
36- L33	Unit III: Centrifugation
37- L34	Introduction and methods of centrifugation – differential and density gradient.
38- L35	Structure of centrifuge – motor, rotor, angle type, swinging bucket type. Types of centrifuge - Preparative and Analytical.
39- L36	Principle, structure and applications of ordinary centrifuge & ultra centrifuge.
40- L37	pH meter – applications – measurements titration curve.
41- L38	Seminar - Colorimeter – principles and applications.
42-P3	Department Seminar
43- L39	Cryopreservation and its applications.
44- L40	Cryotechniques – In vivo, role of fixatives for microscopic observation.
45- L41	Students Seminar - Freezing and freeze drying microtomes.
46- L42	Unit IV: Chromatography
47- L43	Allotting portion for Internal Test-II
	Internal Test II begins
48- L44	Paper Chromatography – types.
49-IT-II	Internal Test-II (03.09.2018)
50-L45	Seminar - Thin layer – affinity chromatography
51- L46	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Column chromatography & gas liquid chromatography – principle - mobile and stationary phase – procedure.
53- L48	Electrophoresis – principle – kinds of electrophoresis media.
54- L49	Principle, instrument, working procedure of Paper and Cellulose Acetate electrophoresis.
55- L50	Principle, instrumentation, working procedure of Agarose and SDS PAGE gel electrophoresis.
56- L51	Immunoelectrophoresis.
57- L52	Seminar - Blotting techniques – southern – northern – western.
58- L53	Radioactive counters – Types of counters – Geiger- Muller tube – Scintillation counters.
59-P4	College level meeting/ function
60- L54	Autoradiography – Principle, method – micro-autoradiography.
61- L55	Seminar - Labelling studies
62- L56	Unit V: Spectrophotometer – Spectrum of light, UV and IR radiation, Beer's

	and Lambert's Law
63- L57	Seminar - Principle, instrumentation and applications of Nuclear Magnetic Resonance spectroscopy.
64- L58	Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Principle, instrumentation and applications of Electron Spin Resonance spectroscopy.
66- L60	Flame emission spectroscopy
67-IT-III	Internal Test-III (08.10.2018)
68- L61	Revision and Group Discussion
69- L62	Revision and Group Discussion
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 23.11.2018

Course Outcomes

Learning Outcomes	COs of the course "Research Methodology"
CO1	Define appropriate research problem and parameters.
CO2	Prepare a project proposal (to undertake a project).
CO3	Describe the types and working principles of centrifuges.
CO4	Able to apply intellectual property law principles (including copyright, patents, designs and trademarks) to real problems and analyse the social impact of intellectual property law and policy.
CO5	Gains knowledge about the cryopreservation and its application.
CO6	Study the mechanism and application of various kinds of blotting techniques.
CO7	Gain knowledge about the labelling studies and autoradiography.
CO8	Describe histological and histochemical details of tissues.
CO9	Study the working mechanism and application of spectrophotometer.
Experimental Learning	
EL1	Visit to biotechnology labs.
EL2	Hands on training on molecular biology.
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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	IMMUNOLOGY & MICROBIOLOGY
Course Code	SMZO62
Class	III year (2019-2020)
Semester	Even
Staff Name	L.Jansi Rani
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- To study the immune system and their role of our body..
- To study about Salient features of antigen- antibody reaction.
- To discuss about Humoral immune response - primary & secondary response
- To study the History & Scope of microbiology
- To learned about Industrial microbiology : production of Antibiotic penicillin.

Syllabus

UNIT I

History and Scope of Immunology.

Immunity-Type of Immunity - Innate & acquired, passive & active.

Lymphoid organs –primary & secondary (Thymus, Bone marrow, Bursa of fabricius , Spleen, Tonsil, Lymph node, Peyer's patches) – Structure and Functions.

(15L)

UNIT II

Immunoglobulin-Structure, Function, Biological properties of Ig classes. Interaction of Antigen and antibody.

Salient features of antigen- antibody reaction. Types of antigen-antibody reaction – Agglutination, Precipitation, Opsonization, Cytolysis.

(15L)

UNIT III

Immune response-Lymphocyte as unit of immune system, stem cells - Structure and lineage, T cells, B cells & Macrophages.

Humoral immune response - primary & secondary responses - B cell activation. Cell -

Mediated immune response - Type of T cells & functions.

Tumour immunology.

(15L)

UNIT IV

Introduction : History & Scope of microbiology. General structure of microbes (Bacteria, virus). Bacterial growth : Culture media & selective media; Continuous & batch culture techniques, growth curve.

(14L)

UNIT V

Food microbiology :Food poisoning ; Food spoilage & preservation.

Industrial microbiology : production of Antibiotic penicillin.

Soil microbiology : Role of soil microbes in N₂ fixation.

Medical microbiology : Diseases caused by bacteria in different systems of man as given below: Dermal – Streptococcal inflammation : - Tuberculosis;

Gastro-intestinal-dysentery:Reproductive – Gonorrhoea.

Viral diseases with reference to causative organisms, symptoms, impact on the host & control measures, AIDS , Rabies, Chicken pox, Measles, Influenza & polio.

(16L)

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 07.12.2017
1-L1	History and Scope of Immunology.

2-L2	Immunity-Type of Immunity
3- L3	Immunity-Innate & acquired
4-L4	Immunity-passive & active.
5-L5	Lymphoid organs –primary
6-L6	Lymphoid organs – secondary
7-L7	Structure and Functions–Thymus
8- P1	Zoology Association activities
9- L8	Structure and Functions - Bone marrow
10- L9	Structure and Functions - Bursa of fabricius
11-L10	Structure and Functions - Spleen
12-L11	Structure and Functions - Tonsil
13-L12	Structure and Functions - Lymph node
14-L13	Structure and Functions - Peyer’s patches)
15-L14	Immunoglobulin-Structure
16-L15	Immunoglobulin- Function
17- L16	Biological properties of Ig classes
18- L17	Interaction of Antigen
19- L18	Interaction of antibody.
20- L19	Salient features of antigen-
21- L20	Antibody reaction. - Allotting portion for Internal Test-I
	Internal Test I begins
22- L21	Types of antigen
23- IT-1	Internal Test-I
24- L22	Antibody reaction
25- L23	Agglutination, Precipitation
26- L24	Opsonization, Cytolysis.- Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Immune response
28- L26	Lymphocyte as unit of immune system
29- L27	Stem cells
30- P2	College level meeting/Cell function
31-L28	Structure and lineage - T cells
32-L29	Structure and lineage - B cells & Macrophages.
33-L30	Humoral immune response
34- L31	Primary & secondary responses
35- L32	B cell activation.
36- L33	Cell - Mediated immune response.
37- L34	Type of T cells
38- L35	Functions of T cells
39- L36	Tumour immunology.
40- L37	Introduction : Microbiology
41- L38	History of microbiology
42-P3	Department Seminar
43- L39	Scope of microbiology
44- L40	General structure of microbes -Bacteria
45- L41	General structure of microbes -Virus.
46- L42	Bacterial growth : Culture media
47- L43	Bacterial growth :Selective media - Allotting portion for Internal Test-II

	Internal Test II begins
48- L44	Continuous & batch culture techniques
49-IT-II	Internal Test-II
50-L45	Bacterial growth :Growth curve
51- L46	Food microbiology - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Food poisoning
53- L48	Food spoilage & preservation.
54- L49	Industrial microbiology
55- L50	Production of Antibiotic penicillin
56- L51	Soil microbiology
57- L52	Role of soil microbes in N ₂ fixation
58- L53	Medical microbiology
59-P4	College level meeting/ function
60- L54	Diseases caused by bacteria in different systems of man - Dermal
61- L55	Diseases caused by bacteria in different systems of man – Streptococcal inflammation
62- L56	Diseases caused by bacteria in different systems of man - Tuberculosis
63- L57	Gastro-intestinal-dysentery:
64- L58	Reproductive – Gonorrhoea- Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Viral diseases with reference to causative organisms, symptoms,
66- L60	Impact on the host & control measures, AIDS , Rabies, Chicken pox, Measles, Influenza & polio.
67-IT-III	Internal Test-III
68- L61	Revision of I & II units
69- L62	Revision of III & IV units
70- L63	Revision of Unit V - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
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 “<IMMUNOLOGY & MICROBIOLOGY>”
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CO1	The students will be able to identify the cellular and molecular basis of immune responsiveness.
CO2	The students will be able to describe the roles of the immune system in both maintaining health and contributing to disease.
CO3	The students will be able to describe immunological response and how it is triggered and regulated.
CO4	The students will be able to demonstrate a capacity for problem-solving about immune responsiveness.
CO5	The students will be able to transfer knowledge of immunology into clinical decision-making through case studies presented in class.
CO6	Understand the rationale in medium formulation & design for microbial fermentation, sterilization of medium and air
CO7	Discuss Microbial contamination/product spoilage and antimicrobial preservation of pharmaceutical formulations during production and in products
CO8	Understand various plant microbes interactions especially rhizosphere, phyllosphere and mycorrhizae and their applications especially the biofertilizers and their production techniques
CO9	Discuss the biosynthesis and the degradation pathways involved.
Experimental Learning	
EL1	Knowledge of the structure and function of the major organ systems, including the molecular, biochemical and cellular mechanisms for maintaining homeostasis
EL2	Knowledge of the pathogenesis of diseases, interventions for effective treatment, and mechanisms of health maintenance to prevent disease
EL3	A commitment to lifelong learning and independently seeking new knowledge and skills in their own recognized areas of learning deficit
EL4	Demonstrate a knowledge and understanding of microbiological assays of growth promoting and growth inhibiting substances.
Integrated Activity	
IA1	Provide students with in-depth training on the conduct and management of research from inception to completion using a wide range of techniques.
IA2	Enable students to acquire expertise in the use and application of the methods of data collection and analysis.

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology (2019-2020)
Course Name	Evolution
Course Code	SMZO61
Class	III year
Semester	EVEN (December 2019-May 2020)
Staff Name	D.V.Sheeba Rajakumari
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- To know how the life originated in our planet and related theories

Syllabus

UNIT I

ORIGIN OF LIFE Chemical origin of life – Biological experimental evidences. Evidences in favour of evolution : -Homologous organs and Analogous structures. -Embryological evidences – palaeontology - geological scale – biochemistry and physiology. **(15L)**

UNIT II

Lamarckism and Neo – Lamarckism Darwinism and Neo – darwinism. Mutation theory of De vries Modern concept of evolution : Natural selection – types and mechanism. **(15L)**

UNIT III :

Variations and Sources of Variability. Isolation and Isolating mechanisms. Population genetics and evolution :

- Hardy – weinberg law
- Species concept and speciation – types and mechanism.

(15L)

UNIT IV:

Mimicry and Protective Colouration . Adaptations : Cursorial , Fossorial , Arboreal, Volant , Aquatic , Desert , Cave. **(15L)**

UNIT V :

Evolution of Horse. Evolution of man- Ancestry of man-Salient features of Apes and Man-Trends in Human Evolution – Causes for Human Evolution- Evolution of man as seen in the fossil record. Cultural Evolution of Man. Animal distribution (Geographical) – Patterns of Distribution - Zoogeography of Palaearctic , Nearctic , Neotropical , Ethiopian , Oriental and Australian region. **(15L) (TOTAL: 75L)**

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 02.12.2019
1-L1	Syllabus discussion
2-L2	Origin of life –introduction
3- L3	Chemical origin of life
4-L4	Biological experimental evidences
5-L5	Evidences in favour of evolution
6-L6	Homologous organs
7-L7	Analogous structures
8- P1	Welcoming of First year and Inauguration of Zoology Association
9- L8	Embryological evidences
10- L9	Palaeontology
11-L10	Geological scale
12-L11	Biochemistry evidences
13-L12	Physiological evidences
14-L13	Lamarkism
15-L14	Neo lamarkism
16-L15	Darwinism
17- L16	Neo Darwinism
18- L17	Mutation theory of devries
19- L18	Morden concept of evolution
20- L19	Natural selection
21- L20	Allotting portion for Internal Test-I
22- L21	Continue-types
23- IT-1	Internal Test-I(23.01.2020)
24- L22	Natural selection mechanism
25- L23	Variation-introduction
26- L24	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Sources of variability
28- L26	Isolation- introduction
29- L27	Isolating mechanisms
30- P2	College level meeting/Cell function
31-L28	Population genetic and evolution
32-L29	Continue
33-L30	Hardy -Weinberg law

34- L31	Species concept
35- L32	Speciation
36- L33	types of speciation
37- L34	Mechanism of speciation
38-L35	Mimicry
39- L36	Protective colouration
40- L37	Cursorial adaptations
41- L38	Fossorial adaptation
42-P3	Department Seminar
43- L39	Arboreal adaptaion
44- L40	Volant adaptaion
45- L41	Aquatic adaptation
46- L42	Desert adaptation
47- L43	Allotting portion for Internal Test-II
	Internal Test II begins(25.02.2020)
48- L44	Cave adaptation
49-IT-II	Internal Test-II
50-L45	Evolution of horse
51- L46	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	Evolution of man
53- L48	Ancestry of man
54- L49	Salient features of apes and man
55- L50	Trends in human evolution
56- L51	Causes for human evolution
57- L52	Evolution of man as seen in the fossil record
58- L53	Cultural evolution of man
59-P4	College level meeting/ function
60- L54	Animal distribution (geographical)
61- L55	Patterns of distribution
62- L56	Zoo geography of Palaeartic
63- L57	Nearctic, neotropical
64- L58	- Allotting portion for Internal Test-III
	Internal Test III begins(27.04.2020)
65- L59	Ethiopian, oriental, australian region
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
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 27.04.2020

Course Outcomes

Learning Outcomes	COs of the course “<course name>”
CO1	Students can understand and describe Fundamental processes of evolutionary change, including genetic drift, natural selection
CO2	The molecular process that underlie evolution
CO3	The theory of evolution
Experimental Learning	
EL1	To do working model for Geological scale
Integrated Activity	
IA1	Prepare chart for Lamarkism
IA2	Prepare chart for Neo Lamarkism

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Genetics
Course Code	SMZO41
Class	II year (December 2019 – April 2020)
Semester	Even
Staff Name	Dr. D. Paramanatha Swami Doss
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To study the basic concepts of genetics
- To study the importance of mendelian principles.
- To understand the inheritance of parental characters and hereditary diseases.
- To illustrate the types of mutations.
- To educate the bacterial genetics.

