Semester - 3

BRANCH	Subject Title	Subject Code
B.Sc. (Zoology – Major)	**Diversity of Chordates and Comparative Anatomy**	**ZOM1-131**

Course learning outcomes:

1. Understand chordate diversity of animals and their

taxonomic position.

2. Identify the morphological and anatomical features and basis of chordate classification

3. Know economic importance and present status that will develop positive attitude towards conservation of

biodiversity.

4. Differentiate the organism belong 3g to different taxa by studying comparative anatomy.

5. The project, assignment will give them a flavor of research in studying biodiversity, taxonomy besides improving their writing skills and lay foundation of career in Zoology.

Unit - 1

1. Introduction to Chordates

1.1 Traditional Knowledge on Animal Science in anicient Indian Civilization

1.2 Origin of Chordates, General characteristics and outline classification of Phylum Chordata up to orders

2. Protochordata

2.1. General characteristics and classification of Sub- Phylum Urochordata and Cephalochordata.

2.2. Type study of Herdmania and retrogressive metamorphosis in ascidian tadpole.

2.3 Type study of amphioxus and its affinities

3. Agnatha

3.1 Comparison of Petromyzon and Myxine.

Unit - 2

1. Pisces:

1.1. General characteristics and classification of Pisces.

1.2. Accessory respiratory organs, Parental care in fishes.

2. Amphibia

2.1 General characteristics and classification of Amphibia.
2.2 Parental Care in Amphibia and Paedomorphosis

3. Reptilia

3.1. General Characteristics and classification of Reptilia.

3.2. Difference between Poisonous and Non Poisonous snakes, Venom and Antivenom

3.3. Poison apparatus and biting mechanism in snake.

Unit – 3

1 Aves

1.1. Brief Introduction of "Birdman" of India - Dr. Salim Ali

1.2. General characteristics and classification of Aves.

1.3. Migration of birds, principles and aerodynamics of flight.

1.4. Flight adaptation in birds.

2. Mammalia

2.1. General characteristics and classification of mammais.
2.2. Adaptive radiation in mammals with reference to locomotory appendages.
2.3. Introduction of ZSI (Zooligical Servey of India)

Unit – 4

Comparative Anatomy of Vertebrates.

1. Comparative study of integument and its derivatives of Vertebrates.
2. Comparative study of appendicular skeleton (Limb and girdles) of Vertebrates.
3 Comparative study of digestive system of Vertebrates.
4.Comparative study of respiratory system of Vertebrates.

Unit – 5

Comparative Anatomy of Vertebrates.

1. Comparative study of aortic arches and heart of Vertebrates..

2. Comparative study of Brain of Vertebrates...

3. Comparative study of Urinogenital System of Vertebrates

4. Study of Eye and Ear of mammais

PRACTICALS:-

Topics

1: Study of museum specimens

1. Protochordata: Herdmania, Amphioxus

2. Fishes: Scoliodon, Stegostoma, Torpedo, Heteropneustes, Labeo, Exocoetus, Hippocampus, Anabas, Eel, Flat fish.

3. Amphibia Necturus, Bufo, Rana, Salamander, Hyla, Axolotl larva, Mid Wife Toad, Ichthyophis

4.Reptillia: Chelone, Trionyx, Hemidactylus, Varanus, Chameleon, Draco, Viper, Naja, Hydrophis.

5. Aves: Local Birds, Vulture, Great Indian Bustard, Lesser Florican Mammalia: Bat, Funambulus, Platypus, Rat,
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2. Study of Histological slides-
T.S. of Duodenum, Stomach, Small Intestine, Liver, Pancreas, Testis, Ovary, V.S. of skin, L.S. of Kidney of vertebrates

3. Osteology
Study of Limb Bones and Girdles of Vertebrates (Amphibia, Reptilia, Aves, Mammalia).

4. Study of different types of feathers/ beaks of birds.

5. Dissection of Local fish (Only demonstration of commercially available local fish / Through computer simulation method/through You tube videos / through models and charts.
a) General Viscera, arterial system
b) Cranial nerves V, VII, IX and X

6. Mounting of scales of fishes

7. Comparative study of heart and brain of vertebrates

8. Study of local bird fauna of surrounding area (College campus/ Village Garden/ Ward)
9. collection

Semester 4

BRANCH	Subject Title	Subject Code
B.Sc. (Zoology – Major)	**Physiology and Biochemistry**	**ZOM1-141**

Course Learning outcomes (CLO)

1. Upon completion of the course, Students will be able to 1 Understand how organs function at different levels i.c. from cellular to system levels.
2. Examine internal harmony of different body systems by learning inherent disorders and deficiencies, which is needed to maintain good health.
3. Understand functions of biomolecules & their roic in metabolism by studying biochemistry.
4. Develop a strong foundation for research & employability
5. skills
6. Improve the student's perspective of health biology through deep study of physiology..

