M.Sc I Year (Semester I) Zoology Core Paper 1

Evolutionary and Taxonomic Approaches

Programme/Class: Diploma	Year: 1	Semester: 1
Subject: Zoology		
Course Code: **M050101T**	Course Title: **Evolutionary and Taxonomic Approaches**	

Course outcomes:

At the end of this course the students will be able to:

- Understand the principles and methods of taxonomy
- Understand the evolution of life, Homology and Analogy phylogeny of animals.
- Students be aware of approaches to study Paleontology i.e. Fossils and its significance
- To acquire knowledge on the taxonomic status of various animal groups
- Understand the Origin and development of animals and the Geological time scale.

Credits: 4	Core Compulsory
Max. Marks: 25+75	Min. Passing Marks: 33 %
Total No. of Lectures= 60	

Unit	Topics	Total No. of Lectures (60)
I	• Science of taxonomy- Definition, concepts, history, scope and application of biosystematics • Zoological Classification – Theories of biological, hierarchies of categories and the higher taxa. Principles, applications and origin of code. Rules of Zoological nomenclature (ICZN),	15
II	• Behavioral taxonomy, cytotaxonomy and molecular taxonomy. Concept of Species – Species category, different concepts and intraspecific categories. • Molecular Evolution: Concepts of neutral evolution, molecular divergence and molecular clocks.	15
III	• Micro and Macro Evolution, Adaptive Radiation and Modification. • Fossil & Fossilization. • Evolution of Man.	15
IV	• Abiotic and Biotic Evolution. Theories of Organic Evolution. • Distribution of Animals with Space and Time. Speciation, Convergent Evolution,	15

	• Sexual Selection, Natural Selection and Genetics of natural selection.	

Suggested Readings:

1.An Introduction to Taxonomy by TC Narendaran: Publisher: ZSI, India- free online on http://faunaofindia.nic.in/PDFVolumes/spb/041/index.pdf
2. Principles of Animal Taxonomy by GG Simpson. Publisher: Columbia University Press
Principles of Systematic Zoology by Ernst Mayr & AD Peter. Publisher: McGraw-Hill
Theory and Practice of Animal Taxonomy by VC Kapoor. Publisher: Oxford & IBH Publishing Co Pvt. Ltd.
5.Evolution: Principals & Processes by Brian k Hall. Publisher: Jones & Bartlett
Evolution: Above the species level by Rensch. Publisher: Columbia University
Evolution by MW Strickberger. Publisher: Jones & Bartlett 8. Introduction to Evolution by PA Moody. Publisher: Riper & Brothers

Suggested Continuous Evaluation Methods:

- Seminar/ Presentation on any topic of the above syllabus
- Test with multiple choice questions/ short and long answer questionsAttendance

Further Suggestions:

It widens the scope for students to join Government and Non-Government organization up skillingthe people at different levels as per their socio-economic structure.

At the End of the whole syllabus any remarks/ suggestions:

……

M.Sc I Year (Semester I) Zoology Core Paper 2

Animal Diversity- Non-Chordata

Programme/Class: Diploma	Year: 1	Semester: 1
Subject: Zoology		
Course Code: **BM050102T**	Course Title: **Animal Diversity- Non-Chordata**	

Course outcomes:

At the end of this course the students will be able to:

- Understand the Organization of invertebrate Life, Diversity and Phylogeny of invertebrates
- Understand the Outline classification of Animals: Classification of animals.
- Understand the Levels of structural organization.
- Analyze the evolutionary relationship of invertebrate taxa
- To understand the adaptive radiations in early life forms.

