# Academic Calendar

Department of Zoology, HMMCW

July, 2017- June, 2018

WBSU 3-Year B.Sc. Syllabus Under (1+1+1) System

| BSC. /YEAR PART/MODULE | SYLLABUS - PAPER | NO OF LECTURES | NAME OF TEACHER | TENTATIVE SCHEDULE |
|---|---|---|---|---|
| **BSc. (Hons') PART I** | **Paper-01: Diversity of Animals and Animal behaviours** | | | |
| Module ZH101 :Living kingdoms and protozoans | 1. Introduction to the modern classification of living organisms into Kingdoms, magnitude of diversity of living organisms: estimated species richness<br><br>2. Introduction to the Kingdom Protozoa: Classifications (up to Phylum only) and examples; Special topics (brief outlines only): contractile vacuoles, structures of cilia, reproduction in Paramoecium. | 10 | Dr. Indrajit Biswas | July'17- August'17 |
| Module ZH102: Non-Chordates | 1. Species diversity and classifications of non-chordate phyla (upto the levels as mentioned below) with salient features and prominent examples of the animal groups: Poriferans, Cnidarians, Ctenophorans, Platyhelminths, Aschelminthes, Annelids, Molluscs, Echinoderms, Arthropods (upto subclass),Rotifera, Bryozoa, Hemichordata (only salient features of the Phyla)<br><br>2. Special topics to understand the diversity of non-chordate structures and functions:<br><br>2.1 Body planes and symmetries, coelom, deuterostome vs protostome (only preliminary conceptual outlines);2.2 Polymorphisms in Cnidaria;2.3 Coral reef: types, formation, distribution, conservation significance;2.4 Torsions in | 35 | Dr. Indrajit Biswas | August'17- October'17 |

| | | | | |
|---|---|---|---|---|
| | Gastropods;2.5 Cyclomorphosis in Rotifers;2.6 Excretion in invertebrates with special reference to flame cells, nephridia, coelomoducts and malpighian tubules;2.7 Gas exchange by gills and trachea in Arthropods 2.8 Water vascular system and haemal system in Echinoderms;2.9 Brief overview of invertebrate larval forms | | | |
| Module ZH103: Chordates | 1.Chordate Classifications: (up to orders with salient features and examples, except for birds and mammals only names and examples of the orders);2Chordates: special topics reflecting diversity of adaptations: 2.1Feeding in Cephalochordates and Urochordates. 2.2 Larval form and metamorphosis in Ascidians.2.3 Experimental analysis of function of a vertebrate structure: study of feeding strike of a venomous Snake 2.4Biting, venom delivery and feeding in snakes 2.5 General features of vertebrate integument and its specialization with reference to exoskeletons 2.6Evolution of aortic arches in vertebrates 2.7Evolutionary trend in vertebrate brains 2.8Tripartite concept of kidney organization 2.9Ruminant stomachs- Digestive tract specializations as fermentation chambers in herbivore mammals 2.10Dentitions in vertebrates 2.11Vertebrae: different types | 35 | Dr.Anindya Sundar Bhunia | October'17-December'17 |
| Module ZH104: Animal Behaviour | 1.Tinbergen's four questions on studying animal behaviour;2.Definitions and examples of habituation, instinctive behaviour, FAP, imprinting and other programmed learning, cultural transmission; 3.Social animals- advantages and disadvantages of living in a group. (Examples of social animals and | 20 | Dr. Indrajit Biswas | December'17 |

| | | | | |
|---|---|---|---|---|
| | outline of their social structures; 4. Definition and examples of altruism, eusociality, units of selection (just preliminary ideas) | | | |
| | **Paper 02: Evolution and Preliminary Knowledge for Quantification in biology** | | | |
| Module ZH201: Evolution | 1.Rise of evolutionary theories: the historical outline- conflict between creationists' idea and evolutionary theories, Lamark's theory, Theories proposed by Darwin and Wallace, modern form of Darwinian theory including modern synthesis<br>2.H-W theorem and its significance in evolutionary theory, calculating gene frequencies for H-W and non-H-W populations (very simple problems only), Variations in natural populations.<br>3.Nature and actions of natural selection-evolution of industrial melanism in Biston betularia as example,<br>4.Genetic Drift, Gene Flow and Mutation Rate (only definitions and outlines of these processes, details of nature of actions by each, mathematical models not necessary)<br>5. Critical concepts (only preliminary and brief discussions)- 5.1 Application of the concept of adaptation- precise definition of adaptation in evolutionary sense, critique of adaptationist program';5.2 Trends in the evolution of modern horses- outlines only; 5.3 Measurement of rates of evolution-with the example of equine teeth including allometry; 5.4 Punctuationist vs. gradualist mode of evolutionary changes; 5.5 Heterochrony - as a process of macroevolution, just definitions of the heterochronic processes and examples including Neoteny and Progenesis; 5.6 Process of | 35 | Dr. Anindya Sundar Bhunia & Smt. Jayashree Shit | December'17-January/18 |

| | | | | |
|---|---|---|---|---|
| | speciation: concept of reproductively isolated species and models of speciation- Allopatric,Sympatric and Parapatric models; 5.7 Recent knowledge about hominid evolution: a brief outline | | | |
| Module ZH202: Preliminary knowledge for quantification in biology | 1. Logarithm, Matrices, Permutation and Combination, Probabilities (just preliminary concepts and very simple problems to be worked out)<br>2. Graphical representation of data- bar chart, histograms, scatter plots, pie charts; Discrete and Continuous variables- examples, Normal distribution (only primary characteristics and examples, detailed mathematical characterizations not required); Mean, Mode and Median, Standard deviation, Variance and Standard error; Simple Correlations; concept of Hypothesis Testing, Tests for goodness of fit- Chi-square, Student t-test for comparing means of two small samples from normal populations. | 15 | Sd. Anwarul Haque | December'17-January'18 |
| | **Paper-03: Practicals**<br>Module ZH301: Morpho-anatomical studies<br>Module ZH302: Identifying important and common animals<br>Module 303: Outdoor animal watching | 60+60 | Dr. Indrajit Biswas<br>&<br>Smt. Jayashree Shit | |
| **BSc. (Hons') PART II** | **Paper-IV (Theory): Genetics, Cell and Molecular Biology, Biochemistry and Biophysics** | | | |
| Module 401: Genetics | 1 Significance of Mendel's experiments and laws, Concepts and examples of -Test Cross and Back Cross, Incomplete Dominance/Codominance, Multiple Alleles, Epistasis, Polygenic inheritance<br>2. Chromosomal aberrations, gene mutations and human diseases (Down's, Klienfelter's, Turner's, Cri du Chat, Sickle cell, Haemophilia, Thallassimia, | 20 | Smt. Jayashree Shit | July'17-August'18 |

| | | | | |
|---|---|---|---|---|
| | Albinism – only genetical aspects here, details of physiological consequences not required), Sex chromosomes and sex-linked inheritance 3. Linkage and Recombination – Types and outcome, linkage disequilibrium, 3-point cross | | | |
| Module 402: Cell Biology and Molecular Biology | 1.Units of biological measurements and microscopy<br>2. Plasma membrane: lipid bilayer, membrane proteins and membrane transport – brief outline<br>3. Other organelles: introduction to structure and functions of mitochondria, GERL<br>4. Cell Cycle: preliminary concept<br>5. Replication: only outline of the mechanisms<br>6. Transcription: only outline of the mechanisms<br>7. Translation: only outline of the mechanisms<br>8. Gene expression-lac operon, trp operon (only introductory outline of the processes) 9. Types of mutations<br>10. Transposable genetic elements (preliminary introductions<br>11. Genetic engineering-preliminary concepts and common examples<br>12. Introductory principles of common methods used in cellular and molecular biology: PCR, RFLP, DNA fingerprinting, Gene sequencing | 30 | Dr. Anindya Sundar Bhunia | August'17-September'17 |
| Module 403: Biochemistry | 1.Chemical evolution of biomolecules (outline only)<br>2.Biological significance of water<br>3.Structural identities of biomolecules: Carbohydrates, Amino Acids, Peptides, Lipids (preliminary Outlines of lipids), nucleic acids<br>4. Enzymes (major classes of enzymes-mode of actions and examples) and enzyme kinetics<br>5.Metabolic pathways: Glycolysis, HMP shunt, Kreb's cycle, electron | 30 | Dr. Indrajit Biswas | August'17-December'17 |

| | | | | |
|---|---|---|---|---|
| | transfer system (outline), Gluconeogenesis, Glycolysis, beta oxidation, | | | |
| Module 404: Biophysics | 1.Three-dimensional structure of proteins (preliminary concepts only): peptide bonds, alpha helix, beta conformation, common examples of globular proteins;2.Structure of nucleic acids (preliminary concepts only): DNA and RNAS;3.Chromosome structure including Nucleosomes (preliminary concepts only;4.Introductory principles of common methods used in biochemistry and biophysics: Chromatography, Ultracentrifuge, Electrophoresis, X-ray crystallography, Immunoeletrophoresis & Western blotting | 20 | Jayashree Shit | December'17-January'18 |
| | **Paper V (Theory): Taxonomy, Ecology, Biodiversity & Microbiology, Parasitology, Immunology** | | | |
| Module 501: Taxonomy and Systematics | 1.Modern definitions of taxonomy and systematics, philosophy and working of modern taxonomy, Linaean hierarchy 2.Concept of a species in taxonomic practices3.ICZN and its important rules, 4.Cladistics: simple introductory concept and examples | 10 | Dr. Indrajit Biswas<br>&<br>Smt. Rituparna Maity | January'18 |
| Module 502: Ecology | 1. Ecology of populations: survivorship curves, life history tables, age-sex pyramids, population growth models (exponential and logistic models only) 2. Ecology of communities: defining a community, measuring species diversity, species interactions (competition and coexistence, predation, herbivory, mutualism), succession and concept of climaxes, Theory of Island Biogeography (introductory concepts only) 3. Ecosystems ecology: trophic structure, energy flow, nutrient cycling | 25 | Smt. Rituparna Maity | August'17-December'17 |
| Module 503: Biodiversity and Wildlife Conservation | 1.Biodiversity: concept of biodiversity, Importance of biodiversity, Megadiversity country, CBD, Indian Biodiversity Act., biodiversity hotspots, India- a megadiversity country, CBD, Indian Biodiversity Act. 2.Wildlife Conservation: Major forest types and | | Smt. Jayashree Shit | December'17 |

