

B.SC. ZOOLOGY

PROGRAMME OUTCOMES OF B.SC. PROGRAMME

- Apply the broaden and in-depth knowledge of science and computing to analyse, think creatively and generate solutions to face the global challenges.
- Foster intellectual curiosity, critical thinking and logical reasoning.
- Adapt to different roles and responsibilities and develop leadership qualities in multicultural working environment by relating to diversity and ethical practices.
- Update the techniques and acquire skills to develop systems and methods to solve current problems.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSOs	Upon completion students of B.Sc. Zoology will be able to :
PSO - 1	Acquire knowledge on biosystematics and functional organization of animals.
PSO - 2	Undertake studies in a range of zoological disciplines including: Biochemistry, Cell Biology, Genetics, Physiology, Developmental Biology, Ecology, Evolution, Immunology, Microbiology, Biostatistics and Computer applications.
PSO - 3	Demonstrate practical skills and to interpret results obtained using the fundamental Zoological techniques.
PSO - 4	Develop entrepreneurship skills utilizing the knowledge gained from courses like Aquaculture, Sericulture, Apiculture, Poultry, Vermitechnology, Clinical lab technology and General health care.
PSO - 5	Plan their career goals and pursue higher studies to meet global challenges.

Semester : I **Major Core I**
Name of the Course : Invertebrate Zoology
Course code : ZC1711

No. of hours, week	No. of credits	Total number of hours	Marks
4	4	60	100

Learning Objectives

1. To know the difference between protozoa and metazoa and to study the structure functional organization adaptations and the economic importance of invertebrates.
2. To enable the students to recognize the invertebrates and to obtain jobs in museum consultancy firms and educational institutions.

Course Outcome

CO	Upon completion of this course the students will be able to :	PSO addressed	CL
CO - 1	Identify major taxonomic groups, functional organization and their relationship with the environment.	PSO-1	R

CO - 2	Communicate the major evolutionary innovations in invertebrate groups.	PSO -1	U
CO - 3	Discuss the ecological and economic importance of invertebrates.	PSO-1	U
CO - 4	Investigate invertebrates in laboratory and field conditions and identify major taxonomic groups.	PSO- 2	Ap; R
CO - 5	Observe draw and synthesize information into ideas and concepts.	PSO- 3	An
CO - 6	Evaluate the animal diversity and develop their career opportunities as a taxonomist.	PSO-4; PSO - 5	C

Teaching Plan
Total Hours: 60 (Including Seminar & Test)

Unit	Module	Topics	Hours	Learning outcome	Pedagogy	Assessment
I	Protozoa (9 hrs)					
	1	Classification of Animal Kingdom. Levels of organization Grades of organization symmetry and coelom	2	Identify major taxonomic groups	Lecture, PPT	MCQ Short test Mind Map
	2	Protozoa: General characters and classification up to classes with names of examples only.	1	Describe the functional organization and identify protozoans based on key characters	Lecture, Vocabulary drill	Formative Assessment I (1, 2, 4)
	3	Type study: <i>Paramecium</i> – Structure osmoregulation and reproduction (binary fission and conjugation) Locomotion and Nutrition in Protozoa	4	Explain the anatomy and physiology of <i>Paramecium</i>	Lecture, Video class, Demonstration	Formative Assessment II (3)
	4	Malaria and Amoebiasis (causes symptoms prevention and control).	2	Relate the aetiology of protozoan diseases	Lecture , PPT	
II	Porifera & Coelenterata (9 hrs)					
	1	Porifera: General characters and classification up to classes with names of examples.	1	Identify poriferans based on key characters	Brain Storming, Lecture	Short test Mind map Objective test
	2	Type study: <i>Leucosolenia</i> – external morphology - body wall Reproduction Canal system in sponges	4	Comprehend the physiology of sponges	Lecture, PPT	Formative Assessment I (45)