Syllabus

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

GENETICS

UNIT I

Introduction to Genetics. Mendel- Reason for Mendel's experiment, Alleles, Backcross, testcross - Mendellian laws of heredity. Monohybrid cross and Dihybrid cross. Interaction of genes – complementary, supplementary, duplicate genes, lethal genes in man, epistasis, complete and incomplete dominance, co-dominance. Multiple alleles – A,B,O blood groups- Rh factors in man Problems related to blood groups - *Erythroblastosis foetalis*. Multiple genes (polygenic inheritance) skin colour in man.

UNIT II

Linkage – complete, incomplete, crossing over – coupling and repulsion – Mechanism of Meiotic crossing over – chromosomes map; Sex determination in man, *Drosophila*. Genic Balance Theory. Sex linked Inheritance in man – Haemophilia, Colour Blindness, and Holandric genes - Hypertrichosis- sex limited genes. Non disjunction in man. Extra chromosomal inheritance in paramecium, maternal predetermination in coiling of shell. Animal breeding: – Inbreeding and out breeding, heterosis.

UNIT III

Mutation – types of mutation- gene mutation – genome mutation – mutagens – mode of action of chemical mutagens and ionizing mutagens – detection of mutation by CIB method. Chromosomal abnormalities – autosomal and sex chromosomes – Klinefelters syndrome, Turner's syndrome and Down's syndrome.

UNIT IV

Human genetics – twins. Human chromosome, karyotypes, idiogram, Simple Mendelian traits in man. Inborn errors of metabolism – Phenylketonuria, Alkaptonuria, Albinism, Sickle – Cell anaemia. Improvement of human race – Eugenics, Euthenics, Pedigree Analysis. Genetics Prognosis – genetic counselling – family history – preventive measures.

UNIT V

Bacterial genetics – structure of *E-coli*, bacterial recombination – transformation conjugation, transduction and sexduction. Genetic application of bacteria, structure and life history of ϕ 4 phage. Genetic application of virus.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 02.12.2019
1-L1	Unit I: Introduction to genetics.
2-L2	Mendel- Reason for Mendel's experiment, characters selected by Mendel, alleles, backcross, test cross.
3- L3	Mendellian laws of heredity. Monohybrid experiment and Dihybrid experiment.
4-L4	Interaction of genes or Genic interaction – Non-allelic gene interaction and allelic gene interaction.
5-L5	Non-allelic gene interaction - complementary, supplementary, duplicate genes, lethal genes in man, epistasis.
6-L6	Allelic gene interaction - complete and incomplete dominance, co-dominance.
7-L7	Multiple alleles – Genetics of A,B,O blood groups, applications of ABO blood group.
8- P1	Zoology Association Meeting
9- L8	Multiple alleles – Genetics of Rh factors in man. Problems related to blood groups - <i>Erythroblastosis foetalis</i> .
10- L9	Polygenic inheritance – Skin Colour in man, eye colour in <i>Drossophila</i> .
11-L10	Unit II: Linkage and Crossing over.
12-L11	Linkage in <i>Drosophila</i> , Complete and incomplete linkage, theories and factor

	affecting linkage.
13-L12	Crossing over in Drosophila, mechanism of crossing over, factors affecting crossing over and coupling and repulsion.
14-L13	Procedure for the chromosome mapping, construction of chromosome map in Drosophila – three point cross.
15-L14	Sex determination in man – by chromosome, by barr body, by hormones. Allotting portion for Internal Test-I
	Internal Test I begins
16-L15	Sex determination in Drosophila – chromosome theory and genic balance theory.
17-IT-1	Internal Test-I (23.01.2020)
18-L16	Sex linked inheritance – Haemophilia, Colour Blindness.
19-L17	Holandric genes - Hypertrichosis- sex limited genes. Test Paper distribution and result analysis.
	Entering Internal Test-I Marks into University portal
20-L18	Non disjunction in man – by meiosis II and mitosis, molecular mechanisms and consequences.
21- L19	Extra chromosomal inheritance in Paramecium, kappa particles in Paramecium.
22- P2	College level meeting/Cell function
23-L20	Maternal predetermination by shell coiling in Snail.
24-L21	Animal breeding – significance of inbreeding, merits and demerits, out breeding – Heterosis.
25-L22	Unit III: Mutation – Introduction about mutagens.
26-L23	Genome mutation – Changes in the structure of chromosome, Changes in the number of chromosomes.
27-L24	Gene mutation – Spontaneous, induced, point, silent, trans-version and base analog mutation.
28-L25	CIB technique to detect mutation and Mutagens.
29-L26	Mode of action of chemical mutagens and ionizing mutagens. Chromosomal abnormalities.
30-L27	Autosomal and sex chromosomes – Klinefelter’s syndrome, Turner’s syndrome and Down’s syndrome.
31-L28	UNIT IV: Human genetics
32-L29	Twins – importance of twins study – Identical, Siamese, Fraternal twins.
33-L30	Human chromosome – Structure, preparation of karyotypes, spectral karyotype technique – Idiogram.
34- P3	Department Seminar
35-L31	Simple Mendelian traits in man – Albinism, taste blindness for PTC, Eye colour.
36-L32	Inborn errors of metabolism – Phenylketonuria - Allotting portion for Internal Test-II
	Internal Test II begins
37- L33	Alkaptonuria, Albinism, Sickle – Cell anaemia.
38- IT-II	Internal Test-II
39-L34	Effects of Drugs on human heredity - Improvement of Human race.
40-L35	Eugenics – Positive and negative eugenics - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Euthenics – Balanced diet, selection of children, creation of superior students.

42- L37	Pedigree Analysis – symbols used in pedigree chart -
43- L38	Genetic counselling – aim, purpose of genetic counselling, medical history or family pedigree, after counselling, preventive measures.
44- P4	College level meeting/ function
45-L39	Genetic Prognosis.
46-L40	Unit V: Introduction about bacterial genetics
47-L41	Bacterial genetics – structure of <i>E-coli</i>
48-L42	Recombination – transformation, conjugation, sexduction and transduction.
49-L43	Genetic application of bacteria – transfer of plasmid DNA, gene mutations, DNA libraries and Genetic engineering.
50-L44	Structure of T4 bacteriophage. Allotting portion for Internal Test-III
	Internal Test III begins
51 L45	Life cycle of phages – lytic and lysogenic cycle.
52- L46	Genetic applications of viruses.
53-IT-III	Internal Test-III
54-L47	Revision
55-L48	Revision and Group Discussion - 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 27.04.2020

Course Outcomes

Learning Outcomes	COs of the course “Genetics”
CO1	Understand the Mendelian and non mendelian inheritance.
CO2	Realize the concept behind genetic disorder, gene mutations-various causes associated with inborn errors of metabolism
CO3	Analyse the concepts of inborn errors of metabolism.
CO4	Gains knowledge about the genetic causes of Haemophilia and Colour Blindness
CO5	Able to illustrate the signs and symptoms of autosomal and sex chromosomal aberrations.
CO6	Explain the mechanism of sex determination in Man and Drosophila.
CO7	Understand the concepts of kayotypes and idiograms.
CO8	Realize the importance of genetic counselling.
CO9	Describe the structure and life history of bacteriophage.
Experimental Learning	
EL1	To do models of pedigree chart.
EL2	Learning the structure of bacteriophage with models.
Integrated Activity	
IA1	--

- # 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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Animal Diversity I - Invertebrata
Course Code	SMZO11
Class	I year (June 2019 to December 2019)
Semester	Odd
Staff Name	Dr. D. Paramanatha Swami Doss
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To elucidate the importance of taxonomy
- To know the methods of nomenclature
- To realize the differences between Protozoa and Metazoa
- To study the structure, functional organization and adaptations of invertebrates
- To realize the economic importance of lower and higher Invertebrates

Syllabus

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

ANIMAL DIVERSITY - I – INVERTEBRATA

UNIT I: Introduction to Principles of taxonomy – Binominal nomenclature.

Protozoa: General Characters and classification up to classes with the examples. **Type study:-** *Paramecium*: morphology – nutrition – Osmoregulation – Excretion – Reproduction (binary fission and conjugation) General structure, life cycle, Pathogeny and Control Measures of the following: (a) *Entamoeba histolytica* (b) *plasmodium*.

Porifera: General Characters and classification up to classes with the names of the examples. **Type study:-** *Leucosolenia* – External morphology – Body wall – Reproduction. **General topic:** Canal system in sponges.

UNIT II: Coelenterata: General characters and classification up to classes with the names of the examples. **Type study:** - *Obelia* – External Characters (structure of the colony) – life history. **General Topics:** Corals, Coral reefs and their significance.

Platyhelminthus: General characters and classification up to classes with the names of the examples. **General topic:** (i) External morphology and life cycle of *Fasciola hepatica*. (ii) Parasitic adaptations of platyhelminthes.

UNIT III: Aschelminthes (Nematoda): External morphology, life cycle, pathogeny, parasitic adaptations and control measures of the following:

- *Ascaris lumbricoides* (Round worm)
- *Dracunculus medinensis* (Guinea worm)
- *Wuchereria bancrofti* (Filarial worm)

Annelida: General characters and classification up to classes with the names of the examples. External characters **General topics:** (i) Metamerism in Annelida. (ii) Biological significance of Earthworm.

UNIT IV: Arthropoda: General Characters and classification up to class with the names of the examples. **Type study:** *Panurginus*: External characters–Appendages–compound eye - Reproductive system and Life cycle. **General topics:** (i) social life in insects – Honey Bees (ii) Beneficial insects – Honey bee, Lac insects and silk moth (iii) External Characters, economic importance and control measures of the pests of agricultural crops (Coconut – Paddy) (a) *Oryctes rhinoceros* (b) *Leptocorisa acuta*

UNIT V: Mollusca: General characters and classification up to classes with the names of the examples. **Type study:** *Pila globosa*: External characters – shell – mantle cavity – Anatomy of Digestive system and reproductive system. **General topics:** (i) Pearl culture and Pearl Industry in India. (ii) Cephalopods as advanced Molluscs.

Echinodermata: General characters and classification up to classes with the names of the example. **Type study: Star fish:** External Characters – Water vascular system. **General topic:** - Larval forms of Echinodermata and their Phylogenetic significance.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 17.06.2019
1-L1	UNIT I: Introduction to Invertebrates – Major and minor phyla.
2-L2	Introduction to Principles of taxonomy – Natural classification, artificial classification, practical classification and binominal classification.
3- L3	General characteristics of phylum Protozoa up to classes with examples.
4-L4	Morphology of <i>Paramecium</i> – oral apparatus, cytoplasm, cilia, trichocyte, nucleus, contractile vacuoles and its function.
5-L5	Nutrition in <i>Paramecium</i> (feeding mechanism, digestion, absorption, egestion) locomotion, osmoregulation and excretion.