Credits: 4	Core Compulsory
Max. Marks: 25+75	Min. Passing Marks: 33 %

Total No. of Lectures= 60

Unit	Topics	Total No. of Lectures (60)
I	• Protozoa: Ultrastructure, osmoregulation, locomotion, Nutrition and reproduction in protozoa. • Porifera: Skeleton and reproduction in sponges	15
II	• Cnidaria: Coral reefs, Polymorphism, Metagenesis. • Platyhelminths: Parasitism and Parasitic adaptations, Larval stages of Trematodes and cestodes. • Aschelminths: Economic importance of nematode in animals and plants.	15
III	• Annelida: Body segmentation, adaptive radiation in polychaeta, filter feeding. • Arthropoda: Exoskeleton, Respiratory system in arthropods, Larval forms in crustaceans. Parasitism in crustaceans. • General organization of Phylum Tardigrada and Trilobitomorpha.	15

IV	• Mollusca: Torsion and detorsion in gastropod, Foot, respiration and shell types in Mollusca. • Echinodermata: Larval forms and their evolutionary significance. Affinities with Phylum hemichordata • Minor phyla: Affinities of phylum Rotifer and Acanthocephalan, Affinities of phylum endoprocta, ectoprocta, Onychophora.	• 15

Suggested Readings:

1. A Biology of Higher Invertebrates by WD Russel-Hunter. Publisher: McMillan Co. Ltd., London.
2. Animal Parasitism by CP Read. Publisher : Prentice Hall Inc., New Jersey
3. Invertebrate structure and function by EJW Barrington. Publisher: Thomas Nelson & Sons Ltd., London
4. Invertebrates Zoology, III Edition by RD Barnes. Publisher : WB Saunders Co. Philadelphia
5. Student text book of Zoology. Vol. I, II & III by AA Sedgwick. Publisher : Central Book Depot, Allahabad
6. Text book of Zoology by TJ Parker & WA Haswell. Publisher : Macmillan Co., London.
7. The Invertebrates smaller coelomate groups, Vol. V. by LH Hyman. Publisher: Mc.Graw Hill Co., New York
8. The invertebrates, Vol. 1 Protozoa through Ctenophora by LH Hyman. Publisher: McGraw Hill Co., New York
9. The Invertebrates. Vol. 2 Platyhelminthes and Rhynchocoela by LH Hyman. Publisher: McGraw Hill Co., New York
10. The Invertebrates. Vol. 8 Environmental Adaptations by LH Hyman. Publisher: McGraw Hill Co., New York

Suggested Continuous Evaluation Methods:

- Seminar/ Presentation on any topic of the above syllabus
- Test with multiple choice questions/ short and long answer questionsAttendance

Further Suggestions:

It widens the scope for students to join Government and Non-Government organization up skillingthe people at different levels as per their socio-economic structure.

At the End of the whole syllabus any remarks/ suggestions:

……

M.Sc I Year (Semester I) Zoology Core Paper 3

Biochemistry and Cell biology

Programme/Class: Diploma	Year: 1	Semester: 1
Subject: Zoology		
Course Code: **M050103T**	Course Title: **Biochemistry and Cell biology**	

Course outcomes:

At the end of this course the students will be able to:

- Acquire an understanding of chemical nature of life and life process.
- Biological structures and importance of molecular interactions and their
- implication in functional aspects of life.
- To be able to solve problems based on Biomolecules, pathways, energetics
- Use current biochemical and molecular techniques to plan and carry out experiments.
- Understand and explain the basics of cell biology.
- Understand the structural and functional details of the basic unit of life at the molecular level.

Credits: 4	Core Compulsory
Max. Marks: 25+75	Min. Passing Marks: 33 %

Total No. of Lectures= 60

Unit	Topics	Total No. of Lectures (60)
I	• Chemical structure and function of biomolecule carbohydrates, lipids, proteins, nucleic acids and vitamins. • Principles of biophysical chemistry (pH, buffer, reaction kinetics, thermodynamics, colligative properties • Conformation of proteins (Ramachandran plot, secondary, tertiary and quaternary structure) • Conformation of nucleic acids (A-,B-,Z-,DNA), Types of RNA.	15
II	• Principles of catalysis, enzymes and enzyme kinetics, enzyme regulation, mechanism of enzyme catalysis, isozymes. • Bioenergetics, glycolysis, oxidative phosphorylation, coupled reactions, group transfer, biological energy transducers.	15