	4	Coelenterata: General characters and classification up to classes with names of examples only. Type study: <i>Obelia</i> - structure of the colony and life history.	3	Recall the different classes of coelenterates Explain <i>Obelia</i> anatomy and life history	Lecture, Group discussion, Concept map	Formative Assessment II (12)
	5	Corals Coral reefs and their significance.	1	Appreciate the corals	Lecture, video	
III	Platyhelminthes & Aschelminthes (9 hrs.)					
	1	Platyhelminthes: General characters and classification up to classes with names of examples only. Type study: Liver fluke (structure and life cycle) Tape worm (structure)	3	Identify the platyhelminth worms Describe the structure and life cycle of flat worms	Lecture, Group discussion, ppt	Short test MCQ Objective test Formative Assessment I (123) Formative Assessment II (4)
	2	Aschelminthes: General characters and classification up to classes with names of examples only.	1	Classify Aschelminthes	Lecture	
	3	Pathogenicity and control measures of <i>Ascaris lumbricoides</i> <i>Wuchereria bancrofti</i> <i>Enterobius vermicularis</i> <i>Ancylostoma duodenale</i> and <i>Dracunculus medinensis</i> .	4	Analyse the pathogenicity of different parasites	Lecture, PPT	
	4	Parasitic adaptations of Helminthes.	1	Comprehend the different adaptations of parasites	Lecture	
IV	Annelida & Arthropoda (9hrs.)					
	1	Annelida: General characters and classification up to classes with names of examples only. Type study: Earthworm (structure and nephridia) Metamerism in Annelida.	3	Identify Metamerism in annelids Explain the structure of nephridia	Lecture, Demonstration, PPT	Diagram test Open book test
	2	Arthropoda: General characters and classification up to classes with names of examples.	1	Identify arthropods based on its characters	Mind Map, Lecture	
	3	Type study: <i>Panaeus</i> - external characters appendages Compound eye Reproductive system and life cycle.	3	Identify the different parts of <i>Panaeus</i> and its life cycle	Demonstration, Lecture	MCQ Formative Assessment I (1, 2, 3, 4) Formative Assessment III

	4	Mouth parts of insects.	1	Relate different mouth parts of insects and their feeding mode	Lecture, PPT	(5)	
	5	Pest of Paddy (<i>Leptocorisa varicornis</i>) Coconut (<i>Oryctes rhinoceros</i>).	1	Compare the pests and control measures	Lecture		
V	Mollusca & Echinodermata (9 hrs.)						Short test Quiz Formative Assessment III (123)
	1	Mollusca: General characters and classification up to classes with names of examples only. Type study: Pila - external characters – shell Pallial complex - Digestive system Respiratory system	4	Identify molluscs Describe the anatomy and physiology of Pila	Mind map, Demonstration , Lecture		
	2	Cephalopods as advanced molluscs.	1	Evaluate the complexity of cephalopods	Lecture		
	3	Echinodermata: General characters and classification with names of examples only Type study: Star fish – external characters Water vascular system Larval forms of Echinoderms and their phylogenetic significance.	4	Identify echinoderms based on the characters. Appreciate water vascular system. Identify larval forms of starfish	Lecture, PPT		

Course instructor
Dr. A. Punitha

Head of the Department
Dr. S. Mary Mettilda Bai

Semester I
Major Practical I (Invertebrate Zoology)
Course Code: ZC17P1

No. of hours/week	No. of credits	Total number of hours	Marks
2	2	30	50

Course Outcomes

CO	Upon completion of this course the students will be able to :	PSO addressed	CL
CO - 1	Identify and list the salient features of selected invertebrate types through the observation of both living and preserved specimens.	PSO- 1	R
CO - 2	Assess the anatomy of few invertebrates based on the dissection.	PSO- 2	An
CO - 3	Apply laboratory skills including microscopy, dissection and careful observation.	PSO- 3	Ap
CO - 4	Apply the skill of handling animals and identification in higher studies.	PSO- 3	Ap
CO - 5	Record the observation.	PSO- 3	Ap; An