6-L6	Reproduction – asexual reproduction by binary fission and sexual reproduction by conjugation – significance of conjugation.
7-L7	General structure, life cycle, pathogeny and control measures of <i>Entamoeba histolytica</i> .
8- P1	Welcoming of First year and Inauguration of Zoology Association
9- L8	General structure, life cycle, pathogeny and control measures of <i>plasmodium</i> .
10- L9	General characters of phylum <i>Porifera</i> - classification – characters of class Calcarea, class Hexactinellida and class Demospongia.
11-L10	External structure of Ascon sponge - body wall, spicules and asexual and sexual reproduction.
12-L11	Canal system in sponges – functions of canal system, types of canal system (Ascon, Sycon, Rhagon and Leucon).
13-L12	Unit II: General characters of phylum Cnidaria (Coelenterata)
14-L13	Classification – characters of class Hydrozoa, class Scyphozoa and class Anthozoa.
15-L14	Structure of the Obelia colony – Polyps and Blastostyles, nematocyst and body wall. Allotting portion for Internal Test-I
	Internal Test I begins
16-L15	Life history of Obelia, metagenesis. Corals – Hydrozoan and Anthozoan corals, structure of the coral polyp.
17-IT-1	Internal Test-I (24.07.2019)
18-L16	Coral reefs – conditions required for coral reef formation, types of coral reefs and theories of coral reef formation.
19-L17	General characters of Platyhelminthes - classification up to classes with examples (class Turbellaria, class Trematoda and class Cestoda). Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	External morphology of Liver Fluke – Life history – larval stages – Capsule, Miracidium larva, Sporocyst, Radia, Cercaria, Metacercaria larva. Alternation of generations.
21- L19	Parasitic adaptations of liver fluke.
22- P2	College level meeting/Cell function
23-L20	UNIT III: Aschelminthes (Nematoda) – External morphology.
24-L21	External morphology, life cycle, pathogeny, parasitic adaptations and control measures of <i>Ascaris lumbricoides</i> (Round worm).
25-L22	External morphology, life cycle, pathogeny, parasitic adaptations and control measures of <i>Dracunculus medinensis</i> (Guinea worm).
26-L23	External morphology, life cycle, pathogeny, parasitic adaptations and control measures of <i>Wuchereria bancrofti</i> (Filarial worm).
27-L24	General characters and classification of Annelida (up to classes with the names of the examples).
28-L25	External structure of Earthworm – Biological significance of earthworm.
29-L26	Metamerism in Annelida – types of metamerism, origin and significance of metamerism.
30-L27	UNIT IV: Arthropoda: General Characters and classification up to class with the names of the examples.
31-L28	External morphology of <i>Penaeus</i> (Marine Prawn).
32-L29	Anatomy of typical appendage – Structure of cephalic and abdominal

	appendages
33-L30	Structure of a compound eye, male and female reproductive systems of Prawn.
34- P3	Department Seminar
35-L31	Life history of Prawn - larval forms viz, Nauplius, Metanauplius, Zoea and Mysis.
36-L32	Social life in honey bees – common species, division of labour, salient features of social life. Allotting portion for Internal Test-II.
	Internal Test II begins
37- L33	Honey bees as a beneficial insects – benefits of honey bee, apiculture.
38- IT-II	Internal Test-II (28.08.2019)
39-L34	Lac insects as a beneficial insects and lac culture -
40-L35	Revision and Group Discussion - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Silk moth as a beneficial insect – biology of silk moth, benefits of silkworm, sericulture.
42- L37	External Characters, economic importance and control measures of the pest of Coconut, <i>Oryctes rhinoceros</i> .
43- L38	External Characters, economic importance and control measures of the pest of Paddy, <i>Leptocorisa acuta</i>
44- P4	College level meeting/ function
45-L39	General characters and classification of Phylum Mollusca (up to classes with the names of the examples).
46-L40	External characters of <i>Pila globosa</i> : structure of the shell and mantle cavity.
47-L41	Anatomical study of digestive system and male and female reproductive system.
48-L42	Pearl culture and Pearl industry – type of pearls, composition, pearl formation and culture of pearls.
49-L43	Cephalopods as advanced Molluscs - advanced characters of Cephalopods.
50-L44	General characters and classification of Phylum Echinodermata (up to classes with the names of the example). Allotting portion for Internal Test-III
	Internal Test III begins
51 L45	External Characters of star fish. Structure of a typical Pedicellaria.
52- L46	Water vascular system (Medreporite, Stone canal, Ring canal, Radial canals, Lateral canals and tube feet), functions of water vascular system.
53-IT-III	Internal Test-III (27.10.2019)
54-L47	Larval forms of Echinodermata and their Phylogenetic significance.
55-L48	Revision and Group discussion Test Paper distribution and result analysis.
	Entering Internal Test-III Marks into University portal
56- MT	Model Test (14.10.2019)
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 “Animal Diversity I Invertebrata”
CO1	Gain knowledge about the general taxonomic rules on animal classification.
CO2	Classify Phylum Porifera to Echinodermata with taxonomic keys.
CO3	Recognize the structural organization of single cell to multicellular invertebrates.
CO4	Understand the parasitic adaptations exists in filarial worm, round worm and Guinea worm.
CO5	Realize the causes and consequence of pathogeny.
CO6	Ability to describe importance of social and beneficial insects.
CO7	Identify the pests of different agricultural crops.
CO8	Realize the importance of pearl oyster.
Experimental Learning	
EL1	Collect the pests of paddy and coconut.
EL2	Study the structure of amoeba and paramecium with the aid of permanent slides.
EL3	Learning the structure of <i>Ascaris</i> , <i>Panaeus</i> and <i>Pila</i> with museum specimens.
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 ZOOLOGY

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc Zoology
Course Name	Personality Development
Course Code	GCSB5B
Class	III year (2019-2020)
Semester	Odd
Staff Name	Dr.Jansi 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 enable the students to groom their personality and prove themselves as good Samaritans of the Society.
- To know the applications of concepts, Theories or issues in human development.
- To know the Qualities of effective leadership
- To aware ideas to tackle the problem of human stress
- To learn about types of interview

Syllabus

PERSONALITY DEVELOPMENT

Unit I Personality

Meaning, definition -determinants of personality- major traits-theories of personality development

Unit 2 Personality concepts

Personality concepts -self image; self esteem, self- monitoring -advantages and disadvantages of self monitoring, perception- meaning, process of perception; factors influencing perception, Errors in perception- attitudes -types of attitudes and factors influencing attitudes

Unit 3 Leadership

Definition of leadership - leadership style - theories of leadership- qualities of an effective leadership

Unit 4 Skills

Meaning and types of skills; communication - definition and importance and process of communication; methods of communication- barriers in communication and technologies of effective communication

Unit 5 Interview

meaning and types of interview- planning for an interview- types of questions in interview- employer's expectations from a candidate.

Reference

1. Personality development - books of MS University Publications

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on (18-06-2015)
1-L1	Personality
2-L2	meaning
3- L3	meaning
4-L4	definition
5-L5	definition
6-L6	determinants of personality
7-L7	determinants of personality
8- P1	Zoology Association
9- L8	major traits
10- L9	major traits
11-L10	major traits-theories of personality development
12-L11	Personality concepts
13-L12	Personality concepts -self image
14-L13	self esteem, self- monitoring
15-L14	advantages and disadvantages of self monitoring
	Allotting portion for Internal Test-I
	Internal Test I begins(20-07-2015)
16-L15	perception
17-IT-1	Internal Test-I
18-L16	meaning, process of perception
19-L17	factors influencing perception Errors in perception
	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	attitudes
21- L19	types of attitudes

22- P2	College level meeting/Cell function
23-L20	factors influencing attitudes
24-L21	Leadership
25-L22	definition of leadership
26-L23	definition of leadership
27-L24	definition of leadership
28-L25	leadership style
29-L26	leadership style
30-L27	theories of leadership
31-L28	theories of leadership
32-L29	qualities of an effective leadership
33-L30	Skills
34- P3	Department Seminar
35-L31	meaning
36-L32	types of skills
	Allotting portion for Internal Test-II
	Internal Test II begins(31-08-2015)
37- L33	communication
38- IT-II	Internal Test-II
39-L34	definition
40-L35	importance and process of communication
	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	importance and process of communication
42- L37	methods of communication
43- L38	barriers in communication
44- P4	College level meeting/ function
45-L39	technologies of effective communication
46-L40	technologies of effective communication
47-L41	Interview
48-L42	meaning and types of interview
49-L43	meaning and types of interview
50-L44	planning for an interview
	Allotting portion for Internal Test-III
	Internal Test III begins(05-10-2015)
51 L45	planning for an interview
52- L46	types of questions in interview
53-IT-III	Internal Test-III
54-L47	employer's expectations from a candidate
55-L48	employer's expectations from a candidate
	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 “<PERSONALITY DEVELOPMENT >”
CO1	enable the students to groom their personality and prove themselves as good Samaritans of the Society
CO2	known the applications of concepts, Theories or issues in human development
CO3	known the qualities of effective leadership
CO4	aware ideas to tackle the problem of human stress
CO5	Get ideas about the types of interview

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Poultry Science (Elective)
Course Code	SEZO5F
Class	III year (June 2019 to November 2019)
Semester	Odd
Staff Name	Dr. D. Paramanatha Swami Doss
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- To explore the scope of poultry science.
- To introduced various breeds of chicks, layers and broilers.
- To describe construction, maintenance of poultry keeping and also introduce the rearing and maintenance of poultry.
- To describe how to prevent and manage various diseases of poultry.
- To understand the role of egg in human nutrition.

Syllabus

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc. Zoology) / Semester – 5 / Elective 2

POULTRY SCIENCE

UNIT I:

Poultry industry in India – a brief introduction. Choosing a commercial laying stock –sexing in one day old chicks. Poultry housing – General principles of building poultry house. Deep litter system – Droppings pit – Feeders, Waterers – Nest boxes. Laying cages – Californian cages – Management of cage birds.

UNIT II:

Poultry manure – Volume, Composition and values. Nutritional content of eggs. Management of Chicks, Growers, Layers and Broilers. Lighting for Chicks, Growers, Layers and Broilers. Summer and winter management. Debeaking – Forced moulting.

Unit III:

Poultry nutrition: Protein and Amino acid requirements for chicks, growers, layers and broilers – Symptoms of excessive dietary levels and deficiency. Carbohydrates and Fat requirements for Chicks, Growers, Layers and Broilers– Symptoms of excessive dietary levels and deficiency. Fiber requirement for poultry feeds. Requirements of vitamins and inorganic minerals for Chicks, Growers and Layers – Deficiency Symptoms.

UNIT IV:

Importance of feed additives in a poultry feed. Preparation of supplementary feed for poultry- South Indian feed ingredients in relation to M.E level, Protein level, Amino acid, Minerals (Calcium and Phosphorus) and Fiber content.

UNIT V:

Poultry diseases – Causes, Symptoms, Transmission, Treatment, Prevention and Control of the following diseases: Viral diseases - Ranikhit disease, Fowl pox, Infection and control bronchitis and Gumboro disease. Bacterial disease – Fowl typhoid, Paratyphoid, Pullorum, fowl cholera, Coryza and Mycoplasmosis. Fungal diseases – Aspergillosis and Aflatoxicosis. Parasitic disease- Coccidiosis. Nematode infections. Tape worm infections. External parasites of chicks – Ticks, mites and lice.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 17.06.2019
1-L1	Unit I: Introduction
2-L2	Poultry industry in India – a brief introduction - development of poultry in India – Five year plan.
3- L3	Choosing a commercial laying stock - Characteristics of different races – selection criteria.
4-L4	Sexing in one day old chicks – Vent sexing – Feather sexing – Advantages and Disadvantages.
5-L5	Poultry housing – Selection of site – Do's and Don't's.
6-L6	Layout of Broiler farm
7-L7	Layout of Layer farm - all in out – continuous farming.
8- P1	Welcoming of First year and Inauguration of Zoology Association
9- L8	Deep litter system – Litter materials – maintenance litter – advantages and disadvantages.
10- L9	Dropping pit -
11-L10	Feeders, Waterers: Tube feeder, Basin feeder, Chain feeder, Automatic feeder. Basin waterer, Nipple drinkers.

12-L11	Nest boxes – location – Size.
13-L12	Laying cages – Californian cages – Construction – M type cage
14-L13	Management of cage birds – Methods, Precautions, Advantages and disadvantages.
15-L14	Unit II: Poultry manure – Volume, Composition and values
16-L15	Nutritional content of eggs.
17- L16	General management for Chicks.
18- L17	General management for growers.
19- L18	General management for Layers.
20- L19	General management for Broilers.
21- L20	Lighting – importance Allotting portion for Internal Test-I
	Internal Test I begins
22- L21	Lighting for Chicks – Chick Guard – Duration – Effect of Chill – Lighting equipment.
23- IT-1	Internal Test-I (24.07.2019)
24- L22	Lighting for Growers – duration – effect of light for reproduction.
25- L23	Lighting for Layers and Broilers.
26- L24	Summer and winter management Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
27- L25	Debeaking – Need – Prevention of peck order – Debeaker – methods – Schedule of debeaking.
28- L26	Force moulting – advantages – Cycle (one and three per year) feeding grit – moulting agents.
29- L27	Unit III: Poultry nutrition - Introduction
30- P2	College level meeting/Cell function
31-L28	Protein and Amino acid requirements for chicks, growers.
32-L29	Protein and Amino acid requirements for layers and broilers.
33-L30	Symptoms of excessive dietary levels and deficiency.
34- L31	Carbohydrates and Fat requirements for Chicks and Growers.
35- L32	Carbohydrates and Fat requirements for Layers and Broilers.
36- L33	Symptoms of excessive dietary levels and deficiency.
37- L34	Fiber requirement for chicks, growers, layers and broiler feeds.
38- L35	Requirements of inorganic minerals – calcium, phosphorous, iron, copper, sodium and potassium for Chicks – Deficiency Diseases and Symptoms.
39- L36	Requirements of inorganic minerals – calcium, phosphorous, iron, copper, sodium and potassium for Growers and Layers – Deficiency Diseases and Symptoms.
40- L37	Requirements of vitamin A, K, D, E, Riboflavin, Pantothenic acid, B12 for Chicks - Deficiency Diseases and Symptoms.
41- L38	Requirements of vitamin A, K, D, E, Riboflavin, Pantothenic acid, B12 for Growers and Layers – Deficiency Diseases and Symptoms.
42-P3	Department Seminar
43- L39	Unit IV: Importance of feed additives in a poultry feed.
44- L40	Preparation of supplementary feed for poultry – Requirement – FCR – Supplementary food for chicks and growers.
45- L41	Preparation of supplementary feed for poultry – Requirement – FCR Supplementary food for layers and broilers.