Unit - I

Introduction and Historical background of Physiology and Biochemistry Biomolecules and Regulatory mechanism.

1. Contribution of Indian Scientists

1.1 Contribution of Charak
1.2 Contribution of Sushrut

2. Biomolecules

2.1 Micro and Macro molecules
2.2 Water and Buffer System

3. Enzymes

3.1 Definition and General Properties

3.2 Nomenclature and Classification and functions

3.3 Mechanism and Regulation of Enzyme action

3.4 Co-Enzyme

4. **Vitamins and Minerals**

4.1 Types and Sources

4.2 Biological importance

4.3 Deficiencies and Disorders

Unit - II

Metabolism, Physiology and Regulation

1. Protein

1.1 Structure, Nomenclature, Classification and Biological importance.

1.2 Metabolism -Deamination, Decarboxylation, Transamination of amino acids and Ornithine cycle

2. Carbohydrates

2.1 Structure, Nomenclature, Classification and Biological importance.

2.2 Metabolism -Glycogenesis, Gluconeogenesis, Glycogenolysis, Glycolysis. Citric Acid Cycle and Electron Transport Chain

3. Lipids

3.1 Structure, Classification and Biological importance
3.2 Metabolism -Beta oxidation of fatty acids.

4. Physiology of Digestion, regulation and disorders

5. Homeostasis and Basal Metabolic rate (BMR)

6. Thermoregulation

Unit - III

Respiration, Excretion and Immune System

1 Respiration

1.1 Mechanism -Inspiration and Expiration

1.2 Physiology- Exchange and Transport of Gases (Oxygen and carbon dioxide), Chloride shift, role of Respiratory pigment.

1.3 Disorders - Apnea, Hypoxia, Asphyxia, Carbon monoxide poisoning. Bronchitis, Asthma

2. Excretion

2.1 Physiology -Urea, Urine formation and Counter Current mechanism

2.2 Excretory products, disorders

2.3 Osmoregulation

3. Immunity

3.1 Innate and acquired Immunity

3.2 Immune cells and Immuno Gobulinus

3.3 Antigen responses

Unit - IV

Neuromuscular Co-ordination

1. Nerves

1.1 Structure and type of Neurons

1.2 Physiology of nerve impulse conduction

1.3 Neuromuscular disorders -Epilepsy, Alzheimer's and Parkinson's disease

2.Muscles

2.1 Structure and type of muscles

2.2 Physiology of muscles contraction and its Biochemistry

2.3 Muscular disorders - Fatigue

Unit - V

Hormones, Endocrine system and Reproductive Physiology

1. Hormones

1.1 Definition and Classification

1.2 Mechanism of hormone action

2. Endocrine system

2.1 Structure, functions and disorders of Pituitary gland

2.2 Structure, functions and disorders of Thyroid and Parathyroid gland

2.3 Structure, functions and disorders of Adrenal gland

2.4 Structure, functions and disorders of Thymus gland, Pineal gland and Pancreas

3. Reproductive Physiology

3.1 Physiology of reproduction

3.2 Sex Hormones

Practical

Unit 1

1. . Qualitative estimations of Protein, Carbohydrates and Lipids.
2. 2. Study of effect of temperature and pH on salivary amylase activity.
3. Study of enzymatic activity of Trypsin and Lipase.
4. . Detection of ammonia, urea and uric acid

Unit 2

1. Estimation of hemoglobin using haemometer.
2. Preparation of haemin crystals.
3. Preparation of blood smear, study and identification of blood cells.
4. Determination of ABO blood groups. RBC, WBC counting

Unit 3

1. Measurement of blood pressure using sphygmomanometer.
2. Principles and uses of instruments-Sphygmomanometer, Stethoscope,iochemistry analyzer

Unit 4

1. Study of endocrine glands through histological slides of pituitary gland, adrenal gland, thyroid gland, pancreas, testis, ovary, spleen and thymus.
2. Study of histological slides of organ systems of mammalian oesophagus, stomach, duodenum, ileum, rectum, liver, trachea, lung, and kidney.