Teaching Plan

Credits: 2

Total Hours: 30

Module	Description	Hours	CO No.
1	Observation of live <i>Paramecium</i> – Hay culture	2	1,3
2	Observation of spicules – Sponge	2	1,3
3	Mounting: Cockroach – mouth parts	2	2,3,4,5
4	Cockroach - salivary gland apparatus	2	2,3,4,5
5	Cockroach - trachea	2	2,3,4,5
6	Dissection: Cockroach - Digestive system	2	2,3,4,5
7	Dissection: Cockroach - Nervous system	2	2,3,4,5
8	<i>Amoeba</i> , <i>Paramecium</i> , <i>Euglena</i> , <i>Spongilla</i> , Sponge gemmule, <i>Obelia</i> , <i>Physalia</i> , Coral (Fungia), Planaria, Liver fluke, Tapeworm, Cercaria larva	4	1,5
9	<i>Ascaris</i> (Male and Female), Earthworm, Nereis, Leech, Trochophore larva, <i>Penaeus</i> , Millipede, Centipede	4	1,5
10	<i>Oryctes rhinoceros</i> , Nauplius larva, Zoea larva, Pila, <i>Lamellidens</i>	4	1,5
11	<i>Pinctada</i> , Sepia, Octopus, Chiton, Starfish, Sea urchin, Sea Cucumber, Bipinnaria larva.	4	1,5

Semester : I Non-Major Elective Course I
Name of the Course : UG - NMEC – Public Health and Hygiene (Interdisciplinary)
Course code : ZNM171

No. of hours/week	No. of credits	Total number of hours	Marks
4	3	60	100

Learning Objectives

1. To make the students understand the various aspects of health and hygiene a practice what they learn to cherish a healthy life.
2. To get job opportunities as health care taker, health inspector, beautician, project assistant in environment related programs, develop skill for personal care, maternal health, etc.

Course Outcomes

CO	Upon completion of this course the students will be able to :	PSO addressed	CL
CO - 1	Discuss the concepts of health and nutrition in relation to physical, mental, social and spiritual fitness.	PSO -1	U
CO - 2	Manage personal health with respect to skin, hair, eye, ear and teeth.	PSO -1	R
CO - 3	Apply the knowledge of maternity and child health.	PSO -2	Ap
CO - 4	Design housing standards and employ good sanitary measures.	PSO -2	Ap
CO - 5	Gain knowledge on first aid procedures and alternative medicine.	PSO -2	U

Teaching Plan

Total Hours: 60 (Including Seminar & Test)

Unit	Module	Description	Hours	Learning outcome	Pedagogy	Assessment
I	Nutrition and health					
	1	Concept of health – physical, mental, social and spiritual. Positive health.	1	Discuss the concepts of health and hygiene	Lecture	MCQ Short test Mind Map Formative Assessment I
	2	Quality of health index.	1	Explain the health index	Lecture	
	3	Nutrition: carbohydrates, lipids, proteins, vitamins, minerals and water.	3	Identify the nutrients in the diet	PPT	
	4	Snacking and fast food.	1	Instruct the effects of Snacks and fast food	PPT/Group discussion	
	5	BMI – obesity – malnutrition (Kwashiorkar and Marasmus).	1	Analyse BMI	Lecture	
6	Food hygiene, food toxicants and adulterants.	2	Identify hygienic food	Lecture, group discussion		
II	Personal health care					
	1	Skin: General care – Skin problems. Anti-ageing strategies.	2	Apply the skin care tips	Lecture	Short test, One word test Formative Assessment II
	2	Hair: General care – preventing hair loss – anti-dandruff strategies.	1	Recall general hair care	Lecture, group discussion	
	3	Teeth: General care – common dental problems.	2	Identify the dental problems	PPT	
4	Eye: General care – common eye problems –	2	Apply the techniques in	Lecture, Chart		