| | | | | |
|---|---|---|---|---|
| | their locations in India, Major wildlife of India – their Indian distribution, present status, conservation efforts (PAs- major sanctuaries and national parks, Indian Wildlife Act, IUCN categories, Project tiger as a case study) | | | |
| Module 504: Microbiology | 1.The study of microbial structure, 2. Microbial Nutrition 3. Microbial growth 4. Control of Microorganisms by Physical and Chemical agents 5.Pathogenicity of Microorganisms 6.Human diseases caused by Virus (polio, avine influenza) Bacteria (cholera, tuberculosis), Fungi (ringworm) | 15 | Dr. Indrajit Biswas | October'17-January'18 |
| Module 505: Parasitology | 1.Concept of parasitism 2. Origin and evolution of parasitism, host parasitic interactions, 3.Parasitic adaptation: physiological, bio-chemical, Zoonosis, Myasis 4.Identifying characters, life cycles, mode of infections of important parasites – Entamoeba, Giardia, Fasciola, Taenia, Ascaris | 15 | Dr. Indrajit Biswas | October'17-January'18 |
| Module 506: Immunology | 1.What is Immunology: a short preview of the development of the subject 2.Innate (Nonspecific) and Acquired (Specific) immunity. 3.Central dogma of Immune system: (a) Cells of Immune system (b) Organs of Immune system- Primary & Secondary lymphoid organs 4.Concept of Antigen & Antigen Presentation: Antigenic determinant (for ABO and Rh group only) 5. The Major Histocompatibility Complex: Antigen processing & presentation 6.Concept of T Cell-Antigen recognition and activation [Intracellular signal transuding enzymes excluded]: Structure and function of TCR complex, APC-T Cell interaction,7.Concept of B Cell Activation and Antibody production [Intracellular signal transuding enzymes excluded]: Structure & Function of Immunoglobins [class switching among Immunoglobin gene excluded].Antigenic determinants of Immunoglobins (Isotype, Allotype & Idiotype). 8. Cytokines (source & function of IL-1, IL-2, IL-4, IL-5, IL-6, IL-8, IL-10, IL-12, Interferons, Tumor Necrosis Factors, Tumor Growth Factors, GM-CSF, M-CSF).9. The Complement System (Basic concepts | 20 | Dr. Indrajit Biswas | January'18-March'18 |

| | | | | |
|---|---|---|---|---|
| | & Types only) 10. Techniques in Immunology: ELISA, RIA, Immunodiffusion Techniques, | | | |
| | **Paper VI: Practicals - Group A and Group B** | | Smt. Jayashree Shit<br>&<br>Dr. Amrita Banerjee | |
| **BSc. (Hons') PART III** | **Paper VII: Theory** | | | |
| Module 701: Animal Physiology | 1. Transport across cell surface membrane, Donnan membrane equilibrium;2. Functions of mammalian blood: Oxygen transport and $CO_2$ transport;3. Neurophysiology: Generation of action potential and propagation of nerve impulse in myelinated and non-myelinated nerve fibers. Synaptic and neuro-mascular junctions: structure and functions ;4. Respiration: gill respirations in fishes, respiration in air-breathing fishes, respiration in avian lungs;5. General architecture of skeletal (striated) muscle and smooth muscle; Ultrastructure of skeletal muscle sarcomere, molecular structure of actin and myosin, Muscle contraction: sliding filament theory ;6. Swim bladder and its functions in teleost fishes;7. Water and osmotic regulations: problems in marine cyclostomes, elasmobranchs and teleosts, freshwater teleosts, in hot desert environments(camel) and examples of significant adaptations solving it by different animal groups;8. Urine formation in human kidney;9. Bioluminescence: occurrence, mechanism of production | 40 | Dr. Anindya Sundar Bhunia | July'17-December'17 |
| Module 702: Endocrinology and Reproductive biology | 1. Classification of vertebrate hormones based on chemical nature and mechanism of action (names and examples only).;2. Hormone delivery systems: Endocrine, neuroendocrine, paracrine, neurocrine, autocrine | 40 | Smt. Jayashree Shit | July'17-December'17 |

| | | | | |
|---|---|---|---|---|
| | (Definitions and examples only); 3. Feedback control of hormone secretion: negative and positive. 4. Hormone biosynthesis (including sites of synthesis, outlines only): Thyroid hormones (T3, T4), testosterone, estrogen, progesterone, adreno-cortical hormones, Insulin, Adrenal catecholamines. 5. Physiologic functions of hormones: Insulin, glucagon. T3 and T4.;6. Hormonal control of spermatogenesis;7. Hormonal control of mammalian ovarian cycle, differences between estrous and menstrual cycle. 8. Mechanism of hormone actions (outlines only): cytoplasmic receptor, nuclear receptor, membrane Receptor, HRE, HSP, CAMP, cGMP, IP3-DAG, tyrosine kinase, calcium-calmodulin 9. Endocrine disorders (symptoms and causes only): Diabetes insipidus; IDDM & NIDDM. Hypothyroidism and hyperthyroidism, Conn's and Cushing's syndrome. | | | |
| Module 703: Histology | 1.Basic tissue types: epithelial, connective, cardiac and nervous tissue(typical structure of neuron and types of neuron, glial cells etc);2.Membrane specializations of epithelia. (Intercellular surface [cell junctions], luminal surfaces and Basal surfaces.).; 3.Exocrine glands: Types and discharge of secretory products (merocrine, apocrine, holocrine).;4.Principles of tissue fixation, staining,;5.Histology of: stomach, pancreas, testis, ovary, thyroid, lymph node. (Outline of structures). 6. Histological structure of mammalian nephron and functions of each regions. | 20 | Dr. Amrita Banerjee | July'17-September'17 |
| | **Paper VIII: Theory** | | | |
| Module 801: Developmental Biology | 1.Outlines of historical concepts and experiments in the emergence of developmental | 30 | Dr. Amrita Banerjee | September'17-December'17 |

| | | | | |
|---|---|---|---|---|
| | biology- Induction,Fate map, Spemann and Mangold's organizer transplant experiments, von Baer's laws.; 2. Germ layers and its contributions to the development of different tissues in vertebrates;. 3.Origin of germ cells, Structural features of sperms and eggs in sea urchins and in mammals,Gametogenesis in mammals,; 4. Fertilization: external fertilization in sea urchins, internal fertilization in mammals (in depth molecular Details not required); 5.Cleavage Types of cleavage found in animals and animal groups that exhibit a type, outlines of cleavage process in C . elegans, Zebrafish and Xenopus and chick; 6.Gastrulation: generalized patterns, brief outlines of the process in C. elegans, Zebra fish, Xenopus and chick ;7.Organogenesis: development of brain in chicken; 8. Conceptual outlines (very brief) of – Cell potency and Stem Cells, Sex determination in Drosophila and Man, Environmental sex determination in reptiles. HOX genes in development | | | |
| Module 802: Environmental Pollutions and Toxicology | 1. Environmental pollutions (nature and sources of pollutants. Impacts on ecosystems and humans, remedies): water, soil, air and sound pollutions;2.Environmental laws: major ones applicable in West Bengal;3.Toxicology: including its significance as a branch of Science;4.Dose-response relationships;5.In vivo and In vitro toxicity test;6.Introduction to the concepts of detoxication mechanisms | 20 | Smt. Rituparna Maity | November'17-December'17 |
| Module 805: Medical Zoology | 1. Mosquito-borne diseases: Malaria and Filaria- causative agents, their life cycle, modes of infections in man, major modes of treatments, major vector species in India, their ecology and life | 15 | Dr. Indrajit Biswas | January'18-February'18 |

| | | | | |
|---|---|---|---|---|
| | cycles, control measures; 2. Mosquito-borne diseases: Dengue and DHF, Chikungunya- causative virus, symptoms and treatments;3. Visceral Leishmaniasis (Kala-azar)- causative species and vectors in West Bengal; 4. Common ticks and mites in human surroundings and diseases caused by them | | | |
| Module 806: Economic Zoology | 1. Fishes and fishery: diversity of indigenous freshwater, estuarine, marine fishes and shell fishes in West Bengal. Invasive and exotic species of fishes in West Bengal. Techniques of modern pisciculture and prawn culture. Problems related to wild prawn seed collections in Sunderbans, fish productivities in India and West Bengal, ecology and degradation of freshwater fish habitats and decrease in wild fish stocks (very brief idea); 2. Sericulture: silks and silk worms, sericulture practices- methods, scopes and problems; 3. Apiculture: Honey bees and their behaviours in relation to bee-keeping, popular methods of bee keeping, scopes and problems; 4. Lac culture: Lac and lac insects, host plants and lac cultivation, scopes and problems; 5. Poultry birds: different breeds, their advantages and disadvantages, importance of indigenous breeds 6. Cattle, goats and lambs: different breeds, their advantages and disadvantages, importance of Indigenous breeds | 35 | Dr. Indrajit Biswas<br>Smt Jayashree Shit<br>Smt Rituparna Maity | October'17-February'18 |
| | **Paper IX: Practical**<br>**Group A**<br>**Group B** | 60+60 | Dr. Anindya Sundar Bhunia & Dr. Indrajit Biswas<br>Smt. Jayashree Shit &<br>Dr. Amrita Banerjee | |
| **BSc. General** | **Group A-Nonchordates**<br>1. Classification with distinctive features and suitable examples of | 30 | Dr. Indrajit Biswas | August'17-September'17 |