	• Catabolism of carbohydrates, lipids, amino acids and nucleotides, • Anabolic pathways: Glycogenesis, gluconeogenesis, synthesis of essential amino acids	
III	• Endomembrane system and intracellular trafficking (endoplasmic reticulum, golgibody, mitochondria , nucleus, lysosomes, endosomes) • Cell division and cell cycle. regulation and control of cell cycle, apoptosis, necrosis and autophagy. • Cell signaling: signaling through G-protein coupled receptors, signal transduction pathways, second messengers, regulation of signaling pathways, bacterial and plant two-component systems.	15
IV	• DNA Structure and processing: supercoiling and polymorphism, DNA replication, DNA damage and repair, Genetic code and Wobble hypothesis. • RNA synthesis, processing and regulation: Mechanism and regulation of transcription, transcriptional inhibitors, transcription factors and machinery, transcription activators and repressors, RNA polymerases, capping, RNA processing, RNA editing, splicing. • Gene regulation: fine structure of gene, regulation of gene expression in prokaryotes and eukaryotes, Intracellular protein degradation, Gene silencing, RNAi.	15

Suggested Readings:

1. A Biologists Guide to Principals and Techniques of Practical Biochemistry by K Wilson & KH Goulding
2. Basic Concepts in Biochemistry: A Student's Survival Guide by Hiram F. Gilbert. Publisher: McGraw Hill Professional.
3. Biochemical Calculations by IH Segal. Publisher: John Wiley a Sons
4. Biochemistry by D Voet and JG Voet. Publisher: John Wiley & Sons.
5. Essentials of Molecular Biology.by George M Malacinski; Dav Freifelder: Publisher: Boston : Jones and Bartlett Publishers.
6. Grisham. Biochemistry by RH Garret & CM Saunders. Publish College Publishers
7. Physical Biochemistry by DWH Freifelder. Publisher: Freeman Co.
8. Practical Physiological Chemistry by PB Hawk. Publisher: P. Blakiston's Son & Co
9. Protein Structure and Molecular Properties by TEWH Creighto Publisher: Freeman & Co.
10. Tools of Biochemistry by TG Cooper. Publisher : Wiley

Suggested Continuous Evaluation Methods:

- Seminar/ Presentation on any topic of the above syllabus
- Test with multiple choice questions/ short and long answer questionsAttendance

Further Suggestions:

It widens the scope for students to join Government and Non-Government organization up skillingthe people at different levels as per their socio-economic structure.

At the End of the whole syllabus any remarks/ suggestions:

……

M.Sc I Year (Semester I) Zoology Core Paper 4

Practical on Evolution, Non- Chordates, and Cell Biology

Programme/Class: Diploma	Year: 1	Semester: 1
Subject: Zoology		
Course Code: **M050104P**	Course Title: **Practical on Evolution, Non- Chordates, and Cell Biology**	

Course Outcomes

At the end of this course, the students will be able to:

- Demonstrate practical understanding of evolutionary concepts through the study of fossils, phylogenetic trees, connecting links, and adaptive features.
- Identify, classify, and describe major non-chordate phyla using museum specimens, permanent slides, and diagnostic morphological characters.
- Apply appropriate taxonomic tools and keys for identification and comparison of non-chordate organisms.
- Perform cell biology techniques, including microscopy, identification of cell organelles, and study of mitosis and meiosis using prepared and temporary slides.
- Conduct basic cytological and biochemical experiments, demonstrating an understanding of cellular structure, function, and organization.
- Record observations accurately, prepare labeled diagrams, and analyze experimental data using scientific methodology.
- Correlate practical observations with theoretical principles of evolution, organismal diversity, and cellular processes.
- Follow laboratory safety measures, ethical guidelines, and scientific integrity while performing zoological practicals.

Credits: 4	Core Compulsory
Max. Marks: 25+75	Min. Passing Marks: 33 %

Total No. of Lab/ Practicals= 60

Unit	**Topics**	**Total No. of Labs (60)**
I	• Analogy & Homology • Adaptive Radiations • Fossils, their models & Videos	15