46- L42	South Indian feed ingredients in relation to M.E level
47- L43	Allotting portion for Internal Test-II
	Internal Test II begins
48- L44	South Indian feed ingredients in relation to Protein level, Amino acid.
49-IT-II	Internal Test-II (28.08.2019)
50-L45	South Indian feed ingredients in relation to Minerals (Calcium and Phosphorus)
51- L46	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
52- L47	South Indian feed ingredients in relation to Fiber content
53- L48	Revision and Group Discussion.
54- L49	Unit V: Introduction about Disease management.
55- L50	Causes, Symptoms, Transmission, Treatment, Prevention and Control of the Viral diseases - Ranikhit disease and Fowl pox.
56- L51	Causes, Symptoms, Transmission, Treatment, Prevention and Control of the Viral diseases - Infection and control bronchitis and Gumboro disease.
57- L52	Causes, Symptoms, Transmission, Treatment, Prevention and Control of the Bacterial disease – Fowl typhoid, Paratyphoid, Pullorum,
58- L53	Causes, Symptoms, Transmission, Treatment, Prevention and Control of the Bacterial disease - fowl cholera, Coryza and Mycoplasmosis.
59-P4	College level meeting/ function
60- L54	Causes, Symptoms, Transmission, Treatment, Prevention and Control of the Fungal diseases – Aspergillosis and Aflatoxicosis.
61- L55	Causes, Symptoms, Transmission, Treatment, Prevention and Control of the Parasitic disease- Coccidiosis.
62- L56	Poultry Farm Visit
63- L57	Visit to District Livestock Farm
64- L58	Allotting portion for Internal Test-III
	Internal Test III begins
65- L59	Causes, Symptoms, Transmission, Treatment, Prevention and Control of the Nematode infections. Tape worm infections.
66- L60	Causes, Symptoms, Transmission, Treatment, Prevention and Control of the External parasites of chicks – Ticks, mites and lice.
67-IT-III	Internal Test-III (27.10.2019)
68- L61	Materials require to formulate to control external parasites – tetrachlorvinphos, carbamyl, etc.
69- L62	Revision and Group discussion.
70- L63	Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
71-MT	Model Test (14.10.2019)
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 30.10.2019

Course Outcomes

Learning Outcomes	COs of the course “POULTRY SCIENCE”
CO1	Students can get self-employed after their graduation.
CO2	Imparts knowledge about the basic concepts of poultry.
CO3	Able to understand the management of broilers and layers.
CO4	Gains knowledge about the practical aspects of chick rearing.
CO5	Understand the role of nutrition for successful poultry farming.
CO6	Know about the benefits of forced moulting.
CO7	Develop the practical skill about disease management.
CO8	Able to describe the vaccination schedule for layers and broilers.
CO9	Understand the importance of poultry manure.
Experimental Learning	
EL1	Field visit to local boiler farm.
EL2	Visit to layer farm.
EL3	Field visit to district livestock farm.
EL4	Visit to hatchery unit
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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Vermitechnology
Course Code	SSZO4B
Class	I year (2019-2020)
Semester	Even
Staff Name	P. Augustus Robince
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To get the thorough knowledge of making vermicompost and vermiculture.
- To encourage the self-employment practice and save the human being by the way of minimizing the use of chemical fertilizers.
- To know the importance of earth worm

Syllabus

UNIT I Earthworm taxonomy – Morphological and anatomical – Classification of earthworms – Food habits – Digestive system – Excretion – Reproduction and Life cycle – Earthworm as farmer's friend.

UNIT II Types of earthworm – Exotic and native species – South Indian and North Indian species used in Vermicomposting – Collection and Preservation of earthworms for vermicomposting – Culture techniques of earthworms.

UNIT III Vermicompost production – Requirements – Different methods of Vermicomposting – Heap method – Pot method and Tray method – changes during Vermicomposting.

UNIT IV Role of Earthworms in soil fertility – Use of Vermicompost for crop production – Use of earthworms in land improvement and land reclamation – Economics of Vermicompost and

vermiwash production. Earthworms as animal feed – Medicinal value of earthworm meal – Role of Earthworms in Solid Waste, Sewage and faecal waste management and Vermifilters. Earthworms as bioreactors.

UNIT V Interaction of earthworms with other organisms – Influence of chemical inputs on earthworm activities – Large scale manufacture of Vermicompost, packaging of vermicompost and its marketing – Financial supporting – Government and NGOs for vermiculture work.

Course Calendar

Hour allotment	Class Schedule
	EvenSemester Begin on 02.12.2019
1-L1	UNIT I Earthworm taxonomy
2-L2	Morphological
3- L3	anatomical
4-L4	Classification of earthworms
5-L5	Food habits
6-L6	Digestive system
7-L7	Excretion.
8- P1	Welcoming of First year and Inauguration of Mathematics Association
9- L8	Reproduction
10- L9	Life cycle
11-L10	Earthworm as farmer"s friend
12-L11	UNIT II Types of earthworm
13-L12	Exotic Species
14-L13	native species
15-L14	- Allotting portion for Internal Test-I
	Internal Test I begins on 23.01.2020
16-L15	South Indian Species Used in vermicomposting.
17-IT-1	Internal Test-I
18-L16	North Indian species used in Vermicomposting –
19-L17	- Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Collection and Preservation of earthworms for vermicomposting.
21- L19	Culture techniques of earthworms.
22- P2	College level meeting/Cell function
23-L20	
24-L21	UNIT III Vermicompost production.
25-L22	Requirements.
26-L23	Different methods of Vermicomposting
27-L24	Heap method .
28-L25	Pot method and Tray method
29-L26	changes during Vemicomposting

30-L27	UNIT IV Role of Earthworms in soil fertility
31-L28	Use of Vermicompost for crop production
32-L29	Use of earthworms in land improvement and land reclamation
33-L30	Economics of Vermicompost and vermiwash production.
34- P3	Department Seminar
35-L31	Earthworms as animal feed.
36-L32	- Allotting portion for Internal Test-II
	Internal Test II begins
37- L33	Medicinal value of earthworm meal.
38- IT-II	Internal Test-II
39-L34	Role of Earthworms in Solid Waste.
40-L35	- Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Sewage
42- L37	faecal waste management
43- L38	Vermifilters. Earthworms as bioreactors
44- P4	College level meeting/ function
45-L39	UNIT V Interaction of earthworms with other organisms .
46-L40	Influence of chemical inputs on earthworm activities .
47-L41	Large scale manufacture of Vermicompost.
48-L42	packaging of vermicompost
49-L43	Marketing of vermicompost
50-L44	- Allotting portion for Internal Test-III
	Internal Test III begins on
51 L45	Financial supporting
52- L46	Government for Vermiculture work
53-IT-III	Internal Test-III
54-L47	NGOs for vermiculture work.
55-L48	- Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
56- MT	Model Test begins
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 “Vermitechnology”
	CO1 Explain different species of earth worm
	CO2 Describe the Anatomy of earth worm
	CO3 Explain the digestive system of earth worm
	CO4 Draw the Life cycle of earthworm
	CO5 Differentiate chemical fertilizer and vermicompost
	CO6 Explain the different methods of vermicompost production

CO7	Justify “Earth worms are farmer’s friends”
CO8	Describe the reproduction in earth worm
CO9	List out the economically important Invertebrates
Experimental Learning	
EL1	Prepare a chart of Life cycle of earth worm
EL2	GD on different methods of vermicompost production
EL3	Collect different species of earth worm available in your area
EL4	Compare the morphology earth worm with other worms
Integrated Activity	
IA1	Growing garden using vermicompost
IA2	Production of vermicompost

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Animal Diversity II - Chordata
Course Code	SMZO12
Class	I year (2019-2020)
Semester	Odd
Staff Name	P. Augustus Robince
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem	
Internal Test-3 Hrs	
Model Test-3 Hrs	
Dept. Meetings-2 Hrs	
College Meetings-2 Hrs	
Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To exemplify the intermediary position of Prochordates between Invertebrates and Vertebrates.
- To study the structure, functional organization.
- To study the adaptations and the economic importance of lower and higher chordates.

Syllabus

Unit I: Introduction to Chordata: General Characters (Diagnostic characters and additional Characters) and Classification up to classes with the name of the examples. Prochordata : General Characters and Classification up to orders with the names of the examples. Type Study: Ascidian – External features – Digestive and Reproductive system External features and Biological significance of the following (a) Amphioxus (b) Balanoglossus Agnatha: Petromyzon - External morphology; Ammocoetes Larva.

Unit II: Pisces: General Characters and Classification up to sub-classes with the names of the examples. Type Study: Scoliodon (Shark) - External characters - Placoid scales - Digestive System - Respiratory system - Receptor Organs - Urinogenital System. General topics: (i) Accessory respiratory organs in fishes (ii) Migration of fishes.

Unit III: Amphibia: General Characters and Classification upto orders with the names of the examples. External features and Biological significance of the following Examples: (a) Rhachophorus (b) Ambystoma (c) Axolotl Larva. General topic: Parental care in Amphibia Reptilia: General Characters and Classification up to orders with the names of the examples. External features and Biological significance of the following Examples: (a) Chelone mydas (b) Chamaeleon (c) Draco (d) Cobra General Topics: (i) Identification of poisonous and non-poisonous snakes of South India (ii) Venom apparatus - Biting mechanism- venom - First aid for snake bite - Antivenom.

Unit IV: Aves: General characters and classification up to subclasses with the names of the examples. Type study: Columba livia (Pigeon) - External characters - Flight muscles - Digestive system - Respiratory system - Urinogenital system General topics: (i) Migration of Birds (ii) Flight adaptations in Birds

Unit V: Mammalia: General Characters and Classification up to subclasses with the names of the examples. Type study: Rabbit - External morphology - Digestive system – Respiratory system - Heart - Structure of Brain - Urinogenital system. General topics: (i) Egg laying mammals (ii) Adaptations of aquatic mammals

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 17.06.2019
1-L1	Unit I: Introduction to Chordata.
2-L2	General Characters (Diagnostic characters and additional Characters) .
3- L3	Classification up to classes with the name of the examples.
4-L4	Prochordata : General Characters.

5-L5	Classification up to orders with the names of the examples.
6-L6	Type Study: Ascidian – External features – Digestive Reproductive sysytem (b) Balanoglossus .
7-L7	External features and Biological significance of the following (a) Amphioxus.
8- P1	Welcoming of First year and Inauguration of Mathematics Association
9- L8	Agnatha: Petromyzon - External morphology; Ammocoetes Larva.
10- L9	Unit II: Pisces: General Characters .
11-L10	Classification up to sub-classes with the names of the examples.
12-L11	Type Study: Scoliodon (Shark) - External characters .
13-L12	Placoid scales - Digestive System - Respiratory system .
14-L13	Receptor Organs - Urinogenital System.
15-L14	_____ - Allotting portion for Internal Test-I
	Internal Test I begins on 24.07.2019
16-L15	General topics: (i) Accessory respiratory organs in fishes (ii) Migration of fishes.
17-IT-1	Internal Test-I
18-L16	Unit III: Amphibia: General Characters .
19-L17	_____ - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Classification upto orders with the names of the examples.
21- L19	External features and Biological significance of the following Examples: (a) Rhachophorus (b) Ambystoma (c) Axolotl Larva.
22- P2	College level meeting/Cell function
23-L20	General topic: Parental care in Amphibia Reptilia.
24-L21	General Characters and Classification up to orders with the names of the examples.
25-L22	External features and Biological significance of the following Examples: (a) Chelone mydas (b) Chamaeleon .