		contact lens.		rectifying eye problems		
	5	Ear: General care – common ear problems – hearing-aid equipment.	2	Identify common ear problems	Lecture	
III	Maternal and Child Health					
	1	Motherhood – Pregnancy confirmation, Antenatal care	1	Record the events involved in pregnancy	Lecture, Demonstration of pregnancy confirmation test.	Listing out important terms, Slip test, Formative assessment I
	2	Physical and emotional changes, common problems during pregnancy	1	Discuss the changes during pregnancy	Lecture	
	3	Intranatal care	1	Explain intranatal care	Lecture, Video	
	4	Labour and delivery – Post natal care.	2	Discuss labour and delivery	Lecture, Video	
	5	Care of the newborn – feeding – nutritional guidelines	1	Recall the care and nutritional guidelines of neonatal	Lecture, Video	
	6	Care of under-five (toddler and pre-school).	1	Differentiate the care given to toddler and pre-school	Lecture, Video	
	7	Family planning.	1	Identify the methods of family planning	Lecture, PPT	
	8	Table showing vaccination schedule in India.	1	Apply vaccination schedule	Chart	
IV	Environment and Health					
	1	Ventilation – standards of housing	2	Apply the standards of housing	Lecture, Video	Short test, MCQ, Formative assessment II
	2	Importance of Excreta disposal.	2	Choose the best method of excreta disposal	Lecture, Video	
	3	Sanitary health measures during fairs and festivals	1	Familiar with sanitary measures	Lecture, PPT	
	4	Environmental sanitation - Food sanitation	2	Apply environmental and food sanitation	Lecture	
	5	Control of infectious diseases	1	Practice healthy life	Lecture, Video	
	6	Swachh Bharat Mission	1	Practice Swachh Bharat Mission	Lecture, Skit and slogan writing	
V	Alternative medicine and First aid					
	1	Naturopathy,	1	Differentiate	Lecture	

	Homeopathy		Naturopathy and Homeopathy		Formative Assessment III MCQ Short test
2	Siddha - Ayurveda	1	Recall different methods of Siddha and Ayurveda	Lecture	
3	Unani, Acupuncture	1	Explain Unani and Acupuncture	Lecture	
4	First aid procedures for dehydration and heart attack	1	Recall the procedures for dehydration and heart attack	Lecture	
6	First aid procedures poisoning, electric shocks	1	Apply first aid measures for poisoning and electric shocks	Lecture	
7	First aid procedures for drowning, snake bite	1	Demonstrate the first aid procedures for drowning and snake bite	Lecture, Video	
8	First aid procedures for Road accidents: bleeding - fractures and dislocation	2	Recall the procedures for Road accidents, bleeding, fractures and dislocation	Lecture, Video	
9	Fire accidents: burns.	1	List the do's and don'ts during burns	Lecture, Video	

Course instructor

Dr. Jeni Chandar Padua

Head of the Department

Dr. S. Mary Metilda Bai

Semester : III

Major Core III

Name of the Course : Cell Biology

Course code : ZC1731

No. of hours/week	No. of credits	Total number of hours	Marks
4	4	60	100

Learning Objectives

1. To enable the students to know about the diversified nature of cells and also the location, structure and functions of all cellular components.
2. To develop skill in micro- and molecular techniques.

Course Outcomes

CO	Upon completion of this course the students will be able to :	PSO addressed	CL
CO - 1	Recognize the cell organelles and discuss their functions.	PSO- 1	U
CO - 2	Explicate the structural organization of chromosomes and their significance.	PSO- 2	R
CO - 3	Outline the structure and functions of nucleic acids.	PSO- 2	R
CO - 4	Apply the knowledge of cell biology in cancer and stem cell research.	PSO -3	Ap

CO - 5	Demonstrate cytological techniques.	PSO- 3	Ap
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Teaching Plan

Total Hours: 60 (Including Seminar & Test)