	• Convergence & Divergence • Dichotomous Key through an example • Techniques of Animal preservation • 3-D Models of human evolution.	
II	• General anatomy (Dissections / Models / Charts / Computer simulation) (a) Earthworm (b) Prawn / Squilla / Crab (c) Sepia / Loligo/ Octopus (d) Cockroach • Mounting (Permanent) Material Provided or material from dissected animals. **Note: Only animals that are permitted by wildlife protection act, 1972**	15
III	Biochemical qualitative tests for Proteins/ Lipids / Carbohydrates • Colorimetric quantitative estimation of Proteins & Carbohydrates • Study of Salivary amylase, enzyme action and effect of PH and Temperature on it. • Paper & Thin Layer Chromatography • 3-D Models of amino acids and structure of proteins.	15
IV	Study Of Cell & Cell organelles, Giant Chromosomes, DNA & its replication through Photographic Plates/ Models/ Computer simulation • Permanent slides of Mitosis & Meiosis • 3-D Models of DNA and RNA • Preparation of (a) slide of Onion root tip by Squash Technique to study stages of Mitosis, fixation and Staining techniques of the treated Tissue Material	15

Suggested Readings:

- https://www.biologysimulations.com/evolution
- https://amrita.olabs.edu.in/?sub=79&brch=16&sim=132&cnt=4
- https://education.nationalgeographic.org/resource/fossil
- https://www.britannica.com/science/evolution-scientific- theory/Convergent-and-parallel-evolution

- https://people.umass.edu/~mcclemen/581Proteins.html
- https://amrita.olabs.edu.in/?brch=18&cnt=1&sim=236&sub=79 https://lab-training.com/thin-layer-chromatography-tlc/
- https://edu.rsc.org/practical/thin-layer-chromatography- practical-videos-16-18-students/4012270.article
- https://edu.rsc.org/practical/paper-chromatography-practical- videos-14-16-students/4011446.article

Suggested Continuous Evaluation Methods:

- Seminar/ Presentation on any topic of the above syllabus
- Test with multiple choice questions/ short and long answer questionsAttendance

Further Suggestions:

It widens the scope for students to join Government and Non-Government organization up skillingthe people at different levels as per their socio-economic structure.

M.Sc. I Year (Semester I) Zoology
Paper 5 Research project/internship/field or survey work M050105R

Programme/Class: Diploma Degree	**Year:** 1	**Semester : 1**
Subject: Biotechnology(**Research project/internship/field or survey work**)		**Credits: 4**
Course Code: **M050105R**	Course Title: **Research project/ Internship/ Field or survey work**	
Topic will be decided		

SEMESTER II

M.Sc I Year (Semester II) Zoology Core Paper 1

Environmental & Wildlife Biology

Programme/Class: Degree	Year: 1	Semester: 2
Subject: Zoology		
Course Code: **M050201T**	Course Title: **Environmental & Wildlife Biology**	

Course outcomes:
At the end of this course the students will be able to:

- Global environmental issues, their causes, consequences and amelioration.
- To understand and identify behaviors in a variety of taxa.
- The proximate and ultimate causes of various behaviors.
- About the molecules, cells, and systems of biological timing systems.
- Conceptualizing how species profitably inhabit in the temporal environment and space out their activities at different times of the day and seasons.
- To interpret the cause and effect of lifestyle disorders contributing to public understanding of biological timing.
- To understand the importance of wildlife conservation.

.

Credits: 4	Core Compulsory
Max. Marks: 25+75	Min. Passing Marks: 33 %

Total No. of Lectures= 60

Unit	Topics	Total No. of Lectures (60)
I	• Environment: Introduction, Physical environment; Biotic and abiotic interactions, • Concept of habitat and niche: Remote sensing and applicability of remote sensing in India • Biosphere and biogeochemical cycle Concept of habitat ecology and ecological niche.	15
II	• Populations Dynamic and Community ecology: Characteristics of a population: concept of metapopulation- demes and dispersal, interdemic extinctions, age structured populations. • community structure and attributes, levels of species diversity and its measurement: edges and ecotone	15
III	• Ecosystem and Ecological successions: • Major Indian ecosystems: terrestrial (forest, grassland) and aquatic (fresh water, marine, estuarine). • Types: mechanisms: changes involved in	15

	succession; concept of climax • Biogeography: Major terrestrial biomes; biogeographical zones of India	
IV	• Biodiversity status, monitoring and documentation; • Conservation biology: Principles of conservation, Environmental Impact Assessment (EIA), Environmental Management Plan (EMP), Environmental Auditing (EA), • Indian case studies on conservation/management strategy (Project Tiger, Biosphere reserves) • Environmental Pollution ecology: Environmental pollution; global environmental change; sustainable development	15