| | | | | |
|---|---|---|---|---|
| **Part-1** | sub kingdom Protozoa (upto Phyla) and Phylum Porifera, Cnideria, Platyhelminthes, Nemathelminthes, Annelida, Arthropoda, Mollusca andEchinodermata (upto Sub class).<br><br>2. General structure and function of the following with reference to the specimens mentioned: 1) Locomotion: a) Microfibrils (Amoeba), b) Cilia (Paramoectum), c) Parapodia (Neanthes). ii) Feeding and digestion: a) Microphagy (Amoeba), b) Macrophagy (Hydra),c) Filter feeding (Balanoglossus) iii) Respiration: a) Ctenidium and Pulmonary sac (Pila), b) Trachea and Booklung (cockroach, scorpion). iv) Excretion: a) Flame cell (Taenia), b) Nephridia (Earthworm), Malpighian tubules (Cockroach) v) Circulation: a) Open circulation (Cockroach), b) Closed circulation (Earthworm), Haemal circulation (Starfish) vi) Neural integration: a) Integration - simple and complex nerve nets b) Nervous system (Earthworm,Cockroach, Apple snail).vii) Reproduction and Life cycle: a) Fission (Amoeba), b) Conjugation (Paramoecium),e) Sexual (Earthworm), d) Metagenesis (.Obelia), e) Metamorphosis in insects | | | |
| | **Group B-Chordates**<br>1. Classification of Phylum Chordata with distinctive features and suitable examples- Fishes and Aves (upto Sub class); Amphibia, Reptilia and Mammalia (upto living orders). 2. a) Functional anatomy in relation to filter feeding (Branchiostoma); circulation with special reference to portal system. b) Structure and function of the following: i) Integument - general structure and function: glands in general | 30 | Dr. Anindya Sundar Bhunia | October'17-November'17 |

| | | | | |
|---|---|---|---|---|
| | and integumentary derivatives (scales in fishes; horny scales and plates in reptiles; feathers of birds; hair of mammals). ii) Digestive system- pharynx (Ascidia); stomach (Columba and Bos).iii) Respiratory system - gills (fish); accessory respiratory organs (fish); lungs (birds and mammals).iv) Excretory system- pro-, meso- and meta-nephric kidneys in vertebrates. v) Circulatory system single circuit heart (fish); double circuit heart (amphibia and mammals); modification of aortic arches in vertebrates. vi) Nervous system - Brain of Bufo; origin and distribution of cranial nerves in vertebrates. | | | |
| | **Group C-Parasitology and Endocrinology**<br>1.a) Parasitism (definition and different types) b) an outline idea of other interspecific interactions (symbiosis, commensalism and mutualism).;2. Life history, pathogenecity and clinical features of i) Entamocha histolytica, ii) Plasmodium vivax, iii) Ascaris; 3. General characters of hormones.; 4. Mammalian endocrine glands (pituitary, thyroid and pancreas with their hormonal functions). | 20 | Dr.Indrajit Biswas | November'17-December'17 |
| | **Group D -Ecology, Ecosystem and Environment**<br>1. Definition, components, energy flow, food chain, food web, ecological pyramids.2. Population-definition and growth,3. Community - definition and types.;4. Pollution air, water and noise.5. Global warming and its impact on environment. 6. Concept of EIA. | 20 | Dr. Amrita Banerjee | January'18 |
| **Part-II** | **Paper-II** | | | |
| | **Group A-Evolutionary Biology**<br>1. Definition of Systematics and Taxonomy.;2. Species as unit of | 30 | Dr. Indrajit Biswas | July'18-January'18 |

| | | | | |
|---|---|---|---|---|
| | evolution (definition and types: biological, monotypic and polytypic);3. Chemical basis of origin of life.;4. Darwinism and synthetic theory of evolution.;5. Hardy-Weinberg equilibrium in relation to natural selection - a brief idea.;6. Anatomical and physiological adaptation: aquatic, desert and volant animals.;7. Zoogeographical realms and their subdivisions with characteristic fauna. | | | |
| | **Group B-Cell and Molecular Biology**<br>1. Ultrastucture and function of plasmamembrane, GERL system and ribosome.;2. Chromosome structure-nucleosome model.;3. Cell cycle (basic idea). ;4. Physico-chemical structure and properties of DNA and RNA.;5. Nucleic acids as genetic material.;6. Mechanism of replication, transcription and translation in E. coli ; 7. Modes of inheritance of autosomal and sex-linked genes in man; Thalassemia and Haemophilia.;8. Linkage and recombination.;9. Point mutation and changes in chromosome number with reference to chromosomal aberrations. Down syndrome and Klienfelter syndrome. 10. Sex determination in Drosophila and man. | 30 | Dr. Anindya Sundar Bhunia | January'18-March'18 |
| | **Group C-Developmental Biology**<br>1. Spermatogenesis and oogenesis.;2. Fertilization in sea-urchin.;3. Types of eggs and cleavage; process of cleavage in frog and chick;4. Gastrulation in frog and chicks; 5. Placentation in mammals. | 20 | Dr. Amrita Banerjee | November'17-December'17 |
| | **Group D-Physiology and Biochemistry**<br>1.Formed elements in vertebrate blood; clotting and coagulation; ABO blood group and Rh factor. 2. Enzyme classification and characteristics; mechanism of enzyme action; effects on | 20 | Smt. Rituparna Maity | November'17-December'17 |

| | | | | |
|---|---|---|---|---|
| | enzymes action (substrate concentration, pH and temperature).; 3. Classification of carbohydrate, protein and lipid; Concept of glycolysis and Kreb's cycle.; 4.Neoglucogenesis.;5.A brief idea on muscle contraction.; 6. Physiology of nerve impulse and synaptic transmission and neuromuscular junction. | | | |
| | **Paper-III - Practical** | 50 | Dr. Amrita Banerjee & Dr. Anindya Sundar Bhunia | |
| **Part-III** | **Paper-IV A**<br>Aquaculture Principles, definition and scope. Fisheries resources of India (inland and off-shore). Exotic fishes their merits and demerits. Induced breeding and its importance. Basic principles of different aquaculture system (Polyculture and Integrated farming). Marine pearl culture, culture of prawn and shrimps; Sericulture Characteristics of sericulture industry and its scope; kinds of silk worm, host plants. Life history and rearing of Bombyx mori, harvesting and processing of cocoon, reeling and extraction of silk, pest on mulberry plants and diseases of Bombyx mori and control measures.Problems and prospects.; Apiculture Types of honey bees, modern methods of apiary management, products and its uses Pest and Pest Management – Pest – definition, types, life history and control i) Scirpophaga, ii) Sitophilus and iii) Bandicoota, Concept on IPM.; Poultry and Poultry Management – Duck and fowl – Types of breeds, rearing and disease management. Wild life and Biodiversity- 1. Conservation of Wild life- Importance and strategies, Concept of Biosphere Reserve, National Park and Wild life Sanctuary. 2. Basic concept of Biodiversity, Biodiversity | 60 | Dr. Indrajit Biswas | July'17-January'18 |

| | | | | |
|---|---|---|---|---|
| | hotspot.3. Endangered Indian mammals, Animal Cruelty Prevention Act. Biotechnology and Immunology –1.Basic concept of genetic engineering and cloning;2.Concept of immunity;3.Outline structure and classification of immunoglobulin; antigen-antibody reaction; 4. Basic principle of vaccination. | | | |
| | **Paper-IV B- Practical** | 50 | Dr. Indrajit Biswas, Dr. Anindya Sundar Bhunia & Smt. Jayashree Shit | January'18 |

# Academic Calendar

## Department of Zoology, HMMCW

July, 2018 - June, 2019

A. WBSU-CBCS Syllabus for both Odd and Even Semesters

B. WBSU BSc. 3-Year Syllabus Under (1+1+1) System- Part-II & Part-III

| Semester/ Year | WBSU-CBCS Syllabus for Odd Semesters<br>Syllabus Module/ Unit | No. of Lecture | Teacher Name | Distribution Tentative |
|---|---|---|---|---|
| **SEM-I HONOURS** | **Non Chordates-I PaperCode:ZOOACOR01T** | **30** | | |
| | **Unit 1: Protista, Parazoa and Metazoa**<br>General characteristics and Classification up to classes, Study of *Paramoecium* Life cycle and pathogenicity of *Entamoeba histolytica* and *Plasmodium vivax* | **6** | Dr. Indrajit Biswas | July'18 |
| | **Unit 2: Porifera**<br>General characteristics and Classification up to classesCanal system and spicules in sponges | **6** | Dr. Indrajit Biswas | **August'18** |
| | **Unit 3: Cnidaria**<br>General characteristics and Classification up to classes,Polymorphism in CnidariaCorals and coral reefs: types,formation, distribution, conservation significance | **6** | Santanu Das | **July'18** |
| | **Unit 4: Ctenophora**<br>General characteristics | **2** | Dr. Indrajit Biswas | **September'18** |
| | **Unit 5: Platyhelminthes**<br>General characteristics and Classification up to classes, Life cycle and pathogenicity of Fasciola hepatica and Taenia solium | **5** | Dr. Anindya Sundar Bhunia | **July'18** |
| | **Unit 6: Nemathelminthes**<br>General characteristics and Classification up to classes, Life cycle, and pathogenicity of Ascaris lumbricoides, Parasitic adaptations in helminths | **6** | Dr. Anindya Sundar Bhunia | **August'18** |
| | **Non-Chordates I Lab Paper Code: ZOOACOR01P** | **30** | Dr. Indrajit Biswas<br>Santanu Das | Acc. To Revised Syllabus 90% completed by end of December |
| | **ECOLOGY**<br>**PAPER CODE: ZOOACOR02T** | **30** | | |
| | **Unit 1: Introduction to Ecology**<br>History of ecology, Autecology and synecology,Levels of organization, Laws of limiting factors, Study of Physical factors, The Biosphere. | **6** | Rituparna Maity | **July'18-August'18** |
| | **Unit 2: Population**<br>life tables, survivorship curves, exponential and logistic growth, r and K strategies Population regulation - density-dependent and independent factors | **10** | Rituparna Maity | **September'18-November'18** |
| | **Unit 3: Community**<br>Community characteristics: species diversity, abundance,dominance, richness, Ecotone, Ecological succession and example of it. | **5** | Jayashree Shit | **July'18** |