26-L23	(c) Draco (d) Cobra .
27-L24	General Topics: (i) Identification of poisonous and non-poisonous snakes of South India .
28-L25	(ii) Venom apparatus - Biting mechanism- venom - First aid for snake bite – Antivenom.
29-L26	Unit IV: Aves: General characters .
30-L27	classification up to subclasses with the names of the examples.
31-L28	Type study: Columba livia (Pigeon) - External characters .
32-L29	Flight muscles .
33-L30	Digestive system .
34- P3	Department Seminar
35-L31	Respiratory system .
36-L32	_____ - Allotting portion for Internal Test-II
	Internal Test II begins on 28.08.2019
37- L33	Urinogenital system .
38- IT-II	Internal Test-II
39-L34	General topics: (i) Migration of Birds .
40-L35	_____ - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	(ii) Flight adaptations in Birds.
42- L37	Unit V: Mammalia: General Characters .
43- L38	Clasification up to subclasses with the names of the examples.
44- P4	College level meeting/ function
45-L39	. 498 Type study: Rabbit - External morphology .
46-L40	Digestive system .
47-L41	Respiratory system .

48-L42	Heart - Structure of Brain .
49-L43	Urinogenital system.
50-L44	_____ - Allotting portion for Internal Test-III
	Internal Test III begins on 27.10.2019
51 L45	General topics: (i) Egg laying mammals .
52- L46	(ii) Adaptations of aquatic mammals.
53-IT-III	Internal Test-III
54-L47	Unit Review.
55-L48	_____ - Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
56- MT	Model Test begins on 14.10.2019
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 "Animal Diversity II – Chordata"
CO1	Observation of the diversity in chordates and their classification.
CO2	Analysis of the significant adaptive features in all classes of Chordata.
CO3	Understand physiological and anatomical peculiarities through type study.
CO4	Appreciate transitional stages and their significance in evolution.

CO5	Understand what transformations are necessary to survive in different adaptive zones.
CO6	Create a positive attitude towards conservation of biodiversity.
CO7	Obtain overview of economically important vertebrates.
CO8	GD on venomous snakes
CO9	Discuss the beneficial insects
Experimental Learning	
EL1	To collect and categories different chordates specimens.
EL2	Observation of external features of specimens of chordates.
EL3	Identification of venomous snakes.
EL4	Identification of fishes.
Integrated Activity	
IA1	Identification of fishes in ponds
IA2	Identification of commercial fishes.

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	Animal Physiology
Course Code	PZOM31
Class	II year (June 2019 to November 2019)
Semester	Odd
Staff Name	Dr. D. Paramanatha Swami Doss
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; $5 \times 16 = 80$; 16Hrs /unit)	

Course Objectives

- This course develops the knowledge about the functions of organs and tissues in the Animal.
- This study also provides the students with the basic understanding of the fundamental processes and mechanisms that serve and control the various functions of the body.
- The basic idea of paper was learned earlier and the detailed course structure were dealt.

Syllabus

MSU / 2017-18 / PG –Colleges / M.Sc. (Zoology) / Semester -III / Ppr.no.14 / Core-13

ANIMAL PHYSIOLOGY

Unit I: Nutrition and Digestion: Important of Carbohydrates, Protein, Lipids. Vitamins and Minerals with regard to human health. Balanced diet, Malnutrition and BMR. Human digestive tract and functions. Role of enzymes in digestion of carbohydrates, proteins and lipids. Gastrointestinal hormones. Intestinal villi and absorption.

Unit II: Blood and Circulation: Structure of arteries and Veins. Blood Corpuscles. Haemopoiesis and formed elements. Plasma functions. Blood volume regulation. Blood groups Coagulation of blood. Structure and function of the human heart. Structure function of

coronary arteries and vein. ECG, Cardiac cycle, Heart rate, Blood pressure. Neural and chemical regulation of heart.

Unit III: Respiration and Excretion: Respiration in air and water. Structure and function of human lung and the respiratory tract. Respiratory pigments. Gas transport between the lungs and tissues. Neural and chemical regulation of respiration. Human: Structure of the Kidney – Nephron Renal circulation –Urine formation. Renal disorders – Micturition and dialysis. Regulation of water and electrolytes. Hormonal control of osmo –iono regulation.

Unit IV: Nervous System and Sense Organs: Neuron –Structure and function Neuro transmitters –Synapse, Conduction of nerve impulses. Structure and function of brain and Spinal cord, EEG. Muscles –Classification – Ultra structure of skeletal muscle -Mechanism of muscular contraction –Neural control of muscles tone and function. Sense organ of vision, hearing and tactile responses.

Unit V: Endocrinology and Reproduction: Structure and function of Endocrine glands. Hormones and diseases. Basics mechanism of hormone action. Estrus and endometrial reproductive cycle's. Neuro endocrine regulation of reproduction.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 17.06.2019
1-L1	Unit I: Nutrition and Thermoregulation – Introduction about Physiology
2-L2	Important of Carbohydrates
3- L3	Importance of Protein and Lipids
4-L4	Importance of Vitamins and Minerals with regard to human health.
5-L5	Student Seminar - Human digestive tract and functions.
6-L6	Role of enzymes in digestion of carbohydrates
7-L7	Role of enzymes in digestion of Proteins.
8-L8	Role of enzymes in digestion of Lipids.
9-L9	Gastrointestinal hormones – types, structure and importance.
10-P1	Structure of Intestinal villi and absorption of Carbohydrate, Protein and Lipid.
11-L10	Revision
12-L11	Unit II: Blood and circulation – Introduction about blood corpuscles.
13-L12	Welcoming of First year and Inauguration of Zoology Association
14-L13	Unit II: Blood and Circulation: Introduction
15-L14	Structure of arteries and Veins.
16-L15	Blood Corpuscles. Haemopoiesis and formed elements.
17-L16	Functions of Blood Plasma.
18-L17	Regulation of Blood volume. Blood groups – A, AB, B and O Coagulation of blood.
19-L18	Structure and function of the human heart
20-L19	Structure function of coronary arteries and vein. ECG
21-L20	Neural and Chemical regulation of heart.
22-L21	Students Seminar - Cardiac cycle, Heart rate, Blood pressure.
23-L22	Unit III Respiration - Respiration in air and water

24-L23	Structural anatomy of the human respiratory tract and lung.
25-L24	Types, structure and importance of respiratory pigments.
26-IT-1	Gas transport between the lungs and tissues.
27-L25	Students Seminar: Neural and chemical regulation of respiration.
28-L26	Revision
29-L27	Excretion – General introduction
30-L28	Allotting portion for Internal Test-I
31- L29	Structural Anatomy of the Kidney –Nephron
32- L30	Renal circulation – Urine formation and concentration
33- L31	Renal disorders – Micturition and dialysis
34-P2	Internal Test-I (24.07.2019)
35- L32	Regulation of water and electrolytes.
36- L33	Hormonal control of osmo-iono regulation
37- L34	Revision
38- L35	Test Paper distribution and result analysis
39- L36	Entering Internal Test-I Marks into University portal
40- L37	Revision
41- L38	Unit IV Neuromuscular and sensory Physiology - Introduction
42- L39	Neuron –Structure and function
43- L40	College level meeting/Cell function
44- L41	Neurotransmitters – History, important neurotransmitters, transport and release.
45- L42	Synapse – Anatomical and functional classification, functions, property
46- L43	Conduction of nerve impulses.
47- L44	Student Seminar: Reflex activity – Classification and property.
48- L45	Structure and function of brain.
49- L46	Student Seminar; Structure of Spinal Cord.
50- L47	Electroencephalogram – Significance, method of recording, EEG during sleep.
51- P3	Revision.
	Department Seminar
52- L48	Revision & Group Discussion.
53- L49	Muscles –Classification.
54- L50	Ultra structure of skeletal muscle
55- L51	Properties of Skeletal muscle.
56-L52	Allotting portion for Internal Test-II
57-L53	Mechanism of muscular contraction – energetics of muscular contraction.
58-L54	Neural control of muscles tone and function
59-IT-II	Internal Test-II (28.08.2019)
60- L55	Neuromuscular junction – Motor unit, Transmission and Blockers.
61- L56	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
62- L57	Sense organ of vision – Structure, physiology of vision, visual pathway and process.
63- L58	Students Seminar – Sense organ of hearing.
64- L59	Students Seminar – Sense organ of taste
65- L60	Sense organ of smell – olfactory pathway, classification of odour / cutaneous receptor.
66- L61	Revision.
67- L62	Revision and Group discussion

68- L63	Unit V: Endocrinology and reproduction – Introduction.
69- L64	Structure and function of Endocrine glands
70- L65	Human: Structure and functions of pituitary.
71- L66	Structure and functions of thyroid.
72- L67	Structure and functions of Adrenal Medulla.
73- L68	Structure and functions of Adrenal Cortex.
74-P4	College level meeting/ function
75- L69	Student Seminar: Hormones and diseases.
76- L70	Basics mechanism of hormone action
77- L71	Oestrous and endometrial cycle.
78- L72	Visit to Clinical Lab.
79- L73	Allotting portion for Internal Test-III
80- L74	Neuroendocrine regulation of reproduction.
81- L75	Revision and Group Discussion
82-IT-III	Internal Test-III (27.10.2019)
83- L76	Revision
84- L77	Test Paper distribution and result analysis
85- L78	Revision
	Entering Internal Test-III Marks into University portal
86- L79	Model Test (14.10.2019)
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 30.10.2019

Course Outcomes

Learning Outcomes	COs of the course “Animal Physiology”
CO1	Understand the importance major food constituents.
CO2	Describe the physiology of digestive and respiratory system of human beings.
CO3	Able to understand how the blood corpuscles are formed.
CO4	Able to detail the blood composition, types, groups and circulatory system.
CO5	Understand the physiology of excretory system and nervous system of human beings.
CO6	Gains knowledge about the physiology of sense organs, muscles and reproductive system.
CO7	Able to differentiate the estrus and menstrual cycle.
Experimental Learning	
EL1	Visit to nearby clinical lab to study the ECG and EEG.
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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology (2019-2020)
Course Name	AQUACULTURE
Course Code	PZOE43
Class	2 year
Semester	EVEN (December 2019-May 2020)
Staff Name	D.V.SHEEBA RAJAKUMARI.
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 promote , facilitate and influence the best possible standards of fisheries management.
- To provide the technical and general knowledge necessary for component fisheries management
- The basic ideas were studied at UG level detailed study are carried in the present course

Syllabus

Unit I : Aquaculture: history, definition, scope & importance, fishery resources of India in general & Tamil Nadu in particular, a biotic and biotic factors of water necessary for fish life, ecological characteristics of lakes & rivers, general ecological characteristics of reservoirs of India.

Unit II : Fish culture: mono, poly, mixed & composite fish culture, fresh water and marine prawn culture and its prospects in India, culture of mussels, clams, oysters and pearl culture, sewage fed fish culture, paddy cum fish culture, frog culture, sea weed culture.

Unit III : Fish breeding in natural conditions, bundh breeding, hypophysation & stripping, transport of live fish and seed, different types of crafts and gears used for fish catching, plankton – its definition, culture & identification, common weeds of fish ponds& methods of their eradication,

production of mono sex and sterile fishes, transgenic fishes, hybridization , polyploidy , role of bio technology in conservation of fishes.

Unit IV : Fresh water fish farm: selection of site, construction of fish farm and soil chemistry, designing layout and construction of different types of fish ponds, setting and management of fresh water aquarium, preservation and processing of fish, fish by products industry and their utility.

Unit V : Water pollution, its effects on fisheries and methods of its abatement, common fish diseases (bacterial, viral, fungal and nutritional deficiency diseases), biochemical composition and nutritional value of fish, fisheries economics and marketing, fisheries managements and extension.