Suggested Readings:

1.The Future of Life by Edward O. Wilson. Publisher : Abacus
2.Baumgartner, population Biology by BD Elseth & KM Van. Publisher : Nostrand Co., New York
3.Ecological Applications by Colin R. Townsend. Publisher : Wiley
4.Ecological Concepts by JM Cherrett. Publisher : Blackwell Science Publication, Oxford, U.K.
5.Ecological Methodology by CJ Krebs. Publisher : Harper and Row , New York
6.Ecology by CJ Krebs. Publisher : Harper and Row, New York
7.Essentials of Ecology by Colin R. Townsend, Michael Begon & John L. Harper. Publisher: Blackwell 8.

Suggested Continuous Evaluation Methods:

- Seminar/ Presentation on any topic of the above syllabus
- Test with multiple choice questions/ short and long answer questionsAttendance

Further Suggestions:

It widens the scope for students to join Government and Non-Government organization up skillingthe people at different levels as per their socio-economic structure.

At the End of the whole syllabus any remarks/ suggestions:

……

M.Sc I Year (Semester II) Zoology Core Paper 2

Animal Diversity-Chordata

Programme/Class: Degree	Year: 1	Semester: 2
Subject: Zoology		
Course Code: **M050202T**	Course Title: **Animal Diversity- Chordata**	

Course outcomes:
At the end of this course the students will be able to:

- Understand the Organization of vertebrate Life:, Diversity and Phylogeny of vertebrates
- Understand the Outline classification of Animals: Classification of animals. Understand the Levels of structural organization.
- Analyze the parallel evolution of vertebrate classes
- To understand the adaptive radiations in recent life forms.

Credits: 4	Core Compulsory
Max. Marks: 25+75	Min. Passing Marks: 33 %
Total No. of Lectures= 60	

Unit	Topics	Total No. of Lectures (60)
I	• Origin and Evolution of Vertebrates • **Fish**: General and Special Characters. General Organization and Affinities of Ostracoderm, Dipnoi & Coelacanthiformes	15
II	• **Amphibia:** General and Special Characters. Parental Care, Neoteny, origin of tetrapods, adaptive radiation, extinct amphibians. • **Reptiles:** General and Special Characters. Adaptive radiation, Skull, Dinosaurs, General organisation and affinities of Chelonia, crocodilian, squamata.	15
III	• **Birds:** General and Special Characters, origin and evolution of Birds, Flight Adaptation, Migration and Territorial Behavior, Flightless birds.	15
IV	• **Mammals:** General and Special Characters. Organization & Affinities of Prototheria. General Organization and Affinities of Marsupial. Aquatic Mammals and their adaptations with reference to Cetacea, stomach, uterus modification.	15

Suggested Readings:

1. Analysis of vertebrate structure. IV. Ed by Milton Hilderbrand. Publisher: John Wiley and Sons Inc., NY
2. Biology of vertebrates by HE Walter & LD Sayles. Publisher: MacMillan & Co. New York
3. Chordata Morphology by Malcom Jollie. Publisher: East – West Pres Pvt. Ltd., New Delhi.
4. Comparative anatomy of vertebrates by CG Kent. Publisher: McGraw Hill, NY
5. Evolution of Chordate Structure by H.S. Smith. Publisher: Hold Rinchart and Winstoin Inc. New York.
6. Life of vertebrates by JZ Young. Publisher: The Oxford University Press, London
7. Outlines of Comparative Autonomy of Vertebrates by JS Kingsley. Publisher: Central Book Depot. Allahabad
8.Structure and Habit in Vertebrate Evolution by GS Carter. Publisher: Sedgwick and Jackson, London
9. Students Text Book of Zoology, Vol.II by AA Sedgwick. Publisher : BiblioLife
10. Vertebrate Body, IIIrd Ed. by AS Romer. Publisher

Suggested Continuous Evaluation Methods:

- Seminar/ Presentation on any topic of the above syllabus
- Test with multiple choice questions/ short and long answer questionsAttendance

Further Suggestions:

It widens the scope for students to join Government and Non-Government organization up skillingthe people at different levels as per their socio-economic structure.