| | | | | |
|---|---|---|---|---|
| | **Unit 4: Ecosystyem**<br>Food chain: Detritus and grazing food chains,Food web, Energy flow through the ecosystem, Ecological pyramids and Ecological efficiencies | **6** | Jayashree Shit | **August'18** |
| | **Unit 5: Applied Ecology**<br>Wildlife Conservation (in-situ and ex-situ conservation).Wild life protection act (1972) | **3** | Santanu Das | **Sepetember'18** |
| | **ECOLOGY LAB PAPER CODE: ZOOACOR02P** | **30** | Jayashree Shit | Acc. To Revised Syllabus 90% completed by end of December |
| **SEM-I GENERAL** | **ANIMAL DIVERSITY PAPER CODE: ZOOGCOR01T** | **30** | | |
| | **Unit-1 Kingdom Protista**<br>General characters and classification of Subkingdom,Protozoa up to Phylum (Levine et al., 1980) | **2** | Dr. Indrajit Biswas | **July'18** |
| | **Unit-2 Phylum Porifera**<br>General character and classification up to classes; Canal system in Sycon | **2** | Dr. Indrajit Biswas | **July'18** |
| | **Unit-3 Phylum Cnidaria**<br>General characters and classification up to classes | **1** | Dr. Indrajit Biswas | **August'18** |
| | **Unit-4 Phylum Platyhelminthes**<br>General characters and classification up to classes; Life history of Taenia solium | **3** | Dr. Indrajit Biswas | **August'18** |
| | **Unit-5 Phylum Nematoda**<br>General characters and classification up to classes; Lifehistory of Ascaris lumbricoides | **3** | Dr. Anindya Sundar Bhunia | **July'18** |
| | **Unit-6 Phylum Annelida**<br>General characters and classification up to classes | **1** | Dr. Anindya Sundar Bhunia | **August'18** |
| | **Unit-6 Phylum Annelida**<br>General characters and classification up to classes | **1** | Dr. Anindya Sundar Bhunia | **August'18** |
| | **Unit 7 Phylum Arthropoda**<br>General characters and classification up to classes Metamorphosis in Insects | **2** | Dr. Anindya Sundar Bhunia | **Sepetember'18** |
| | **Unit-8 Phylum Mollusca**<br>General characters and classification up to classes;Respiration in Pila | **2** | Dr. Anindya Sundar Bhunia | **Sepetember'18** |
| | **Unit-9 Phylum Echinodermata**<br>General characters and classification up to classes; Water-vascular system in Asterias | **2** | Rituparna Maity | **July'18** |
| | **Unit-10 Protochordates**<br>General features | **1** | Rituparna Maity | **Agust'18** |
| | **Unit-11 Agnatha**<br>General features and classification up to classes (Young,1981) | **1** | Rituparna Maity | **August'18** |
| | **Unit-12 Pisces**<br>General features and Classification up to Subclasses(Romer, 1959); Osmoregulation in Fishes | **2** | Rituparna Maity | **September'18** |
| | **Unit-13 Amphibia**<br>General features and Classification up to living | **2** | Santanu Das | **July'18** |

| | | | | |
|---|---|---|---|---|
| | orders (Duellman & Trueb, 1986); Metamorphosis in Toad | | | |
| | **Unit-14 Reptiles** General features and Classification up to living Subclass(Young, 1981); Poisonous and non-poisonous snakes | **2** | Santanu Das | **Agust'18** |
| | **Unit-15 Aves** General features and Classification up to orders (Young,1981); Flight adaptations in birds | **2** | Jayashree Shit | **July'18** |
| | **Unit-16 Mammals** Classification up to Subclasses (Young, 1981) | **1** | Jayashree Shit | **Agust'18** |
| | **ANIMAL DIVERSITY PAPER CODE: ZOOGCOR01P** | **30** | Rituparna Maity Dr. Anindya SundarBhunia | Acc. To Revised Syllabus 90% completed by end of December |
| **SEM-II HONOURS** | **Non-Chordates II Paper Code: ZOOACOR03T** | **30** | | |
| | **Unit 1: Introduction to Coelomates** Evolution of coelom and metamerism | **3** | Dr. Indrajit Biswas | **February'19** |
| | **Unit 2: Annelida** General characteristics and Classification up to classes Excretion in Annelida | **4** | Dr. Indrajit Biswas | **March'19** |
| | **Unit 3: Arthropoda** General characteristics and Classification up to classes,Metamorphosis in Insects Social life in bees and termites | **8** | Dr. Indrajit Biswas | **April'19** |
| | **Unit 4: Onychophora** General characteristics | **2** | Dr. Indrajit Biswas | **May'19** |
| | **Unit 5: Mollusca** General characteristics and Classification up to classes Respiration in Mollusca Torsion and detorsion in Gastropoda | **6** | Santanu Das | **February'19-March'19** |
| | **Unit 6: Echinodermata** General characteristics and Classification up to classes Water-vascular system in Asteroidea Larval forms in Echinodermata | **4** | Santanu Das | **April'19** |
| | **Unit 7: Hemichordata** General characteristics of phylum Hemichordata. Phylogenetic relationship with non-chordates and chordates (only recent concept) | **3** | Smt. Rituparna Maity | **February'19** |
| | **Non-Chordates II Lab Paper Code: ZOOACOR03P** | **30** | S Dr. Indrajit Biswas Smt. Rituparna Maity | Acc. To Revised Syllabus 90% completed by end of July |
| | **CELL BIOLOGY PAPER CODE: ZOOACOR04T** | **30** | | |
| | **Unit 1: Overview of Cells** Prokaryotic and Eukaryotic cells, Virus, Viroids | **2** | Jayashree Shit | **February'19** |
| | **Unit 2: Plasma Membrane** Various models of plasma membrane structure Transport across membranes: Active and Passive transport, facilitated transport, Cell junctions: Tight junctions, Desmosomes, Gap junctions | **5** | Jayashree Shit | **March'19-April'19** |

| | | | | |
|---|---|---|---|---|
| | **Unit 3: Endomembrane System**<br>Structure and Functions: Endoplasmic Reticulum, Golgi Apparatus, Lysosomes | **5** | Jayashree Shit | **April'19** |
| | **Unit 4: Mitochondria and Peroxisomes**<br>Mitochondria: Structure, Semi-autonomous nature, Mitochondrial Respiratory Chain, Peroxisomes | **4** | Mr.Santanu Das | **February'19** |
| | **Unit 5: Cytoskeleton**<br>Structure and Functions: Microtubules, Microfilaments and Intermediate filaments | **4** | Mr. Santanu Das | **March'19** |
| | **Unit 6: Nucleus**<br>Structure of Nucleus: Nuclear envelope, Nucleolus<br>Chromatin: Euchromatin and Heterochromatin and packaging (nucleosome) | **2** | Dr. Anindya Sundar Bhunia | **February'19** |
| | **Unit 7: Cell Division**<br>Mitosis and Meiosis<br>Cell cycle and its regulation<br>Mechanisms of cell death: brief overview | **4** | Dr. Anindya Sundar Bhunia | **March'19** |
| | **Unit 8: Cell Signaling**<br>Cell signalling transduction pathways; Types of signaling molecules and receptors GPCR and Role of second messenger (cAMP) | **5** | Dr. Anindya Sundar Bhunia | **April'19-May'19** |
| | **CELL BIOLOGY LAB**<br>**PAPER CODE: ZOOACOR04P** | **30** | Dr. Anindya Sundar Bhunia<br>Jayashree Shit | Acc. To Revised Syllabus 90% completed by end of July |
| **SEM-II GENERAL** | **PHYSIOLOGY AND BIOCHEMISTRY**<br>**PAPER CODE: ZOOGCOR02T** | **30** | | |
| | **Unit-1 Nerve and muscle**<br>1.Structure of a neuron, Resting membrane potential, Graded potential, Origin of Action potential and its propagation in myelinated and non-myelinated nerve fibres.2.Ultra-structure of skeletal muscle, Molecular and chemical basis of muscle contraction. | **4** | Dr. Indrajit Biswas | **February'19** |
| | **Unit-2 Digestion**<br>Absorption of carbohydrates, proteins, lipids | **2** | Dr. Indrajit Biswas | **March'19** |
| | **Unit-3 Respiration**<br>Pulmonary ventilation, Respiratory volumes and capacities, Transport of Oxygen and carbon dioxide in blood | **3** | Dr. Anindya Sundar Bhunia | **February'19** |
| | **Unit-4 Excretion**<br>Structure of nephron, Mechanism of Urine formation, Counter-current Mechanism | **3** | Dr. Anindya Sundar Bhunia | **March'19** |
| | **Unit-5 Cardiovascular system**<br>Composition of blood, Homeostasis, Structure of Heart, Origin and conduction of the cardiac impulse, Cardiac cycle | **3** | Smt. Rituparna Maity | **February'19** |
| | **Unit-6 Reproduction and Endocrine Glands**<br>Physiology of male reproduction: hormonal control of spermatogenesis; Physiology of female reproduction: hormonal control of menstrual cycle. Structure and function of thyroid, pancreas | **4** | Smt. Rituparna Maity | **March'19-April'19** |
| | **Unit 7 Carbohydrate**: Structure and Metabolism<br>Introduction to Carbohydrates, Structure & Types of Carbohydrates, Introduction to Intermediary metabolism: Glycolysis, Krebs cycle, Electron transport chain | **4** | Jayashree Shit | **February'19-March'19** |
| | **Unit-8 Lipid:**<br>Structure and Metabolism<br>Introduction to Lipids: Definitions; classes of lipids; β oxidation of palmitic acid | **2** | Mr. Santanu Das | **February'19** |