Unit	Module	Topics	Hours	Learning outcome	Pedagogy	Assessment
I	Cell and micro techniques (9 hrs)					
	1	Scope of cell Biology. Cell theory	1	Comprehend the scope of cell biology and cell theory	Lecture / Vocabulary drill	Jigsaw MCQ
	2	Microscopy: Compound, phase contrast and electron microscope.	3	Recognize different Microscopes and interpret its application	Lecture/ PPT	Short test Mind Map Formative Assessment I (1,2,4)
	3	Cytological techniques: Fixation and fixatives – types of stains.	3	Develop skills to prepare permanent slides	Lecture / Demonstration	Formative Assessment II (3)
	4	General organization of a prokaryotic (Bacteria) and Eukaryotic cell.	2	Differentiate prokaryotes and eukaryotes	Inquiry based learning/PP T/	
II	Cell organelles (9 hrs)					
	1	Ultrastructure and functions of Plasma membrane	2	Describe the structure of cell membranes and its functions	Lecture/PPT /video clippings on transport	Short test Objective test Formative Assessment I (1,2,)
	2	Ultrastructure and functions of Mitochondria	2	Comprehend cellular respiration	Lecture/ PPT	Formative Assessment II (1,2)
	3	Ultrastructure and functions of Ribosomes, Endoplasmic reticulum,	2	Explain the importance of endomembrane system in cellular function	Lecture/ Group discussion Concept map	
	4	Ultrastructure and functions of Golgi complex, Lysosomes, Centrosomes	3	Differentiate ER, Golgi, and lysosome	Lecture/ppt	
III	Nucleus (9hrs)					
1	Ultrastructure and functions of Nucleus - Nuclear membrane, Nucleolus.	2	Describe the structure and function of the nucleus	Lecture/ Group discussion/p pt	Short test MCQ	

	2	Chromosomes – types, structure and functions.	1	Classify chromosomes and enumerate its functions	Lecture/ppt	Objective test Formative Assessment I (1,2,3) Formative Assessment II (4)
	3	Special types of chromosomes - Polytene and Lamp brush.	1	Trace special types of chromosomes.	Lecture/PPT	
	4	Structure, functions and types of Nucleic acids (DNA & RNA).	4	Recognize the composition and roles of nucleic acids in the cell	Lecture/model	
IV	Gene Expression and regulation (9hrs.)					
	1	General characteristics of Genetic code	1	Explain the genetic code	Lecture/Demonstration/PPT	Open book test MCQ Formative Assessment II Formative Assessment III (5)
	2	Structure of gene - promoter sequence and coding sequence.	2	Comprehend the gene structure	Mind Map/Lecture	
	3	Protein synthesis – transcription and translation in prokaryotes.	3	Explain inter relation between transcription, translation, and protein synthesis	Lecture/ppt	
	4	Regulation of gene expression - Lac operon.	3	Explain the control of transcription by Lac operon	Lecture/Videocliping	
V	Cell division and significance (9hrs.)					
	1	Cell cycle –Mitosis Meiosis Mitotic apparatus, anaphase chromosomal movements and synaptonemal complex.	4	Describe and differentiate the major events of a cell division.	Mind map, Demonstration/Lecture/mind map	Short test, Quiz, Formative Assessment III (1,2,3)
	2	Cancer – properties of cancer cells, types, causes, diagnosis and treatment	2	List the characteristics and treatment of cancer cells	Lecture/PPT	
	3	Oncogenes, Aging and Apoptosis.	3	Describe the of role oncogenes in cancer and cell death	Lecture/Discussion	

Course instructor

Dr. S. Mary Mettilda Bai

Head of the Department

Dr. S. Mary Mettilda Bai

Semester : III
 Name of the Course : Biochemistry and Biophysics
 Course code : ZC1732

Major Elective I (a)