Reference Books (latest editions):

1. T.V.R.Pillay & Dill: Advances in Aquaculture
2. Agarwal & S.C.Narendra: A Hand Book of Fish Farming
3. R.K.Rath: Fresh water Aquaculture
4. Schonder: Hypophysation in Indian Major Carp
5. C.B.Hall: Ponds & Fish Culture
6. C.B.L.Srivastava: Fishes of India
7. Jhingaran: Fish and Fisheries of India

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 2.12.2019
1-L1	Syllabus discussion
2-L2	Introduction to aquaculture
3- L3	History and definition of aquaculture
4-L4	Scope and important of aquaculture
5-L5	Fishery resources of india in general and tamilnadu in particular
6-L6	Abiotic and biotic factors of water necessary for fish life
7-L7	Ecological characteristics of lakes and rivers
8- P1	Welcoming of First year and Inauguration of zoology Association
9- L8	General characteristics of reservoirs of india
10- L9	Fish culture-mono and poly culature
11-L10	Mixed and composite fish culture
12-L11	Fresh water and marine prawn culture and it prospects in india
13-L12	Culture of mussels, clams
14-L13	Oysters and pearls culture
15-L14	Oysters and pearls culture - Allotting portion for Internal Test-I
	Internal Test I begins(23.01.2020)
16-L15	Sewage fed fish culture ,paddy cum fish culture
17-IT-1	Internal Test-I
18-L16	Frog culture, sea weed culture
19-L17	sea weed culture - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Fish breeding in natural conditions , bundh breeding

21- L19	Hypophysation and stripping
22- P2	College level meeting/Cell function
23-L20	Transport of live fish and seed
24-L21	Different types of crafts and gears used for fish catching
25-L22	Plankton –its definition ,culture and identification
26-L23	Common weeds of fish ponds and methods of their eradication
27-L24	Production of monosex and sterile fish , transgenic fishes
28-L25	Hybridization,polyploidy,role of biotechnology in conservation of fishes
29-L26	Freshwater fish farm: selection of site,construction of fish farm and soil chemistry
30-L27	Continue-designing layout and construction of different types of fish ponds
31-L28	Setting and management of fresh water aquarium
32-L29	Preservation and processing of fish
33-L30	Fish by products industry and their utility
34- P3	Department Seminar
35-L31	Water pollution,
36-L32	Water pollution - Allotting portion for Internal Test-II
	Internal Test II begins(25.02.2020)
37- L33	Continue –its effects on fisheries and methods of its abatement
38- IT-II	Internal Test-II
39-L34	Common fish diseases – bacterial , viral
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Fungal and nutritional deficiency diseases
42- L37	Biochemical composition of fish
43- L38	Nutritional value of fish
44- P4	College level meeting/ function
45-L39	Fisheries economic
46-L40	Fisheries marketing
47-L41	Fisheries management
48-L42	Fisheries extension
49-L43	Revesion
50-L44	Allotting portion for Internal Test-III
	Internal Test III begins
51 L45	Revesion
52- L46	Revesion
53-IT-III	Internal Test-III
54-L47	Revesion
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 27.04.2020

Course Outcomes

Learning Outcomes	COs of the course
CO1	Basic understanding of agriculture and aquaculture and fisheries
CO2	Skills as fisheries biologist
CO3	Social outlook on pros and cons of aquaculture industry
CO4	Computer and communication based skills in aquaculture
CO5	Basics of animal biology and fish taxonomy
CO6	Types of food and feeding strategies in finfishes and shellfishes
CO7	Pond fertilization and biological food production
Experimental Learning	
EL1	To do working models to explain frog culture
EL2	To do working models to explain sea weed culture

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology (2019-2020)
Course Name	Cell and molecular biology
Course Code	PZOM12
Class	I year
Semester	Odd(June 2019-Novemger 2019)
Staff Name	D.V.SHEEBA RAJAKUMARI.
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 provide with the core principles of molecular biology
- To gain higher level thinking skills
- To learn basic science and its applications

Syllabus

Unit I : Structure and functions of cell types – Prokaryotes, Eukaryotes. Plasma membrane – structure of membrane, models. Membrane transport, membrane potentials – Extracellular space – cell adhesion, intercellular recognition – intercellular junctions. Mitochondria – ultrastructure – functions – energetic – cellular respiration – Biogenesis.

Unit II : Ultrastructure of Ribosomes, Endoplasmic reticulation and Golgi complex. Biosynthesis of secretary proteins on ribosomes and rough endoplasmic reticulum- post-translational modifications of proteins both in the RER and SER. Golgi Complex- formation of disulfide bonds- glycosylation. Lysozyme – ultrastructure – enzymes– origin and functions of lysosome.

Unit III : Cell – Cell signaling – signaling mechanisms, signal molecules – signal receptors – form of intracellular signaling – cell surface receptors – signal transduction – pathways – signaling from plasma membrane to nucleus. Cell adhesion – calcium dependent hemophilic cell – cell adhesion – N-CAMs mediated calcium independent hemophilic cell – cell

adhesion. Cell matrix adhesion – cell matrix adhesion proteins – integrins – Hemidesmosomes – collagen and non-collagen components.

Unit IV : Nucleus – structure and function. Nucleo-cytoplasmic interaction, Nuclear transplantation. Cell fusion – homokaryons heterokaryons, cytoplasts, karyoplasts.

Unit V : Cell division – mitosis – molecular mechanisms for regulating mitotic events – cyclins and their kinases (cdks) – cell death and its regulation- Characteristics of cancer cells, causes and onset of cancer

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 17.06.2019
1-L1	Structure and function of cell types –prokaryotes,eukaryotes
2-L2	Plasmamembrane-structure of membrane models
3- L3	Membrane transport
4-L4	Membrane potential ,extra cellular space- cell adhesion
5-L5	Intercellular recognition- intercellular junction
6-L6	Mitochondria – ultra structure and functions
7-L7	Energetic -cellular respiration- biogenesis
8- P1	Welcoming of First year and Inauguration of ZOOLOGY Association
9- L8	Ultra structure of ribosomes
10- L9	Ultra structure of endoplasmireticulum
11-L10	Ultra structure of golgi complex
12-L11	Biosynthesis of secretary proteins on ribosomes
13-L12	Biosynthesis of secretary protein on RER
14-L13	Golgicomplex-formation of disulphidebonds- glycosylation
15-L14	Allotting portion for Internal Test-I
	Internal Test I begins(24.07.2019)
16-L15	Lysozyme –ultra structure – enzymes –origin and functions of lysozyme
17-IT-1	Internal Test-I
18-L16	Cell –cell signalling-signaling mechanism
19-L17	- Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Signal molecules –signal receptor –form of intra cellular signaling
21- L19	Cell surface receptor
22- P2	College level meeting/Cell function
23-L20	Signal transduction –pathways
24-L21	Signalling from plasmamembrane to nucleus
25-L22	Cell adhesion –calcium dependent haemophilic cell –cell adhesion
26-L23	N –CAMs mediated calcium independent haemophilic cell-cell adhesion
27-L24	Cell matrix adhesion-cell matrix adhesion proteins -integrins
28-L25	Hemidesmosomes
29-L26	Collagen and non collagen components
30-L27	Nucleus- structure and function
31-L28	Nucleo cytoplasmic interaction

32-L29	Nuclear transplantation
33-L30	Cell fusion-homokaryons and heterokaryons
34- P3	Department Seminar
35-L31	Cytoplast
36-L32	Allotting portion for Internal Test-II
	Internal Test II begins(28.08.2019)
37- L33	Karyoplast
38- IT-II	Internal Test-II
39-L34	Cell division
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Mitosis
42- L37	Molecular mechanism for regulating mitotic events
43- L38	Cyclins and their kinases (cdks)
44- P4	College level meeting/ function
45-L39	Cell death
46-L40	Regulation of cell death
47-L41	Characteristic of cancer cell
48-L42	Causes of cancer
49-L43	Onset of cancer
50-L44	- Allotting portion for Internal Test-III
	Internal Test III begins(27.10.2019)
51 L45	Reversion
52- L46	Reversion
53-IT-III	Internal Test-III
54-L47	Reversion
55-L48	Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
56- MT	Model Test(14.10.2019)
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
CO1	Exhibit a knowledge base in genetics, cell and molecular biology and anatomy and physiology
CO2	Demonstrate the knowledge of common and advanced laboratory practices in cell and molecular biology.
CO3	Exhibit clear and concise communication of scientific data
CO4	Engage in review of scientific literature in the areas of biomedical sciences

CO5	Critique and professionally present primary literature articles in the general biomedical sciences field.
Experimental Learning	
EL1	To do working models to explain Genetic code
EL2	To do working models to explain Coding sequences

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	ENTOMOLOGY
Course Code	PZOM24
Class	I year (2019-2020)
Semester	Even
Staff Name	Dr,M.Rajakumari
Credits	4
L. Hours /P. Hours	4 / WK
Total 60 Hrs/Sem Internal Test-3 Hrs Model Test-3 Hrs Dept. Meetings-2 Hrs College Meetings-2 Hrs Remaining 50 Hrs (5 units; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To understand basic insect biology, as well as natural history and evolutionary relationships of insect orders and families
- To have a deeper understanding of several aspects of the biology of insects
- To appreciate the impact that insects have (both positive and negative) on human society, including human health, agriculture, and the environment
- To explain, critically evaluate, and effectively interpret claims, theories, and assumptions in biology
- Communicate scientific arguments and ideas clearly and explicitly through writing, speech, and graphical media

Syllabus

Unit I : Taxonomy : Principles of insect classification – Classification of insects upto order – key characteristics with Indian examples. Collection and preservation of insects.

Unit II : Structure and function : Types of antennae – mouth parts (Piercing and sucking type – cutting & chewing type and siphoning type) – wings and venation. Integumentary system : Structure and chemistry. Digestive system : Structure and physiology of digestive system. Respiration : Aerial and aquatic respiration. Circulatory system : Structure of heart, mechanism of haemolymph circulation. Excretory system : Malpighian tubules and their function – role of rectum in water and ion regulation. Receptors : compound eye, coeloconia, Johnston's organ – chordotonal organs and stridulatory organ. Endocrine control of moulting and metamorphosis. Male and female reproductive system : Types of ovaries – Vitellogenesis – mating and oviposition.

Unit III : Insect pest : Life cycle and damage caused by insect pests of economically important crops : cotton, paddy, groundnut, sugarcane, coconut, pulses, brinjal and stored grains. Human diseases : Biology, mode of transmission of diseases and control – mosquito, housefly and sand fly.

Unit IV : Insect pest management : Assessment of pest population and pest damage. Control measures : Natural, cultural, mechanical, physical, legal, chemical control – mode of entry and mode of action, biological control. Recent trends in pest control : Chemosterilants, hormones, pheromones, anti-feedants and IPM.

Unit V : Applied Entomology : Beneficial insects – Economic significance of silkworm, lac insects and honeybees, pollinating insects. The value of insects of man – insects as protein sources of human and animal feeds. Medicinal use of insects. Forensic entomology.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 02.12.2019
1-L1	Introduction to Taxonomy
2-L2	Principles of insect classification
3- L3	Classification of insects upto order
4-L4	Key characteristics with Indian examples
5-L5	Collection of insects.
6-L6	Preservation of insects.
7-L7	Types of antennae
8- P1	Zoology Association activities
9- L8	Mouth parts (Piercing and sucking type -cutting & chewing type and siphoning type)
10- L9	wings and venation. Integumentary system :
11-L10	Structure and chemistry. Digestive system :
12-L11	Structure and physiology of digestive system
13-L12	Respiration : Aerial and aquatic respiration.
14-L13	Circulatory system : Structure of heart, mechanism of haemolymph circulation.
15-L14	Excretory system : Malphigian tubules and their function - Allotting portion for Internal Test-I
	Internal Test I begins
16-L15	Role of rectum in water and ion regulation
17-IT-1	Internal Test-I
18-L16	Receptors : compound eye, coelocoria,
19-L17	Jhonston's organ - Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Chordotonal organs
21- L19	Stridulatory organ.
22- P2	College level meeting/Cell function
23-L20	Endocrine control of moulting and metamorphosis
24-L21	Male reproductive system :
25-L22	Female reproductive system :
26-L23	Types of ovaries
27-L24	Vitellogenesis
28-L25	Mating and oviposition.
29-L26	Introduction to Insect pest
30-L27	Life cycle of Insect pest
31-L28	Damage caused by insect pests of economically important crops
32-L29	Damage caused by insect pests of cotton, paddy
33-L30	Damage caused by insect pests of groundnut, sugarcane, coconut
34- P3	Department Seminar
35-L31	Damage caused by insect pests of pulses, brinjal and stored grains.
36-L32	Human diseases - Allotting portion for Internal Test-II
	Internal Test II begins
37- L33	Biology, mode of transmission of diseases and control
38- IT-II	Internal Test-II
39-L34	Mosquito, housefly and sand fly

40-L35	Insect pest management : Assessment of pest population and pest damage - Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Control measures : Natural, cultural
42- L37	Mechanical, physical, legal, chemical control
43- L38	Mode of entry and mode of action, biological control
44- P4	College level meeting/ function
45-L39	Recent trends in pest control
46-L40	Chemosterilants, hormones, pheromones, anti-feedants and IPM.
47-L41	Introduction to Applied Entomology
48-L42	Beneficial insects
49-L43	Economic significance of silkworm, lac insects and honeybees
50-L44	pollinating insects. - Allotting portion for Internal Test-III
	Internal Test III begins
51 L45	The value of insects of man – insects as protein sources of human and animal feeds.
52- L46	Medicinal use of insects. Forensic entomology.
53-IT-III	Internal Test-III
54-L47	Revision of Units I & II
55-L48	Revision of Units III & IV - 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 27.04.2020

Course Outcomes

Learning Outcomes	COs of the course “<ENTOMOLOGY>”
CO1	Be able to apply concepts and analytical approaches in evolutionary biology, genetics and two other areas of biology of the student's choice.
CO2	Demonstrate phylogenetic "tree thinking" and be able to categorize insects based on basic ecological, behavioral, morphological, physiological, or developmental attributes.
CO3	To be able to examine insects deeply within a biological level of analysis and compare strategies used by different groups
CO4	Be able to identify the potential impact of different insect species on agriculture, human health, and society in general; to be knowledgeable about potential control strategies
CO5	Be able to locate, comprehend and synthesize information important for informed decisions about broader issues in our society
CO6	To effectively communicate in written, oral, and graphical form
CO7	Are skilled in determining pest levels and impact on plant and animal hosts, and the management of these pests
CO8	Understand the environmental, legal, and ethical issues involved in insect population management
Experimental Learning	
EL1	Demonstrate an understanding of insect identification, structure, and function
EL2	Understand the evolutionary and ecological relationships of insects with other life forms and the impact of insects relative to human health and well being and animal and plant health
EL3	Understand the principles and methods of managing beneficial and pest insect populations
Integrated Activity	
IA1	Apply the scientific method in problem solving and the principles of experimental design and analysis
IA2	Be able to communicate research and educational materials properly and competently – orally, visually, and in writing – will be able to work effectively with others

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology (2019-2020)
Course Name	Evolution
Course Code	PZOM23
Class	1 year
Semester	EVEN (December 2019-May 2020)
Staff Name	D.V.SHEEBA RAJAKUMARI.
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; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To develop a genomics platform dedicated to the study of eco and socio evolutionary dynamics
- To gain insight into eco evolutionary dynamics within and across trophic level

Syllabus

Unit I : Origin of cells and unicellular evolution : Origin of basic biological molecules, abiogenesis, biogenesis, Biochemical origin of life, biological evolution (protenoids and microsphere coacervates), biogeny of protein and nucleic acid ,concept of Oparin and Haldane – Experiment of Urey and Miller

Unit II : Evidences and Theories of Evolution : Evidences : From Paleontology – Geological time scales and its major events - Types of fossils and process of fossilization – Evidences from biogeography – Evidences from morphology, comparative anatomy, embryology, biochemistry and physiology. Theories of organic evolution : Lamarkism, Darwinism, Mutation theory, Modern synthetic theory.