| | | | | |
|---|---|---|---|---|
| | **Unit-9 Protein**: Structure and metabolism<br>Proteins and their biological functions, functions of amino acids; primary structure of protein, secondary, tertiary and quaternary structures. Transamination, Deamination. | 2 | Mr. Santanu Das | **March'19** |
| | **Unit-10 Enzymes**<br>Introduction, Classification of Enzymes, Mechanism of action, Enzyme Kinetics, Inhibition and Regulation | 2 | Mr. Santanu Das | **April'19** |
| | **PHYSIOLOGY AND BIOCHEMISTRY LAB<br>PAPER CODE: ZOOGCOR02P** | **30** | Smt. Rituparna Maity<br>Dr. Anindya Sundar Bhunia | Acc. To Revised Syllabus 90% completed by end of July |

| BSC. /YEAR PART/MODULE | WBSU BSc. 3-Year Syllabus Under (1+1+1) System- Part-II & Part-III SYLLABUS - PAPER | NO OF LECTURES | NAME OF TEACHER | TENTATIVE SCHEDULE |
|---|---|---|---|---|
| **BSc. (Hons') PART II** | **Paper-IV (Theory): Genetics, Cell and Molecular Biology, Biochemistry and Biophysics** | | | |
| Module 401: Genetics | 1 Significance of Mendel's experiments and laws, Concepts and examples of -Test Cross and Back Cross, Incomplete Dominance/Codominance, Multiple Alleles, Epistasis, Polygenic inheritance<br>2. Chromosomal aberrations, gene mutations and human diseases (Down's, Klienfelter's, Turner's, Cri du Chat, Sickle cell, Haemophilia, Thallassimia, Albinism – only genetical aspects here, details of physiological consequences not required), Sex chromosomes and sex-linked inheritance<br>3. Linkage and Recombination – Types and outcome, linkage disequilibrium, 3-point cross | 15 | Santanu Das | August'18-October'18 |
| Module 402: Cell Biology and Molecular Biology | 1.Units of biological measurements and microscopy<br>2. Plasma membrane: lipid bilayer, membrane proteins and membrane transport – brief outline<br>3. Other organelles: introduction to structure and functions of mitochondria, GERL<br>4. Cell Cycle: preliminary concept<br>5. Replication: only outline of the mechanisms<br>6. Transcription: only outline of the mechanisms<br>7. Translation: only outline of the mechanisms<br>8. Gene expression-lac operon, trp operon (only introductory outline of the processes)<br>9. Types of mutations<br>10. Transposable genetic elements (preliminary introductions<br>11. Genetic engineering- preliminary concepts and common examples | 35 | Dr. Anindya Sundar Bhunia | July'18-Spetember'18 |

| | | | | |
|---|---|---|---|---|
| | 12. Introductory principles of common methods used in cellular and molecular biology: PCR, RFLP, DNA fingerprinting, Gene sequencing | | | |
| Module 403: Biochemistry | 1.Chemical evolution of biomolecules (outline only)<br>2.Biological significance of water<br>3.Structural identities of biomolecules: Carbohydrates, Amino Acids, Peptides, Lipids (preliminary Outlines of lipids), nucleic acids<br>4. Enzymes (major classes of enzymes-mode of actions and examples) and enzyme kinetics<br>5.Metabolic pathways: Glycolysis, HMP shunt, Kreb's cycle, electron transfer system (outline), Gluconeogenesis, Glycolysis, beta oxidation, | 30 | Dr. Indrajit Biswas | September'18 |
| Module 404: Biophysics | 1.Three-dimensional structure of proteins (preliminary concepts only): peptide bonds, alpha helix, beta conformation, common examples of globular proteins;2.Structure of nucleic acids (preliminary concepts only): DNA and RNAS;3.Chromosome structure including Nucleosomes (preliminary concepts only;4.Introductory principles of common methods used in biochemistry and biophysics: Chromatography, Ultracentrifuge, Electrophoresis, X-ray crystallography, Immunoeletrophoresis & Western blotting | 20 | Jayashree Shit | September'18 |
| | **Paper V (Theory): Taxonomy, Ecology, Biodiversity & Microbiology, Parasitology, Immunology** | | | |
| Module 501: Taxonomy and Systematics | 1.Modern definitions of taxonomy and systematics, philosophy and working of modern taxonomy, Linaean hierarchy<br>2.Concept of a species in taxonomic practices3.ICZN and its important rules,<br>4.Cladistics: simple introductory concept and examples | 10 | Smt. Rituparna Maity | November'18 |
| Module 502: Ecology | 1. Ecology of populations: survivorship curves, life history tables, age-sex pyramids, population growth models (exponential and logistic models only) 2. Ecology of communities: defining a community, measuring species diversity, species interactions (competition and coexistence, predation, herbivory, mutualism), succession and concept of climaxes, Theory of Island Biogeography (introductory concepts only) 3. Ecosystems ecology: trophic structure, energy flow, nutrient cycling | 30 | Smt. Rituparna Maity | December'18-February'19 |

| | | | | |
|---|---|---|---|---|
| Module 503: Biodiversity and Wildlife Conservation | 1.Biodiversity: concept of biodiversity, Importance of biodiversity, Megadiversity country, CBD, Indian Biodiversity Act., biodiversity hotspots, India- a megadiversity country, CBD, Indian Biodiversity Act. 2.Wildlife Conservation: Major forest types and their locations in India, Major wildlife of India – their Indian distribution, present status, conservation efforts (PAs- major sanctuaries and national parks, Indian Wildlife Act, IUCN categories, Project tiger as a case study) | 15 | Jayashree Shit | November'18-December'18 |
| Module 504: Microbiology | 1.The study of microbial structure, 2. Microbial Nutrition 3. Microbial growth 4. Control of Microorganisms by Physical and Chemical agents 5.Pathogenicity of Microorganisms 6.Human diseases caused by Virus (polio, avine influenza) Bacteria (cholera, tuberculosis), Fungi (ringworm) | 15 | Smt. Rituparna Maity | December'18 |
| Module 505: Parasitology | 1.Concept of parasitism 2. Origin and evolution of parasitism, host parasitic interactions, 3.Parasitic adaptation: physiological, bio-chemical, Zoonosis, Myasis 4.Identifying characters, life cycles, mode of infections of important parasites – Entamoeba, Giardia, Fasciola, Taenia, Ascaris | 15 | Dr. Indrajit Biswas | December'18 |
| Module 506: Immunology | 1.What is Immunology: a short preview of the development of the subject 2.Innate (Nonspecific) and Acquired (Specific) immunity. 3.Central dogma of Immune system: (a) Cells of Immune system (b) Organs of Immune system- Primary & Secondary lymphoid organs 4.Concept of Antigen & Antigen Presentation: Antigenic determinant (for ABO and Rh group only) 5. The Major Histocompatibility Complex: Antigen processing & presentation 6.Concept of T Cell-Antigen recognition and activation [Intracellular signal transuding enzymes excluded]: Structure and function of TCR complex, APC-T Cell interaction,7.Concept of B Cell Activation and Antibody production [Intracellular signal transuding enzymes excluded]: Structure & Function of Immunoglobins [class switching among Immunoglobin gene excluded].Antigenic determinants of Immunoglobins (Isotype, Allotype & Idiotype). 8. Cytokines (source & function of IL-1, IL-2, IL-4, IL-5, IL-6, IL-8, IL-10, IL-12, Interferons, Tumor Necrosis Factors, Tumor Growth Factors, GM-CSF, M-CSF).9. The Complement System (Basic concepts & Types | 20 | Dr. Indrajit Biswas | December'18-January'19 |

| | | | | |
|---|---|---|---|---|
| | only) 10. Techniques in Immunology: ELISA, RIA, Immunodiffusion Techniques, | | | |
| | **Paper VI: Practicals -Group A and Group B** | 60+60 | | |
| **BSc. (Hons') PART III** | **Paper VII: Theory** | | | |
| Module 701: Animal Physiology | 1. Transport across cell surface membrane, Donnan membrane equilibrium;2. Functions of mammalian blood: Oxygen transport and $CO_2$ transport;3. Neurophysiology: Generation of action potential and propagation of nerve impulse in myelinated and non-myelinated nerve fibers. Synaptic and neuro-mascular junctions: structure and functions ;4. Respiration: gill respirations in fishes, respiration in air-breathing fishes, respiration in avian lungs;5. General architecture of skeletal (striated) muscle and smooth muscle; Ultrastructure of skeletal muscle sarcomere, molecular structure of actin and myosin, Muscle contraction: sliding filament theory ;6. Swim bladder and its functions in teleost fishes;7. Water and osmotic regulations: problems in marine cyclostomes, elasmobranchs and teleosts, freshwater teleosts, in hot desert environments(camel) and examples of significant adaptations solving it by different animal groups;8. Urine formation in human kidney;9. Bioluminescence: occurrence, mechanism of production | 40 | Dr. Anindya Sundar Bhunia | July'18 |