No. of hours/week	No. of credits	Total number of hours	Marks
4	4	60	100

Learning Objectives

1. To enrich the knowledge of students on the structure, classification and metabolism of biomolecules and to learn the principle and functions of specified bio-instruments.
2. To develop practical skills on biochemical techniques and to use bioinstruments

Course Outcomes

CO	Upon completion of this course the students will be able to :	PSO addressed	CL
CO – 1	Discuss the structure of an atom, molecule and their interactions.	PSO – 1	U
CO – 2	Evaluate the importance of buffer system and enzymes.	PSO – 2	R
CO – 3	Classify biological macromolecules and describe their structure and significance.	PSO – 2	R
CO – 4	Use methods and techniques of physics to study biological processes.	PSO – 3	Ap
CO – 5	Apply basic methods in the fields of biophysics, biochemistry.	PSO – 3	Ap

Modules with Teaching Plan

Credits: 4

Total Hours: 60 (Incl. Seminar & Test)

Unit	Module	Description	Hours	Learning outcome	Pedagogy	Assessment
I	Bonds and Buffer					
	1	Atoms – Chemical bonds Isotopes	2	Explain Atoms , Chemical bonds and isotopes	Lecture, Demonstration, PPT	Short test, Quiz, Formative Assessment I (1,2) Formative Assessment II (3)
	2	Hydrogen ion concentration – pH Measurement of pH Acids and bases, Acidosis and alkalosis	4	Demonstrate pH and evaluate the importance of acids and bases	Lecture, PPT	
	3	Buffers – Mechanism of buffer action Hendersen-Hasselbalch equation Biological buffer systems Significance of buffers	3	Discuss the mechanism of buffer action	Demonstration, Lecture, Video class	
II	Proteins					
	1	Amino acids – classification Structure and properties	2	Explain the structure and properties of amino acids	Lecture	Short test, Quiz,

	2	Proteins – classification Structure (primary, secondary, tertiary and quaternary) Haemoglobin, Silk Biological functions of proteins.	4	Compare the structure and biological functions of Proteins	Demonstration, Lecture	Formative Assessment I (1,2)
	3	Enzymes –Classification of enzymes, nomenclature Properties Mechanism of enzyme action	4	Discuss the classification, nomenclature and mechanism of enzyme action	Lecture, Demonstration, PPT	Formative Assessment II (3, 4)
III	Carbohydrates and Lipids					
	1	Carbohydrates – classification Monosaccharides(glucose and fructose) Disaccharides(sucrose and lactose) Polysaccharides(glycogen) Biological functions of carbohydrates	4	Discuss the carbohydrates – classification and biological functions	Lecture, Demonstration/ PPT	Short test, Quiz, Formative Assessment I (1) Formative Assessment II (2)
	2	Lipids – classification Simple lipids(triglycerides and waxes) Compound lipids (lecithin), Derived lipids(cholesterol) Biological functions of lipids	4	Discuss the properties of compound lipids and their biological functions	Lecture	
IV	Thermodynamics and Light					
	1	Laws of thermodynamics, enthalpy, entropy Free energy, Redox reactions and redox potential ATP bioenergetics	3	Recall the laws of thermodynamics, free energy, redox potential and bioenergetics	Lecture, PPT	Short test, Quiz, Formative Assessment I (1,2)
	2	Membrane conductivity- diffusion, osmosis Active transport – mechanism, biological significance	2	Explain the membrane conductivity and biological significance	Lecture, PPT	Formative Assessment II (3)
	3	Light –Nature and properties Electromagnetic spectrum- Absorption and Emission spectrum Fluorescence and Phosphorescence Bioluminescence	4	List the properties of light. Describe fluorescence , phosphorescence and bioluminescence	Lecture, PPT	
V	Bioinstrumentation					