Unit III : Mechanism of Evolution : Population genetics – population, gene pool, gene frequency ; Hardy – Weinberg law, Gene frequency and its impacts, natural selection, migration and genetic drift, variations, isolating mechanism and origin of species – Allopatric and sympatric speciation.

Unit IV : Origin of Higher Taxa : Simpson’s definition of the higher taxa, Simpson’s adaptive grid, pre-adaptations and post-adaptations, patterns of evolution : convergent evolution and parallel evolution, Micro evolution, Macro evolution (adaptive radiation), Mega evolution, Connecting link between vertebrate classes, quantum evolution. Rates of Evolution : Orthotely, Bradytely and Tachytely, Gradualism versus punctuated equilibrium, Extinction and its causes.

Unit V : Mankind evolution : Phylogenetic tree and stages of primate evolution including Homo sapiens. Place and time of origin, characteristics and ancestors of man. Evolutionary trends of man evolution, cultural evolution of man, allometry, altruism and kin and kin selection.

Reference Books

1. Moody, P. A., 1978. Introduction to evolution (Harper International).
2. Stebbins, C. L., 1979. Processes of organic evolution (Prentice – Hall India, New Delhi)

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 02.12.2019
1-L1	Syllabus discussion
2-L2	Introduction to evolution
3- L3	Origin of basic biological molecules
4-L4	Abiogenesis ,biogenesis
5-L5	Biochemical origin of life, biological evolution
6-L6	Biology of protein and nucleic acid
7-L7	Concept of oparin and Haldane
8- P1	Welcoming of First year and Inauguration of zoology Association
9- L8	Experiment of urey and miller
10- L9	Evidences : from paleontology
11-L10	Geological time scale and it major events
12-L11	Types of fossils and process of fossilization
13-L12	Evidences from biogeography
14-L13	Evidences from morphology,comparative anatomy, embryology

15-L14	Allotting portion for Internal Test-I
	Internal Test I begins(23.01.2020)
16-L15	Continue- evidences from biochemistry and physiology
17-IT-1	Internal Test-I
18-L16	Theories of organic evolution- lamarkism ,Darwinism
19-L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Continue- mutation and modern synthetic theory
21- L19	Mechanism of evolution –population genetics- population ,genepool, gene frequency
22- P2	College level meeting/Cell function
23-L20	Hardy-weinberg law, gene frequency and its impacts
24-L21	Natural selection, migration and genetic drift
25-L22	Continue – variation ,isolating mechanism and origin of species
26-L23	Allopatric and sympatric speciation
27-L24	Origin of higher taxa: simpson’s definition of the higher taxa, simpson’s adaptive grid
28-L25	Preadaptation and post adaptation
29-L26	Patterns of evolution: convergent and parallel evolution
30-L27	Micro and macro evolution, and mega evolution
31-L28	Connecting link between vertebrate classes
32-L29	Quantum evolution
33-L30	Rates of evolution: horotely , bradetely, and tachytely
34- P3	Department Seminar
35-L31	Graduation versus punctuated equilibrium
36-L32	Allotting portion for Internal Test-II
	Internal Test II begins(25.02.2020)
37- L33	Extinction and its causes
38- IT-II	Internal Test-II
39-L34	Man kind evolution: phylogenetic tree
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Stages of primate evolution including homo sapiens
42- L37	Place of origin
43- L38	Time of origin
44- P4	College level meeting/ function
45-L39	Characteristics and ancestors of man
46-L40	Evolutionary trends of man evolution
47-L41	Cultural evolution of man
48-L42	Allometry
49-L43	Altruism
50-L44	Allotting portion for Internal Test-III
	Internal Test III begins
51 L45	Kith and kin selection
52- L46	Revesion
53-IT-III	Internal Test-III
54-L47	Revesion
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 27.04.2020

Course Outcomes

Learning Outcomes	COs of the course “<course name>”
CO1	To develop a genomics platform dedicated to the study of eco and socio evolutionary dynamics
CO2	To gain insight into eco evolutionary dynamics within and across trophic level
Experimental Learning	
EL1	Prepare a model for Geological time scale
Integrated Activity	
IA1	Prepare a chart for Quantum evolution
IA2	Prepare a chart for Rates of evolution: horotely , bradetely, and tachytely

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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology
Course Name	Microbiology
Course Code	PZOM21
Class	I year (December 2019 to April 2020)
Semester	Even
Staff Name	Dr. D. Paramanatha Swami Doss
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; $5 \times 13 = 65$; 13Hrs /unit)	

Course Objectives

- An education on microbiology will impart extensive knowledge to the students with basic concepts that occur within all microorganisms.
- To know the theoretical and practical aspects of microbial growth.
- To better understand the morphology and physiological characteristics of different groups of microorganisms.
- To enable the students to understand the techniques for bacterial culture.
- To understand the applications of microbiology in Agriculture, Medicine and daily life.

Syllabus

MSU / 2017-18 / PG –Colleges / M.Sc. (Zoology) / Semester -II / Ppr.no.5 / Core-5

MICROBIOLOGY

Unit I: Historical perspectives in Microbiology – Scope of microbiology – Classification of microorganisms – protozoa – algae – fungi – bacteria (Gram Negative and Gram Positive) and virus –Whittaker's five kingdom concept. Ultra structure of bacteria – capsule, cell wall – Gram negative and Gram positive, Cytoplasmic inclusion.

Unit II: Microbial growth and nutrition – requirements – culture media –Microbiological media, enrichment media, enriched media, transport media, selective media and pure culture

techniques – growth curve – kinetics of growth – Batch culture – Synchronous growth – Measurement of growth and enumeration of cells. Cultivation of microorganisms – Methods of preservation and maintenance of cultures – Role of disinfectants.

Unit III: Dairy, Food and Industrial Microbiology: Microbiology of milk – Pasteurization, Dairy product and fermentation technology. Microbiology of food: Food spoilage – spoilage of meat – bread – food poisoning and food preservation. Industrial production of Penicillin, amino acid and wine.

Unit IV: Microbial diseases and their control: Bacterial diseases, Air borne disease, Diphtheria – Pertusis – Tuberculosis. Food borne and water borne diseases: Cholera, Typhoid, Salmonellosis. Soil borne diseases: Tetanus and Anthrax, sexually transmitted and contact diseases: Gonorrhoea, Syphilis and Leprosy. Viral diseases – Air borne diseases: Measles, Mumps, Chicken pox. Insect borne diseases: Dengue fever, chikungunya. Food and water borne diseases: Polio, Hepatitis – A Direct Conduct Diseases: Viral Hepatitis – Hepatitis B, Rabies, AIDS.

Unit V: Environmental and Agriculture Microbiology Potable water: Microbial analysis of water, purification of water. Organic compost, Biogas, mechanism of methane formation, Sewage treatment, treatment of industrial effluents. Microbial leaching: Copper and uranium. Biodegradation – Petroleum and xenobiotic. Nutrient cycling (Carbon cycle, phosphorus cycle, Sulphur cycle and nitrogen cycle). Microbial herbicides: Bacterial insecticides - *Pseudomonas* and *Bacillus* as insecticides. Viral insecticides, Entomopathogenic fungi.

Course Calendar

Hour allotment	Class Schedule
	Even Semester Begin on 02.12.2019
1-L1	Unit I : General introduction about the world of microbes.
2-L2	Historical perspectives in Microbiology – Contributions of Pioneers - Scope of microbiology.
3- L3	Classification of microorganisms - 3 kingdom classification, 5 kingdom classification, 8 kingdom classification and molecular classification.
4-L4	General characters and classification of protozoa – algae – fungi.
5-L5	Ultra structure of bacteria – Detailed about Cytoplasm, the Cell Envelope, the Cytoplasmic Membrane, the Cell Wall.
6-L6	Gram positive and gram negative bacteria.
7-L7	Student Seminar – Cytoplasmic inclusions – ribosomes, glycogen, lipid and pigments
8- P1	Zoology Association Meeting
9- L8	Revision and Group discussion
10- L9	Unit II: Introduction
11-L10	Microbial growth and nutrition – requirements for microbial culture.
12-L11	Preparation of different kinds of culture media and their features.
13-L12	Microbiological media, enrichment media, enriched media, transport media, selective media.

14-L13	Culture techniques – pure culture and batch culture.
15-L14	Allotting portion for Internal Test-I
	Internal Test I begins
16-L15	Growth curve – Lag, Log, Stationary and Decline phases - kinetics of growth. Synchronous growth – conditions required for bacterial growth.
17- IT1	Internal Test-I (23.01.2020)
18- L16	Measurement of growth and enumeration of cells – viable plate count, by turbidity, by using colony counter etc.
19- L17	Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20- L18	Cultivation of microorganisms - Broth cultures, Agar plates, Stab cultures, Culture collections and Methods of preservation and maintenance of cultures.
21- L19	Students Seminar - Solid plate culture of thermophilic microorganisms
22-P2	College level meeting/Cell function
23- L20	Students Seminar - – Role of disinfectants.
23- IT-1	Unit III: Introduction &
24- L21	Microbiology of milk – Pasteurization.
25- L22	Dairy product and fermentation technology
26-L23	Microbial Food spoilage – spoilage of meat – bread
27-L24	Food poisoning by harmful bacteria and role of beneficial bacteria for food preservation.
28-L25	Students Seminar - Industrial production of Penicillin.
29-L26	Students Seminar – Microbial production of Wine.
30-L27	Students Seminar – Microbial production of Amino acids.
31-L28	Revision
32-L29	Revision and Class test
33-L30	Unit IV: Introduction about the microbes and disease.
34- P3	Department Seminar
35-L31	Bacterial Diseases – Causative agent, Symptoms, Causes and Treatment of Air borne disease - Diphtheria – Pertusis – Tuberculosis
36-L32	Bacterial Diseases – Causative agent, Symptoms, Causes and Treatment of Food borne and water borne diseases: Cholera, Typhoid, Salmonellosis. Allotting portion for Internal Test-II.
	Internal Test II begins
37- L33	Bacterial Diseases – Causative agent, Symptoms, Causes and Treatment of Soil borne diseases: Tetanus and Anthrox.
38- IT-II	Internal Test-II
39-L34	Bacterial Diseases – Causative agent, Symptoms, Causes and Treatment of Sexually transmitted and contact diseases: Gonorrhoea, Syphilis and Leprosy.
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Viral diseases - Causative agent, Symptoms, Causes and Treatment of Air borne diseases: Measles, Mumps, Chicken pox.
42-L37	Viral diseases - Causative agent, Symptoms, Causes and Treatment of Insect borne diseases: Dengue fever, Chikungunya.
43- L38	Viral diseases - Causative agent, Symptoms, Causes and Treatment of Food and water borne diseases: Polio, Hepatitis – A

44- P4	College level meeting/ function
45-L39	Student seminar -Direct Conduct Diseases: Viral Hepatitis – Hepatitis B, Rabies, AIDS.
46-L40	Unit V: Environmental and Agriculture Microbiology Potable water: Microbial analysis of water, purification of water.
47-L41	Organic compost, Biogas, mechanism of methane formation, Sewage treatment, treatment of industrial effluents.
48-L42	Microbial leaching: Copper and uranium. Biodegradation – Petroleum and xenobiotic.
49-L43	Students Seminar - Nutrient cycling (Carbon cycle, phosphorus cycle)
50-L44	Allotting portion for Internal Test-III
	Internal Test III begins
51 L45	Sulphur cycle and nitrogen cycle.
52- L46	Microbial herbicides: Bacterial insecticides - <i>Pseudomonas</i> and <i>Bacillus</i> as insecticides.
53-IT-III	Internal Test-III
54-L47	Viral insecticides, Entomopathogenic fungi.
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 27.04.2020

Course Outcomes

Learning Outcomes	COs of the course “Microbiology”
CO1	Understand the taxonomic classification of microorganisms.
CO2	Gain knowledge about the concepts of growth and reproduction of bacteria.
CO3	Gather theoretical background of microbial cultivation.
CO4	Familiar with various sterilization techniques.
CO5	Able to explore the microbial food poisoning.
CO6	Able to know the techniques used in industrial production of alcohol.
CO7	Know about various bacterial disease, their causative agent, mode of infection, epidemiology and treatment.
CO8	Understand the soil microbiology and xenobiotics.
CO9	Describe the microbial method of waste water treatment.
Experimental Learning	
EL1	Visit to microbiology lab.
EL2	Hands on training on microbial plating techniques.