| | | | | |
|---|---|---|---|---|
| Module 702: Endocrinology and Reproductive biology | 1. Classification of vertebrate hormones based on chemical nature and mechanism of action (names and examples only).;2. Hormone delivery systems: Endocrine, neuroendocrine, paracrine, neurocrine, autocrine (Definitions and examples only); 3. Feedback control of hormone secretion: negative and positive. 4. Hormone biosynthesis (including sites of synthesis, outlines only): Thyroid hormones (T3, T4), testosterone, estrogen, progesterone, adreno-cortical hormones, Insulin, Adrenal catecholamines. 5. Physiologic functions of hormones: Insulin, glucagon. T3 and T4.;6. Hormonal control of spermatogenesis;7. Hormonal control of mammalian ovarian cycle, differences between estrous and menstrual cycle. 8. Mechanism of hormone actions (outlines only): cytoplasmic receptor, nuclear receptor, membrane Receptor, HRE, HSP, CAMP, cGMP, IP3-DAG, tyrosine kinase, calcium-calmodulin 9. Endocrine disorders (symptoms and causes only): Diabetes insipidus; IDDM & NIDDM. Hypothyroidism and hyperthyroidism, Conn's and Cushing's syndrome. | 40 | Jayashree Shit | July'18-August'18 |
| Module 703: Histology | 1.Basic tissue types: epithelial, connective, cardiac and nervous tissue(typical structure of neuron and types of neuron, glial cells etc);2.Membrane specializations of epithelia. (Intercellular surface [cell junctions], luminal surfaces and Basal surfaces.).; 3.Exocrine glands: Types and discharge of secretory products (merocrine, apocrine, holocrine).;4.Principles of tissue fixation, staining,;5.Histology of: stomach, pancreas, testis, ovary, thyroid, lymph node. (Outline of structures). 6. Histological structure of mammalian nephron and functions of each regions. | 20 | Dr. Indrajit Biswas | September'18 |
| | **Paper VIII: Theory** | | | |
| Module 801: Developmental Biology | 1.Outlines of historical concepts and experiments in the emergence of developmental biology- Induction,Fate map, Spemann and Mangold's organizer transplant experiments, von Baer's laws.; 2. Germ layers and its contributions to the development of different tissues in vertebrates;. 3.Origin of germ cells, Structural features of sperms and eggs in sea urchins and in mammals,Gametogenesis in mammals,; 4. Fertilization: external fertilization in sea urchins, internal fertilization in mammals (in depth molecular | 30 | Santanu Das | July'18-August'18 |

| | | | | |
|---|---|---|---|---|
| | Details not required); 5.Cleavage Types of cleavage found in animals and animal groups that exhibit a type, outlines of cleavage process in C . elegans, Zebrafish and Xenopus and chick; 6.Gastrulation: generalized patterns, brief outlines of the process in C. elegans, Zebra fish, Xenopus and chick ;7.Organogenesis: development of brain in chicken; 8. Conceptual outlines (very brief) of – Cell potency and Stem Cells, Sex determination in Drosophila and Man, Environmental sex determination in reptiles. HOX genes in development | | | |
| Module 802: Environmental Pollutions and Toxicology | 1. Environmental pollutions (nature and sources of pollutants. Impacts on ecosystems and humans, remedies): water, soil, air and sound pollutions;2.Environmental laws: major ones applicable in West Bengal;3.Toxicology: including its significance as a branch of Science;4.Dose-response relationships;5.In vivo and In vitro toxicity test;6.Introduction to the concepts of detoxication mechanisms | 20 | Rituparna Maity | July'18 |
| Module 805: Medical Zoology | 1. Mosquito-borne diseases: Malaria and Filaria- causative agents, their life cycle, modes of infections in man, major modes of treatments, major vector species in India, their ecology and life cycles, control measures; 2. Mosquito-borne diseases: Dengue and DHF, Chikungunya- causative virus, symptoms and treatments;3. Visceral Leishmaniasis (Kala-azar)- causative species and vectors in West Bengal; 4. Common ticks and mites in human surroundings and diseases caused by them | 15 | Dr. Indrajit Biswas | November'18 |
| Module 806: Economic Zoology | 1. Fishes and fishery: diversity of indigenous freshwater, estuarine, marine fishes and shell fishes in West Bengal. Invasive and exotic species of fishes in West Bengal. Techniques of modern pisciculture and prawn culture. Problems related to wild prawn seed collections in Sunderbans, fish productivities in India and West Bengal, ecology and degradation of freshwater fish habitats and decrease in wild fish stocks (very brief idea); 2. Sericulture: silks and silk worms, sericulture practices- methods, scopes and problems; 3. Apiculture: Honey bees and their behaviours in relation to bee-keeping, popular methods of bee keeping, scopes and problems; 4. Lac culture: Lac and lac insects, host plants and lac cultivation, scopes and problems; 5. Poultry birds: different breeds, their advantages and disadvantages, importance of indigenous breeds 6. Cattle, goats and lambs: different | 40 | Dr. Indrajit Biswas<br>Rituparna Maity | December'18 |

| | | | | |
|---|---|---|---|---|
| | breeds, their advantages and disadvantages, importance of Indigenous breeds | | | |
| | **Paper IX: Practical**<br>**Group A**<br>**Group B** | 60+60 | Dr. Anindya sundar bhunia<br>Dr. Indrajit Biswas<br>Jayashree Shit | |
| **BSc. (General) Part-II** | **Paper-II** | | | |
| | **Group A-Evolutionary Biology**<br>1. Definition of Systematics and Taxonomy.;2. Species as unit of evolution (definition and types: biological, monotypic and polytypic);3. Chemical basis of origin of life.;4. Darwinism and synthetic theory of evolution.;5. Hardy-Weinberg equilibrium in relation to natural selection - a brief idea.;6. Anatomical and physiological adaptation: aquatic, desert and volant animals.;7. Zoogeographical realms and their subdivisions with characteristic fauna. | 30 | Dr. Indrajit Biswas | July'18 |
| | **Group B-Cell and Molecular Biology**<br>1. Ultrastucture and function of plasmamembrane, GERL system and ribosome.;2. Chromosome structure-nucleosome model.;3. Cell cycle (basic idea). ;4. Physico-chemical structure and properties of DNA and RNA.;5. Nucleic acids as genetic material.;6. Mechanism of replication, transcription and translation in E. coli ; 7. Modes of inheritance of autosomal and sex-linked genes in man; Thalassemia and Haemophilia.;8. Linkage and recombination.;9. Point mutation and changes in chromosome number with reference to chromosomal aberrations. Down syndrome and Klienfelter syndrome. 10. Sex determination in Drosophila and man. | 30 | Dr. Anindya Sundar Bhunia | August'18 |
| | **Group C-Developmental Biology**<br>1. Spermatogenesis and oogenesis.;2. Fertilization in sea-urchin.;3. Types of eggs and cleavage; process of cleavage in frog and chick;4. Gastrulation in frog and chicks; 5. Placentation in mammals. | 20 | Jayashree Shit | July'18 |
| | **Group D-Physiology and Biochemistry**<br>1.Formed elements in vertebrate blood; clotting and coagulation; ABO blood group and Rh factor. 2. Enzyme classification and characteristics; mechanism of enzyme action; effects on enzymes action (substrate concentration, pH and temperature).; 3. Classification of carbohydrate, protein and | 20 | Rituparna Maity | September'18 |

| | | | | |
|---|---|---|---|---|
| | lipid; Concept of glycolysis and Kreb's cycle.; 4.Neoglucogenesis.;5.A brief idea on muscle contraction.; 6. Physiology of nerve impulse and synaptic transmission and neuromuscular junction. | | | |
| **Part-III** | **Paper-IV A** | 60 | | |
| | Aquaculture Principles, definition and scope. Fisheries resources of India (inland and off-shore). Exotic fishes their merits and demerits. Induced breeding and its importance. Basic principles of different aquaculture system (Polyculture and Integrated farming). Marine pearl culture, culture of prawn and shrimps; Sericulture Characteristics of sericulture industry and its scope; kinds of silk worm, host plants. Life history and rearing of Bombyx mori, harvesting and processing of cocoon, reeling and extraction of silk, pest on mulberry plants and diseases of Bombyx mori and control measures.Problems and prospects.; Apiculture Types of honey bees, modern methods of apiary management, products and its uses Pest and Pest Management – Pest – definition, types, life history and control i) Scirpophaga, ii) Sitophilus and iii) Bandicoota, Concept on IPM.; Poultry and Poultry Management – Duck and fowl – Types of breeds, rearing and disease management. Wild life and Biodiversity- 1. Conservation of Wild life- Importance and strategies, Concept of Biosphere Reserve, National Park and Wild life Sanctuary. 2. Basic concept of Biodiversity, Biodiversity hotspot.3. Endangered Indian mammals, Animal Cruelty Prevention Act. Biotechnology and Immunology –1.Basic concept of genetic engineering and cloning;2.Concept of immunity;3.Outline structure and classification of immunoglobulin; antigen-antibody reaction; 4. Basic principle of vaccination. | 60 | Dr. Indrajit Biswas | July'18-September'18 |
| | **Paper-IV B- Practical** | 60 | Dr. Indrajit Biswas | September'18-December'18 |

