

SYLLABUS FOR M.Sc. ENTRANCE IN ZOOLOGY- 2023

UNIVERSITY OF KASHMIR, SRINAGAR

UNIT-I: ANIMAL DIVERSITY (INVERTEBRATE- I)

Protista: General characters and classification up to classes; Locomotion in Protozoa

Porifera: General characters and classification up to classes; Canal System

Cnidaria: General characters and classification up to classes; Polymorphism in Hydrozoa

Helminthes: General characters and classification up to classes of platyhelminthes and nemathelminthes: Life history of *Taenia solium* and *Ascaris lumbricoides*; Parasitic adaptations

Unit 2: ANIMAL DIVERSITY (INVERTEBRATE-II)

Annelida: General characters and classification up to classes; Filter feeding in Polychaetes

Arthropoda: General characters & classification up to classes; Vision in Arthropoda, Metamorphosis in Insects

Mollusca: General characters and classification up to classes; Torsion in gastropods

Echinodermata: General characters and classification up to classes; Water-vascular system in Asteroidea

Unit 3: ANIMAL DIVERSITY (VERTEBRATE-I)

Urochordates: General features and classification; Phylogeny of Protochordata

Cephalochordates: General features and classification

Agnatha: General features of Agnatha and classification of cyclostomes up to classes

Pisces: General features and Classification up to orders; Osmoregulation

Unit 4: ANIMAL DIVERSITY (VERTEBRATE-II)

Amphibians: General features and Classification up to orders; Parental care

Reptiles: General features and Classification up to orders; Poisonous and non-poisonous snakes

Aves: General features and Classification up to orders; Flight adaptations

Mammals: General characters and Classification up to orders; Adaptive radiation

Unit 5: COMPARATIVE ANATOMY OF VERTEBRATES-I

Integumentary System: Derivatives of integument;

Skeletal System, Evolution of visceral arches.

Digestive System: Brief account of alimentary canal and digestive glands.

Respiratory System: Brief account of Gills, lungs, air sacs and swim bladder

Unit 6: COMPARATIVE ANATOMY OF VERTEBRATES-II

Circulatory System: Evolution of heart and aortic arches.

Urinogenital System: Evolution of kidney and urinogenital ducts.

Nervous System: Comparative account of brain

Sense Organs: Different types of receptors

Unit 7: DEVELOPMENTAL BIOLOGY

Gametogenesis, fertilization in mammals, Types and patterns of cleavage

Blastulation and gastrulation, Role of primary organisers

Extra embryonic membranes, Types of placenta

Basic processes in development (gene activation, determination, induction)

Basic processes in embryonic development (differentiation, intra cellular communications, cell movement and cell death)

Unit 8: VERTEBRATE PHYSIOLOGY (I)

Digestion: Physiology of digestion; Absorption of carbohydrates, proteins and lipids

Respiration: Pulmonary respiration, Respiratory volumes and capacities, Transport of Oxygen and carbon dioxide in blood, types of respiratory pigments, oxygen dissociation curves

Excretion: Formation and excretion of nitrogenous wastes.

Unit 9: VERTEBRATE PHYSIOLOGY (II)

Origin and conduction of cardiac impulse

Different types of potentials, action potential and its propagation in different nerve fibres. Molecular and chemical basis of muscle contraction. Physiology of vision

Physiology of hearing

UNIT 10: ENDOCRINOLOGY

Hormonal control of Gametogenesis

Hormonal control of reproductive cycles in mammals

Hormones of Pituitary, Thyroid and Parathyroid

Hormones of Pancreas, Adrenal and Thymus

UNIT 11: BIOCHEMISTRY

Carbohydrate metabolism: Glycolysis, Krebs-cycle, Pentose phosphate pathway, Gluconeogenesis, Glycogen metabolism, Electron transport chain;

Lipid metabolism: Biosynthesis and β oxidation of palmitic acid.

Protein metabolism: Transamination, deamination and urea cycle

Enzymes: Introduction, Mechanism of action, Enzyme Kinetics, Inhibition and Regulation

Unit 12: CLASSICAL GENETICS

Mendelian genetics, Linkage, Linkage maps and crossing over; Nature of heterochromatin

Organisation of genetic material in prokaryotes and eukaryotes. Multiple alleles, Lethality, Epistasis, Sex linked inheritance, Extra chromosomal Inheritance

Unit 13: MOLECULAR GENETICS

Mutations: Structural and numerical changes in chromosomes; Gene mutations

Replication: Replication in prokaryotes and eukaryotes

Transcription and translation: Transcription and post transcriptional modifications, Translation

Sex Determination, Chromosomal mechanisms, Dosage compensation

Unit 14: EVOLUTION

Introduction to Evolutionary Theories; Lamarckism, Darwinism, Neo-Darwinism

Evidences of Evolution; Types of fossils, Dating of fossils, Phylogeny of horse

Processes of Evolutionary Change; Organic variations; Isolating Mechanisms; Natural selection Industrial melanism, Directional, Stabilizing and Disruptive selection, Artificial selection

Unit 15: MOLECULAR EVOLUTION

Species Concept: Biological species concept; Modes of speciation (Allopatric, Sympatric)

Macro-evolution, Macro-evolutionary principles (example: Darwin's Finches)

Extinction: Mass extinction, Causes and Role of extinction in evolution; Major extinctions, K-T extinction