EL3	Visit to nearest sewage treatment plant.
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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	B.Sc. Zoology
Course Name	Animal Physiology
Course Code	SMZO51
Class	III year
Semester	Odd(2020-2021)
Staff Name	D.V.SHEEBA RAJAKUMARI.
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; $5 \times 10 = 50$; 10Hrs /unit)	

Course Objectives

- To provide with the core principles of animal physiology
- To gain higher level thinking, understanding about the functions of different organs.
- To learn basic science and its applications

Syllabus

UNIT I

- Introduction – Animal physiology and Biochemistry
- Carbohydrates – Classification – Structure and functions of glucose, fructose, sucrose and glycogen
- Proteins – classification – structure and function of albumin and glycoproteins.
- General structure of amino acids – essential, non essential aminoacids.
- Lipids – classification – structure and functions of lecithin, Cephalin, glycol lipids and cholesterol
- Prostaglandins – Introduction – Structure – Classification –Functions.

UNIT II

- Enzymes – classification – Nomenclature and properties – Mechanism of enzyme action.
- Digestion – Role of enzymes in carbohydrate, Protein and Fat Digestion in man absorption of digested food materials in man.
- Metabolism – Carbohydrates – Glycogenesis, glycogenolysis, glycolysis – Krebs's cycle.
- Protein's – Deamination – Transamination – Urea cycle.
- Lipids – β -Oxidation.

UNIT III

- Respiration – respiratory pigments – Distribution – composition – properties – Functions – Transport and exchange of oxygen and carbon-di-oxide - Anaerobiosis - Respiratory Quotient.
- Circulation – Origin and conduction of heart beat – cardiac cycle – ECG – Blood pressure – Heart diseases – Artherosclerosis, Angiogram.
- Excretion – kinds of excretory products – structure of kidney – Nephron – Mechanism of urine formation in man – composition of urine – Nephritis – Dialysis.

UNIT IV

- Muscle Physiology – types of muscles - Ultra structure of skeletal muscle – properties – mechanism of muscle contraction – Tetanus – Muscle fatigue
- Nerve Physiology – structure, types and functions of neuron.
- Nerve impulse – Definition – Conduction of nerve impulse through nerve – Saltatory conduction – Synapse – Synaptic transmission of impulses – Neurotransmitters – Neuromuscular junction.

UNIT V

- Endocrine system – Fine structure and functions of Pituitary, thyroid, Parathyroid, Adrenal, Islets of Langerhans – Testis, Ovary.
- Reproductive Physiology - Ovary, Graafian follicles, menstrual cycle, pregnancy, lactation, menopause - the role of hormones.

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 03.08.2020
1-L1	Syllabus discussion,
2-L2	Introduction – Animal physiology and Biochemistry
3- L3	Structure and functions of glucose, fructose
4-L4	Sucrose and glycogen
5-L5	Proteins – classification
6-L6	Structure and function of albumin and glycoproteins.
7-L7	General structure of amino acids
8- P1	Welcoming of First year and Inauguration of zoology Association
9- L8	Essential, non essential aminoacids.
10- L9	Lipids – classification – structure and functions of lecithin
11-L10	Cephalin, glycol lipids and cholesterol
12-L11	Prostaglandins – Introduction
13-L12	Structure – Classification –Functions.
14-L13	Enzymes – classification– Nomenclature and properties
15-L14	Mechanism of enzyme reaction- Allotting portion for Internal Test-I
	Internal Test I begins(29.08.2020)
16-L15	Digestion – Role of enzymes in carbohydrate
17-IT-1	Internal Test-I
18-L16	Protein and Fat Digestion in man absorption of digested food materials in man
19-L17	Metabolism – Carbohydrates – Glycogenesis, Glycogenolysis- Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	glycolysis – Kreb’s cycle
21- L19	Protein’s – Deamination
22- P2	College level meeting/Cell function
23-L20	Transamination – Urea cycle
24-L21	Lipids – β -Oxidation.
25-L22	Respiration – respiratory pigments
26-L23	Distribution – composition – properties –Functions
27-L24	Transport and exchange of oxygen and carbon-di-oxide
28-L25	Anaerobiosis -Respiratory Quotient.
29-L26	Circulation – Origin and conduction of heart beat
30-L27	Cardiac cycle – ECG – Blood pressure
31-L28	Heart diseases – Artherosclerosis, Angiogram
32-L29	Excretion – kinds of excretory products
33-L30	Structure of kidney – Nephron
34- P3	Department Seminar
35-L31	Mechanism of urine formation in man-composition of urine-Nephritis-Dialysis
36-L32	Muscle Physiology – types of muscles - Allotting portion for Internal Test-II
	Internal Test II begins(25.09.2020)
37- L33	Ultrastructure of skeletal muscle – properties –mechanism of muscle contraction
38- IT-II	Internal Test-II
39-L34	Tetanus – Muscle fatigue
40-L35	Nerve Physiology – structure - Test Paper distribution and result analysis

	Entering Internal Test-II Marks into University portal
41-L36	types and functions of neuron.
42- L37	Nerve impulse – Definition
43- L38	Conduction of nerve impulse through nerve – Saltatory conduction
44- P4	College level meeting/ function
45-L39	Synapse – Synaptic transmission of impulses
46-L40	Neurotransmitters –Neuromuscular junction.
47-L41	Endocrine system – Fine structure and functions of Pituitary
48-L42	thyroid, Parathyroid, Adrenal, Islets of Langerhans
49-L43	Testis,Ovary.
50-L44	Reproductive Physiology - Ovary, Graafian follicles, - Allotting portion for Internal Test-III
	Internal Test III begins(02.11.2020)
51 L45	menstrual cycle, pregnancy, lactation,
52- L46	menopause - the role of hormones.
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(21.11.2020)
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 2.12.2020

Course Outcomes

Learning Outcomes	COs of the course
	CO1 Exhibit a knowledge base in physiology
	CO2 Demonstrate the knowledge of common and advanced laboratory practices in animal physiology.
	CO3 Exhibit clear idea about the functioning of different organs
Experimental Learning	
EL1	To do working models to explain the functioning of heart
EL2	To do working models to explain functioning of Kidney
Integrated Activity	
IA1	Prepare chart for sturcture of Muscles
IA2	Prepare chart for Digestive 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 Zoology

COURSE ACADEMIC PLAN

(Prepared by staff member handling the course)

Programme Name	M.Sc. Zoology (2020-2021)
Course Name	Cell and molecular biology
Course Code	PZOM12
Class	I year
Semester	Odd(June 2020-December 2020)
Staff Name	D.V.SHEEBA RAJAKUMARI.
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 provide with the core principles of molecular biology
- To gain higher level thinking skills
- To learn basic science and its applications

Syllabus

Unit I : Structure and functions of cell types – Prokaryotes, Eukaryotes. Plasma membrane – structure of membrane, models. Membrane transport, membrane potentials – Extracellular space – cell adhesion, intercellular recognition – intercellular junctions. Mitochondria – ultrastructure – functions – energetic – cellular respiration – Biogenesis.

Unit II : Ultrastructure of Ribosomes, Endoplasmic reticulation and Golgi complex. Biosynthesis of secretory proteins on ribosomes and rough endoplasmic reticulum- post-translational modifications of proteins both in the RER and SER. Golgi Complex- formation of disulfide bonds- glycosylation. Lysozyme – ultrastructure – enzymes– origin and functions of lysosome.

Unit III : Cell – Cell signaling – signaling mechanisms, signal molecules – signal receptors – form of intracellular signaling – cell surface receptors – signal transduction – pathways – signaling from plasma membrane to nucleus. Cell adhesion – calcium dependent hemophilic cell – cell adhesion – N-CAMs mediated calcium independent hemophilic cell – cell

adhesion. Cell matrix adhesion – cell matrix adhesion proteins – integrins – Hemidesmosomes – collagen and non-collagen components.

Unit IV : Nucleus – structure and function. Nucleo-cytoplasmic interaction, Nuclear transplantation. Cell fusion – homokaryons heterokaryons, cytoplasts, karyoplasts.

Unit V : Cell division – mitosis – molecular mechanisms for regulating mitotic events – cyclins and their kinases (cdks) – cell death and its regulation- Characteristics of cancer cells, causes and onset of cancer

Course Calendar

Hour allotment	Class Schedule
	Odd Semester Begin on 03.08.2020
1-L1	Structure and function of cell types –prokaryotes,eukaryotes
2-L2	Plasmamembrane-structure of membrane models
3- L3	Membrane transport
4-L4	Membrane potential ,extra cellular space- cell adhesion
5-L5	Intercellular recognition- intercellular junction
6-L6	Mitochondria – ultra structure and functions
7-L7	Energetic -cellular respiration- biogenesis
8- P1	Welcoming of First year and Inauguration of ZOOLOGY Association
9- L8	Ultra structure of ribosomes
10- L9	Ultra structure of endoplasmireticulum
11-L10	Ultra structure of golgi complex
12-L11	Biosynthesis of secretary proteins on ribosomes
13-L12	Biosynthesis of secretary protein on RER
14-L13	Golgicomplex-formation of disulphidebonds-glycosylation
15-L14	Allotting portion for Internal Test-I
	Internal Test I begins(29.08.2020)
16-L15	Lysozyme –ultra structure – enzymes –origin and functions of lysozyme
17-IT-1	Internal Test-I
18-L16	Cell –cell signalling-signaling mechanism
19-L17	- Test Paper distribution and result analysis
	Entering Internal Test-I Marks into University portal
20-L18	Signal molecules –signal receptor –form of intra cellular signaling
21- L19	Cell surface receptor
22- P2	College level meeting/Cell function
23-L20	Signal transduction –pathways
24-L21	Signalling from plasmamembrane to nucleus
25-L22	Cell adhesion –calcium dependent haemophilic cell –cell adhesion
26-L23	N –CAMs mediated calcium independent haemophilic cell-cell adhesion
27-L24	Cell matrix adhesion-cell matrix adhesion proteins -integrins
28-L25	Hemidesmosomes
29-L26	Collagen and non collagen components
30-L27	Nucleus- structure and function
31-L28	Nucleo cytoplasmic interaction

32-L29	Nuclear transplantation
33-L30	Cell fusion-homokaryons and heterokaryons
34- P3	Department Seminar
35-L31	Cytoplast
36-L32	Allotting portion for Internal Test-II
	Internal Test II begins(25.09.2020)
37- L33	Karyoplast
38- IT-II	Internal Test-II
39-L34	Cell division
40-L35	Test Paper distribution and result analysis
	Entering Internal Test-II Marks into University portal
41-L36	Mitosis
42- L37	Molecular mechanism for regulating mitotic events
43- L38	Cyclins and their kinases (cdks)
44- P4	College level meeting/ function
45-L39	Cell death
46-L40	Regulation of cell death
47-L41	Characteristic of cancer cell
48-L42	Causes of cancer
49-L43	Onset of cancer
50-L44	- Allotting portion for Internal Test-III
	Internal Test III begins(02.11.2020)
51 L45	Reversion
52- L46	Reversion
53-IT-III	Internal Test-III
54-L47	Reversion
55-L48	Test Paper distribution and result analysis
	Entering Internal Test-III Marks into University portal
56- MT	Model Test(21.11.2020)
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 02.12.2020

Course Outcomes

Learning Outcomes	COs of the course
CO1	Exhibit a knowledge base in genetics, cell and molecular biology and anatomy and physiology
CO2	Demonstrate the knowledge of common and advanced laboratory practices in cell and molecular biology.
CO3	Exhibit clear and concise communication of scientific data
CO4	Engage in review of scientific literature in the areas of biomedical sciences

CO5	Critique and professionally present primary literature articles in the general biomedical sciences field.
Experimental Learning	
EL1	To do working models to explain Genetic code
EL2	To do working models to explain Coding sequences

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

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