# Academic Calendar

## Department of Zoology, HMMCW

July, 2019 - June, 2020

A. WBSU-CBCS Syllabus for both Odd and Even Semesters

B. WBSU BSc. 3-Year Syllabus Under (1+1+1) System- Part-III

| Semester/ Year | WBSU-CBCS Syllabus for Odd Semesters<br>Syllabus Module/ Unit | No. of Lecture | Teacher Name | Distribution Tentative |
|---|---|---|---|---|
| **SEM-I HONOURS** | **Non-Chordates I**<br>**Paper Code: ZOOACOR01T** | **30** | | |
| | **Unit 1: Protista, Parazoa and Metazoa**<br>General characteristics and Classification up to classes, Study of *Paramoecium* Life cycle and pathogenicity of *Entamoeba histolytica* and *Plasmodium vivax* | **6** | Dr. Indrajit Biswas | **June'20-July'20**<br>**July'20-July'20** |
| | **Unit 2: Porifera**<br>General characteristics and Classification up to classes Canal system and spicules in sponges | **5** | Dr. Indrajit Biswas | **August'20** |
| | **Unit 3: Cnidaria**<br>General characteristics and Classification up to classes Polymorphism in CnidariaCorals and coral reefs: types, formation, distribution, conservation significance | **6** | Santanu Das | **August'20-October'20** |
| | **Unit 4: Ctenophora**<br>General characteristics | **2** | Santanu Das | **July'20-August'20** |
| | **Unit 5: Platyhelminthes**<br>General characteristics and Classification up to classes, Life cycle and pathogenicity of *Fasciola hepatica* and *Taenia solium* | **6** | Dr. Anindya Sundar Bhunia | **August'20-September'20-** |
| | **Unit 6: Nemathelminthes**<br>General characteristics and Classification up to classes, Life cycle, and pathogenicity of *Ascaris lumbricoides,* Parasitic adaptations in helminths | **5** | Dr. Anindya Sundar Bhunia | **June'20-June'20**<br>**June'20-July'20** |
| | **Non-Chordates I Lab**<br>**Paper Code: ZOOACOR01P** | **30** | Dr. Indrajit Biswas<br>Santanu Das | **Acc. To Revised Syllabus 90% completed by end of November** |
| | **ECOLOGY**<br>**PAPER CODE: ZOOACOR02T** | **30** | | **August'20** |
| | **Unit 1: Introduction to Ecology**<br>History of ecology, Autecology and synecology, Levels of organization, Laws of limiting factors, Study of Physical factors, The Biosphere. | **6** | Rituparna Maity | **August'20-October'20** |
| | **Unit 2: Population**<br>life tables, survivorship curves, exponential and logistic growth, r and K strategies Population regulation - density-dependent and independent factors | **10** | Rituparna Maity | **July'20-August'20**<br>**September'20-** |
| | **Unit 3: Community**<br>Community characteristics: species diversity, abundance, dominance, richness, Ecotone, Ecological succession and example of it. | **5** | Dr. S Rehan Ahmad | **September'20** |
| | **Unit 4: Ecosystyem**<br>Food chain: Detritus and grazing food chains,Food web, Energy flow through the ecosystem, Ecological pyramids and Ecological efficiencies | **6** | Dr. S Rehan Ahmad | **June'20-June'20** |

| | | | | |
|---|---|---|---|---|
| | **Unit 5: Applied Ecology**<br>Wildlife Conservation (in-situ and ex-situ conservation). Wild life protection act (1972) | **3** | Santanu Das | **August'20** |
| | **ECOLOGY LAB**<br>**PAPER CODE: ZOOACOR02P** | **30** | Rituparna Maity | **Acc. To Revised Syllabus 90% completed by end of November** |
| **SEM-I GENERAL** | **ANIMAL DIVERSITY**<br>**PAPER CODE: ZOOGCOR01T** | **30** | | |
| | **Unit-1 Kingdom Protista**<br>General characters and classification of Subkingdom Protozoa up to Phylum (Levine et al., 1980) | **2** | Dr. Indrajit Biswas | **June'20** |
| | **Unit-2 Phylum Porifera**<br>General character and classification up to classes; Canal System in Sycon | **2** | Dr. Indrajit Biswas | **June'20-July'20** |
| | **Unit-3 Phylum Cnidaria**<br>General characters and classification up to classes | **1** | Dr. Indrajit Biswas | **July'20-July'20** |
| | **Unit-4 Phylum Platyhelminthes**<br>General characters and classification up to classes; Life history of Taenia solium | **3** | Dr. Indrajit Biswas | **August'20** |
| | **Unit-5 Phylum Nematoda**<br>General characters and classification up to classes; Life history of Ascaris lumbricoides | **3** | Dr. Anindya Sundar Bhunia | **June'20-July'20** |
| | **Unit-6 Phylum Annelida**<br>General characters and classification up to classes | **1** | Dr. Anindya Sundar Bhunia | **August'20-** |
| | **Unit-6 Phylum Annelida**<br>General characters and classification up to classes; | **1** | Dr. Anindya Sundar Bhunia | **September'20** |
| | **Unit 7 Phylum Arthropoda**<br>General characters and classification up to classes Metamorphosis in Insects | **2** | Dr. Anindya Sundar Bhunia | **October'20** |
| | **Unit-8 Phylum Mollusca**<br>General characters and classification up to classes; Respiration in Pila | **2** | Dr. Anindya Sundar Bhunia | **November20** |
| | **Unit-9 Phylum Echinodermata**<br>General characters and classification up to classes; Water-vascular system in Asterias | **2** | Rituparna Maity | **June'20-July'20** |
| | **Unit-10 Protochordates**<br>General features | **1** | Rituparna Maity | **July'20-July'20** |
| | **Unit-11 Agnatha**<br>General features and classification up to classes (Young, 1981) | **1** | Rituparna Maity | **August'20** |
| | **Unit-12 Pisces**<br>General features and Classification up to Subclasses (Romer, 1959); Osmoregulation in Fishes | **2** | Rituparna Maity | **August'20-** |
| | **Unit-13 Amphibia**<br>General features and Classification up to living orders (Duellman & Trueb, 1986); Metamorphosis in Toad | **2** | Santanu Das | **September'20** |
| | **Unit-14 Reptiles**<br>General features and Classification up to living Subclass (Young, 1981); Poisonous and non- poisonous snakes | **2** | Santanu Das | **November'20** |
| | **Unit-15 Aves**<br>General features and Classification up to orders (Young, 1981); Flight adaptations in birds | **2** | Dr. S Rehan Ahmad | **June'20-July'20** |
| | **Unit-16 Mammals**<br>Classification up to Subclasses (Young, 1981) | **1** | Dr. S Rehan Ahmad | **July'20-July'20** |

| | | | | |
|---|---|---|---|---|
| | **ANIMAL DIVERSITY**<br>**PAPER CODE: ZOOGCOR01P** | **30** | Rituparna Maity<br>Dr. Anindya Sundar Bhunia | **Acc. To Revised Syllabus 90% completed by end of November** |
| **SEM-III HONOURS** | **CHORDATES**<br>**PAPER CODE: ZOOACOR05T** | **60** | | |
| | **Unit 1: Introduction to Chordates**<br>General characteristics and outline classification of Phylum Chordata | **4** | Rituparna Maity | **June'20-July'20** |
| | **Unit 2: Protochordata**<br>General characteristics and classification of sub-phylum Urochordata and Cephalochordata up to Classes. Metamorphosis in Ascidia Chordate Features and Feeding in Branchiostoma | **8** | Rituparna Maity | **July'20-July'20** |
| | **Unit 3: Origin of Chordata**<br>Dipleurula concept and the Echinoderm theory of origin of chordates Advanced features of vertebrates over Protochordata | **5** | Rituparna Maity | **August'20** |
| | **Unit 4: Agnatha**<br>General characteristics and classification of cyclostomes up to order | **2** | Rituparna Maity | **August'20-** |
| | **Unit 5: Pisces**<br>General characteristics and classification of Chondrichthyes and Osteichthyes up to Subclasses Accessory respiratory organ, Advanced features of vertebrates over Protochordata,migration and parental care in fishes Swim bladder in fishes. Classification up to Sub- Classes | **10** | Rituparna Maity | **September November** |
| | **Unit 6: Amphibia**<br>General characteristics and classification up to living Orders Metamorphosis with parental care | **5** | Dr. S Rehan Ahmad | **June'20-July'20** |
| | **Unit 7: Reptilia**<br>General characteristics and classification up to living Orders Poison apparatus and Biting mechanism in Snake | **7** | Dr. S Rehan Ahmad | **July'20-July'20** |
| | **Unit 8: Aves**<br>General characteristics and classification up to Sub-Classes, Exoskeleton and migration in Birds, Principles and aerodynamics of flight | **7** | Dr. S Rehan Ahmad | **August'20** |
| | **Unit 9: Mammals**<br>General characters and classification up to living orders, Phylogenetic significance of Prototheria<br>Exoskeleton derivatives of mammals<br>Adaptive radiation in mammals with reference to locomotory appendages Echolocation in Microchiropteransand Cetaceans | **10** | Dr. S Rehan Ahmad | **September'20 November'20** |
| | **Unit 10: Zoogeography**<br>Zoogeographical realms,-Plate tectonic and Continental drift theory, Distribution of birds and mammals in different realms | **2** | Dr. S Rehan Ahmad | **November'20** |
| | **CHORDATES LAB**<br>**PAPER CODE: ZOOACOR05P** | **60** | Santanu Das<br>Rituparna Maity | **Acc. To Revised Syllabus 90% completed by end of November** |
| | **PHYSIOLOGY**<br>**PAPER CODE: ZOOACOR06T** | **60** | | |