1	Centrifugation – principle and applications of differential and density gradient centrifugation Types of centrifuges	3	State the principles and applications of centrifugation	Lecture, PPT	Short test, Quiz, Formative Assessment III (1,2,3,4,5,)
3	Colorimeter and spectrophotometer – principle, instrument and applications.	2	Demonstrate colorimetry and spectrophotometry	Lecture	
4	Chromatography – principle and applications of paper, thin layer and column chromatography.	2	Differentiate thin layer and column chromatography	Lecture, PPT	
5	Electrophoresis – principle and applications of Agarose and PAGE.	2	State the principles and applications of Agarose and PAGE.	Lecture	

Course instructor
Dr. S. Prakash Shoba

Head of the Department
Dr. S. Mary Mettilda Bai

Semester : III **Major Practical III**
Name of the Course : Cell Biology, Biochemistry and Biophysics
Course code : ZC17P3

No. of hours/week	No. of credits	Total number of hours	Marks
2	2	30	100

Learning Objectives

1. To develop skill in identifying cell types and cell division.
2. To apply working principles in basic bio instruments and to interpret the biological changes.

Course Outcomes

CO	Upon completion of this course the students will be able to :	PSO addressed	CL
CO - 1	Prepare squash and smear of Biological samples and identify the cells.	PSO - 3	Ap
CO - 2	Develop skills in handling analytical instruments.	PSO - 3	Ap
CO - 3	Analyse biochemical constituents qualitatively and quantitatively.	PSO - 2	An
CO - 4	Use paper chromatography to separate biomolecules.	PSO - 3	Ap
CO - 5	Understand the structure of biomolecules and the Principles of biological processes.	PSO - 3	U

Teaching Plan

Credits: 2

Total Hours: 30

Module	Description	Hours	CO No.
1	Observation of mitosis in onion root tip.	2	1
2	Observation of giant chromosomes in <i>Chironomus</i> larva.	2	1

3	Preparation of Human blood smears.	2	1
4	Smear preparation of Squamous epithelium.	2	1
5	Qualitative test for carbohydrates, lipids and proteins.	2	3
6	Quantitative estimation of protein by Biuret method.	2	3
7	Determination of pH using pH meter.	2	2
8	Separation of amino acids using paper chromatography.	2	4
9	Verification of Beer's Law.	2	2
10	Demonstration of osmosis using grapes.	2	5
11	Compound microscope, Mitochondria, Golgi complex	2	2, 1
12	Endoplasmic reticulum, Ribosomes, Lysosomes (polymorphism)	2	1
13	Interphase Nucleus, DNA (Watson & Crick model), tRNA	2	1
14	Glucose, Amino acid, Cholesterol, ATP, EM spectrum	2	5
15	Centrifuge, Colorimeter, pH meter	2	2

Semester : III Allied Zoology
Name of the Course : General Zoology
Course code : ZA1731

No. of hours/ week	No. of credits	Total number of hours	Marks
4	4	60	100

Learning Objectives

1. To acquire a basic knowledge about animal diversity and general principles of Cell Biology, Genetics, Developmental Biology, Evolution and Physiology.
2. To seek employment in educational institutions and museums.

Course Outcome

CO	Upon completion of this course the students will be able to :	PSO addressed	CL
CO- 1	Describe general principles of taxonomy on animal classification.	PSO -1	U
CO- 2	Explain the specific characteristics of invertebrates and vertebrates.	PSO -2	R
CO- 3	Explain the structure of cells, chromosomes and apply the knowledge of genetics in identifying genetic disorders.	PSO -2; PSO -3	R ; Ap
CO -4	Explain the development and evolution of animal life.	PSO -2	R
CO- 5	Recognize the major functions of organ systems in human body and the role played by animals in their environment.	PSO -2	R
CO -6	Apply diverse taxonomic resources for animal identification and simple experimental procedures pertaining to the course.	PSO -2 PSO -3	Ap

Teaching Plan
Total Hours: 60 (Including Seminar & Test)