At the End of the whole syllabus any remarks/ suggestions:

……

M.Sc I Year (Semester II) Zoology Core Paper 3

Animal Physiology and Behavior

Programme/Class: Diploma	Year: 1	Semester: 2
Subject: Zoology		
Course Code: **M050203T**	Course Title: **Animal Physiology and Behavior**	

Course outcomes:

- Apply to clinical scenarios the concepts and knowledge of the general terminology, gross anatomy, and physiology of several organ systems (integumentary, skeletal, muscular, and nervous)
- Understand functional relationships of various organs and organ system.
- 3. Students acquire knowledge of key concepts and principles and overarching themes in animal behavior, animal cognition, conservation psychology/biology, animal welfare science.

Credits: 4	Core Compulsory
Max. Marks: 25+75	Min. Passing Marks: 33 %
Total No. of Lectures= 60	

Unit	Topics	Total No. of Lectures (60)
I	• **Digestive & Respiratory** system: Physiology of digestion, absorption, BMR. • Comparison of respiration in different species, transport of gases, exchange of gases, waste elimination, Regulation of respiration. • Introduction of immunology, Antigen, Immunoglobins: Type and Structure, Cells of immune system, Types of immunity, Vaccines	15
II	• **Cardiovascular System** and Blood circulation: Comparative anatomy of heart structure, ECG, cardiac cycle, blood pressure. • Blood corpuscles, Hematopoiesis, plasma function, blood groups, hemoglobin, • **Excretory system:** Comparative physiology of excretion, kidney, urine, osmoregulation.	15
III	• **Nervous system**: Neurons, action potential, Anatomy of the brain and spinal cord, Central and peripheral nervous system. • **Reproductive Physiology**- Menstrual cycle, ovulation, pregnancy, lactation, reproductive processes, • **Endocrine** glands, basic mechanism of hormone action, hormones and diseases; neuroendocrine regulation.	15
IV	• Introduction to **Animal Behaviour**. classification of behavioural patterns, Genetic and environmental components in the development of behaviour.	15

	Stereotyped behavior- Taxes, reflexes, instinct and motivation and Conflict behavior. • Learning, memory and Communication - Definition, forms, development and mechanism of learning, neural basis of learning, memory in animals. Study of communication, messages and their meanings, the forms of signals.	

Suggested Readings:

1. BRS Physiology by Linda S. Costanzo. Publisher: Lippincott Williams and Wilkins
2. Comparative Animal Physiology by CL Prosser and FA Brown. Publisher: W.B. Sanders Co.
3. Endocrine Physiology by CR Martin. Publisher: -Oxford University Press
4. Fundamentals of Human Physiology by Stuart Ira Fox. Publisher: McGraw-Hill Education - Europe
5. Ganong's Review of Medical Physiology by Brooks, Boitano and Barman. Publisher: Mc Graw Hill
6. General & comparative Endocrinology by EJW Barrington. Publisher: Oxford, Claredon Press
7. Guyton & HallTextbook of Medical Physiology by V Hall & R Kurpad. Publisher: Elsevier
8. Fundamental of Immunology by William E. Paul. Publisher: Lippincott Williams & Wilkins

Suggested Continuous Evaluation Methods:

- Seminar/ Presentation on any topic of the above syllabus
- Test with multiple choice questions/ short and long answer questionsAttendance

Further Suggestions:

It widens the scope for students to join Government and Non-Government organization up skillingthe people at different levels as per their socio-economic structure.

At the End of the whole syllabus any remarks/ suggestions:

……

M.Sc I Year (Semester II) Zoology Core Paper 4

Practical on Environmental Biology, Chordata and Animal Physiology

Programme/Class: Degree	Year: 1	Semester: 2
Subject: Zoology		
Course Code: **BM050204P**	Course Title: **Practical on Environmental Biology, Chordata and Animal Physiology**	

After successful completion of this practical course, the students will be able to:

Perform standard laboratory and field-based experiments related to **environmental biology**, including analysis of water, soil, and ecological parameters using scientific methods.

Identify, classify, and prepare **taxonomic keys, museum specimens, and diagnostic characters** of major **Chordata groups** through hands-on practical work.