Unit	Module	Topics	Hours	Learning outcome	Pedagogy	Assessment
I	Invertebrate Zoology (9 hrs)					
	1	General characters of Invertebrates – Classification upto phylum with two examples for each.	2	State the principles of taxonomy on animal classification.	Lecture, PPT	MCQ Short test Mind Map Formative Assessment I (1,2,4) Formative Assessment II (3)
	2	<i>Paramecium</i> – external features and Conjugation <i>Obelia</i> – external features Polymorphism	3	Recall the anatomy and physiology of <i>Paramecium</i> and <i>Obelia</i>	Lecture, Vocabulary drill	
	3	<i>Ascaris</i> - external features and Parasitic adaptations <i>Panaeus</i> – external features	2	Describe the anatomy and physiology of <i>Ascaris</i> and <i>Panaeus</i>	Lecture, Demonstration	
	4	Star fish – external features Water vascular system.	2	Discuss the anatomy and physiology of star fish	Lecture, Group discussion	
II						
II	Chordate Zoology (9 hrs)					
	1	General characters of chordates Outline classification up to classes with one example and characteristics of Chordates	2	Relate the general principles of taxonomy in animal classification	Brain Storming, Lecture	Short test Mind map Objective test Formative Assessment I (1,2) Formative Assessment II (3,4)
	2	Rabbit – external characters Migration of fishes	2	Identify the external features of rabbit and fish	Lecture, Video	
	3	Identification of poisonous snakes Identification of non-poisonous snakes Poison apparatus and First-aid for snake bite	3	Differentiate poisonous and non-poisonous snakes.	Lecture, Group discussion	
	4	Flight adaptations in birds Dentition in mammals	2	Identify the flight adaptations in birds and dentition in rabbit	Lecture, video	
III						
Cell Biology and Genetics (9hrs.)						

	1	Structure of prokaryotic and eukaryotic cell Human chromosomes – structure – types and function	3	Differentiate prokaryotic and eukaryotic cell, and state the structure of human chromosomes	Lecture, PPT	Short test MCQ Objective test Formative Assessment I (1,2,3) Formative Assessment II (4)
	2	Simple Mendelian traits in man Genetics of blood groups in man,	2	Explain Mendelian traits in man and Genetics of blood group	Lecture, Group discussion	
	3	Sex linked inheritance in man Colour blindness and haemophilia	2	Identify Sex linked inheritance in man	Lecture, PPT	
	4	Non-disjunction and syndromes in man: Klinefelter's syndrome Turner's syndrome and Down's syndrome	2	Recognize the syndromes in man	Lecture, PPT	
IV	Developmental Zoology and Evolution (9hrs.)					
	1	Early development in frog Structure of sperm and ovum	2	Recall the structure of sperm and egg of frog	Lecture, PPT	Diagram test Open book test MCQ Formative Assessment I (1,2,3,4) Formative Assessment III (5)
	2	Fertilization Cleavage	2	Describe Fertilization and Cleavage	Lecture, video	
	3	Blastulation Gastrulation	2	Explain Blastulation and Gastrulation	Lecture, video	
	4	Placenta – Types and functions	1	Differentiate the types of Placenta	Lecture, PPT	
	5	Urey Miller Experiment Modern synthetic theory of evolution.	2	Demonstrate the theory of evolution	Lecture	
V	Physiology (9hrs.)					
	1	Digestion – digestion of carbohydrates Digestion – digestion of proteins and fats	1	Discuss digestion in man	Lecture, PPT	Short test, Quiz (1,2) Formative Assessment
	2	Respiration – structure and functions of lungs in man.	1	Recall the mechanism of respiration in man	Lecture	

	3	Excretion: structure and functions of kidney in man. Circulation: structure and function of human heart.	3	Describe the anatomy and physiology of kidney and heart of man	Lecture, PPT	III (1, 2, 3,4)
	4	Nervous system – central, peripheral, Sympathetic, parasympathetic Nervous system - Structure of a neuron.	4	Explain the nervous system of man	Lecture, video	

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