Conduct **animal physiology experiments** to study functions of respiratory, circulatory, muscular, nervous, and excretory systems using appropriate instruments and protocols.

Demonstrate proficiency in **microscopy, dissection techniques, slide preparation, and physiological recording instruments** relevant to zoological studies.

Analyze experimental data, record observations systematically, and interpret results with scientific reasoning and accuracy.

Apply **laboratory safety practices, ethical guidelines, and environmental awareness** during practical and field-oriented activities.

Correlate practical findings with theoretical concepts of **environmental adaptation, chordate evolution, and physiological regulation**.

Develop skills for **research orientation, problem-solving, and experimental design**, preparing students for higher research and professional applications in zoological sciences.

.

Credits: 4	Core Compulsory
Max. Marks: 25+75	Min. Passing Marks: 33 %
Total No. of Lab/ Practicals= 60	

Unit	**Topics**	**Total No. of Labs (60)**
I	Measurement of climatic factors such as Temperature & relative humidity • Estimation of Temperature, PH, Alkalinity, Hardness of water, soil analysis, Texture, Salinity • Numerical Problems of Population density	15

	• Determine texture of various soil samples. • A field study of any one of the habitat to be assigned to the group of students. Tour Of any Wildlife sanctuary/ Park/ Reserve to study behavioural activities of animals and prepare a short report • Projects on wildlife.	
II	Study of Museum specimens of animals from all Chordate groups (a) (Protochordata to Mammals) (b) Anatomy (Models / Charts/ Computer simulation) (c) Cranial Nerves, Afferent & efferent blood vessels of any Food fish. (d) Study of differences between Poisonous & Non-Poisonous snakes and Biting mechanisms. (e) Perching mechanism, Air sacs of Pigeon (f) Reproductive System & Neck Nerves of Rat (g) Osteology: Comparative study of Axial & Appendicular skeleton from Fish, Amphibia, Reptiles, Aves, Mammals. Palate in Birds, Carapace & Plastron of Turtle, skull of Mammals. (h) Histology: Comparative study from prepared slides of skin, Ovary, Testis, Pancreas, Liver, Brain, stomach & Intestine.	15
III	• Permanent Mounting, Different types of scales in Fish, Feathers of Bird, Note: Use of animals for Dissection/ Practical work, subjects to the condition that they are not banned under the Wildlife Protection Act & UGC guidelines	15
IV	Enumeration of number of RBC/ WBC by Hemocytometer/ Blood Analyzer • Estimation of Haemoglobin percentage by Haemometer • Differential leucocyte count using Leishman's Stain • Preparation of Haemin Crystals • Physiological & Endocrinological disorders through charts/ Photographic plates/ computer simulation • ABO Blood group typing (Agglutination reaction) Imprinting in Birds • Study of Food preferences and feeding behaviour of an insect pest •Conditioning relex • Communication in Bees • To study nests and nesting habits of the birds and social insects. • Study of circadian functions in hum	15

Suggested Readings:

1. https://labmonk.com/estimation-of-total-red-blood-corpuscles- rbc-count

2. https://labmonk.com/estimation-of-haemoglobin-content#:~:text=The%20graduated%20tube%20is%20filled,acid
3. %20in%20the%20graduated%20tube. https://www.labtestsguide.com/differential-leukocyte-count-dlc- test-procedure https://www.ebiologylab.com/experiments/haemin-crystals
4. https://www.ebiologylab.com/home

Suggested Continuous Evaluation Methods:

- Seminar/ Presentation on any topic of the above syllabus
- Test with multiple choice questions/ short and long answer questionsAttendance

Further Suggestions:

It widens the scope for students to join Government and Non-Government organization up skillingthe people at different levels as per their socio-economic structure.

At the End of the whole syllabus any remarks/ suggestions:

……

M.Sc. I Year (Semester II) Zoology

Paper 5 Research Project/ Internship/ Field or survey work (M050205R)

Programme/Class: Diploma Degree	**Year:** 1	**Semester : 1I**
Subject: Biotechnology(**Research project/ Internship/ Field or survey work**)		**Credits: 4**
CourseCode: **M050105R**	Course Title: **Research Project/ Internship/ Field or survey work**	
Topic will be decided		