| | | | | |
|---|---|---|---|---|
| | **Unit 1: Tissues**<br>Structure, locations, classification and functions of epithelial tissues, connective tissues, muscular tissues and nerve tissues | **10** | Dr. Indrajit Biswas | **June'20-July'20** |
| | **Unit 2: Bone and Cartilage**<br>Structure and types of bones and cartilages,Ossification | **5** | Dr. Indrajit Biswas | **July'20-July'20** |
| | **Unit 3: Nervous System**<br>Structure of neuron, resting membrane potential, Origin of action potential and its propagation across the myelinated and unmyelinated nerve fibers; Types of synapse, Synaptic transmission and Neuromuscular junction,Reflex action and its types | **15** | Dr. Indrajit Biswas | **September'20 November'20** |
| | **Unit 4: Muscular system**<br>Histology of different types of muscle; Ultra structure of skeletal muscle; Molecular and chemical basis of muscle contraction,-Characteristics of muscle fiber | **10** | Santanu Das | **June'20-July'20** |
| | **Unit 5: Reproductive System**<br>Histology of testis and ovary; Physiology of Reproduction | **5** | Santanu Das | **August'20** |
| | **Unit 6: Endocrine System**<br>Histology and function of pituitary,thyroid,Pancreas, and adrenal. Classification of hormones; Mechanism of Hormone action; Signal transduction pathways for Steroidal and Non-steroidal hormones; Hypothalamus (neuroendocrine gland) - principal nuclei involved in neuroendocrine control of anterior pituitary and endocrine system; Placental hormones | **15** | Dr. S Rehan Ahmad | **June'20-July'20** |
| | **PHYSIOLOGY LAB**<br>**PAPER CODE: ZOOACOR06T** | **60** | Dr. Anindya Sundar Bhunia<br>Dr. S Rehan Ahmad | **Acc. To Revised Syllabus 90% completed by end of November** |
| | **BIOCHEMISTRY**<br>**PAPER CODE: ZOOACOR07T** | **60** | | |
| | **Unit 1: Fundamentals of biochemical reactions and metabolism**<br>Ionization of water, weak acids and bases, buffering and pH changes in living systems, Metabolism: Catabolism and Anabolism, Compartmentalization of metabolic pathways Shuttle systems and membrane transporters;-ATP as "Energy Currency of cell"; coupled reactions; Use of reducing equivalents and cofactors; Intermediary metabolism and regulatory mechanisms | **10** | Dr. S Rehan Ahmad | **September'20 November'20** |
| | **Unit 2: Carbohydrates**<br>Structure and Biological importance: Monosaccharides, Disaccharides, Polysaccharides; Derivatives of Monosachharides, Carbohydrate metabolism: Glycolysis, Citric acid cycle, Pentose phosphate pathway, Gluconeogenesis | **10** | Dr. S Rehan Ahmad | **August'20** |
| | **Unit 3: Lipids**<br>Structure and Significance: Physiologically important saturated and unsaturated fatty acids, Triacylglycerols, Phospholipids, Sphingolipid, Glycolipids, Steroids, Eicosanoids and terpinoids. Lipid metabolism: β-oxidation of fatty acids; Fatty acid biosynthesis | **4** | Dr. S Rehan Ahmad | **August'20 September'20** |

| | | | | |
|---|---|---|---|---|
| | **Unit 4: Proteins**<br>Amino acids Structure, Classification, General and Electro chemical properties of α-amino acids; Physiological importance of essential and non-essential amino acids Proteins Bonds stabilizing protein structure; Levels of organization, Protein metabolism: Transamination, Deamination, Urea cycle,-Fate of C-skeleton of Glucogenic and Ketogenic amino acids | **14** | Dr. Anindya Sundar Bhunia | **June'20-July'20** |
| | **Unit 5: Nucleic Acids**<br>Structure: Purines and pyrimidines, Nucleosides, Nucleotides, Nucleic acids Types of DNA and RNA, Complementarity of DNA,-Hypo- Hyperchromaticity of DNA Outlines of nucleotide metabolism | **4** | Dr. Indrajit Biswas | **September'20 November'20** |
| | **Unit 6: Enzymes**<br>Nomenclature and classification; Cofactors; Specificity of enzyme action; Isozymes, Mechanism of enzyme action; Enzyme kinetics; Derivation of Michaelis-Menten equation, Lineweaver- Burk plot; Factors affecting rate of enzyme-catalyzed reactions; Enzyme inhibition; Allosteric enzymes and their kinetics;-Strategy of enzyme action- Catalytic and Regulatory (Basic concept with one example each) | **12** | Dr. Anindya Sundar Bhunia | **August'20 September'20** |
| | **Unit 7: Oxidative Phosphorylation**<br>Redox systems; Review of mitochondrial respiratory chain, Inhibitors and un-couplers of Electron Transport System | **6** | Dr. Anindya Sundar Bhunia | **September'20 November'20** |
| | **BIOCHEMISTRY LAB**<br>**PAPER CODE: ZOOACOR07T** | **60** | Dr. Anindya Sundar Bhunia<br>Dr. S Rehan Ahmad | **Acc. To Revised Syllabus 90% completed by end of November** |
| **SEM-III GENERAL** | **INSECT VECTOR AND DISEASES**<br>**PAPER CODE: ZOOGCOR03T** | **60** | | |
| | **Unit-1 Introduction to Insect**s General Features of Insects, Morphological features, Head – Eyes, Types of antennae Mouth parts with respect to feeding habit | **4** | Dr. Indrajit Biswas | **June'20-July'20** |
| | **Unit-2 Concept of Vectors**<br>Brief introduction to Vectors (mechanical and biological), Reservoirs, Host-vector relationship, Adaptations as vectors, Host specificity | **6** | Dr. Anindya Sundar Bhunia | **June'20-July'20** |
| | **Unit-3 Insects as Vectors**<br>Detailed features of insect orders as vectors – Diptera, Siphonoptera, Siphunculata, Hemiptera | **6** | Dr. S Rehan Ahmad | **June'20-July'20** |
| | **Unit-4 Dipteran as Disease Vector**<br>Study of important Dipteran vectors – Mosquitoes, Sand fly, Houseflies vectors Study of mosquito-borne diseases – Malaria, Dengue, Chikungunya, Viral encephalitis, Filariasis Control of mosquitoes | **16** | Rituparna Maity | **June'20-July'20** |
| | **Unit-5 Siphonaptera as Disease Vectors**<br>Fleas as important insect vectors; Host-specificity, Study of Flea-borne diseases – Plague, Typhus fever; Control of fleas | **10** | Rituparna Maity | **August'20 November'20** |
| | **Unit-6 Siphunculata as Disease Vectors**<br>Human louse (Head, Body and Pubic louse) as important insect vectors; Control of human louse | **8** | Santanu Das | **June'20-July'20** |

| | | | | |
|---|---|---|---|---|
| | **Unit-7 Hempitera as Disease Vectors**<br>Bugs as insect vectors; Blood-sucking bugs; Chagas disease, Bed bugs as mechanical vectors, Control and prevention measures | **10** | Santanu Das | **September'20-November'20** |
| | **INSECT VECTORE AND DISEASES<br>PAPER CODE: ZOOGCOR03P** | **60** | Dr. Indrajit Biswas | **Acc. To Revised Syllabus 90% completed by end of November** |

| Semester/ Year | WBSU-CBCS Syllabus for Even Semesters Syllabus Module/ Unit | No. of Lecture | Teacher Name | Distribution Tentative |
|---|---|---|---|---|
| **SEM-II HONOURS** | **Non-Chordates II<br>Paper Code: ZOOACOR03T** | **30** | | |
| | Unit 1: Introduction to Coelomates Evolution of coelom and metamerism | **3** | Dr. Indrajit Biswas | **1st week February** |
| | Unit 2: Annelida General characteristics and Classification up to classes Excretion in Annelida | **4** | Dr. Indrajit Biswas | **2nd week March** |
| | Unit 3: Arthropoda General characteristics and Classification up to classes,Metamorphosis in Insects Social life in bees and termites | **8** | Dr. Indrajit Biswas | **3rd Week of April** |
| | Unit 4: Onychophora General characteristics | **2** | Dr. Indrajit Biswas | **1st week of June** |
| | Unit 5: Mollusca General characteristics and Classification up to classes Respiration in Mollusca Torsion and detorsion in Gastropoda | **6** | Santanu Das | **1st week of May-3rd week of May** |
| | Unit 6: Echinodermata General characteristics and Classification up to classes Water-vascular system in Asteroidea Larval forms in Echinodermata | **4** | Mr. Santanu Das | **4th week of May – 1st week of June** |
| | Unit 7: Hemichordata General characteristics of phylum Hemichordata. Phylogenetic relationship with non-chordates and chordates (only recent concept) | **3** | Smt. Rituparna maity | **1st week of May-4th week of May** |
| | **Non-Chordates II Lab<br>Paper Code: ZOOACOR03P** | **30** | Dr. Indrajit Biswas<br>Smt. Rituparna Maity | **Acc. To Revised Syllabus 90% completed by end of July** |
| | **CELL BIOLOGY<br>PAPER CODE: ZOOACOR04T** | **30** | | **Acc. To Revised Syllabus 90% completed by end of November** |
| | Unit 1: Overview of Cells Prokaryotic and Eukaryotic cells, Virus, Viroids | **2** | Dr. S Rehan Ahmad | **1st week of March** |
| | Unit 2: Plasma Membrane Various models of plasma membrane structure Transport across membranes: Active and Passive transport, facilitated transport, Cell junctions: Tight junctions, Desmosomes, Gap junctions | **5** | Dr. S Rehan Ahmad | **2nd week of May-1st week of June** |
| | Unit 3: Endomembrane System Structure and Functions: Endoplasmic Reticulum, Golgi Apparatus, Lysosomes | **4** | Dr. S Rehan Ahmad | **end of April** |

| | | | | |
|---|---|---|---|---|
| | Unit 4: Mitochondria and Peroxisomes Mitochondria: Structure, Semi-autonomous nature, Mitochondrial Respiratory Chain, Peroxisomes | **4** | Mr.Santanu Das | **2nd week of aPRIL-3rd week of June** |
| | Unit 5: Cytoskeleton Structure and Functions: Microtubules, Microfilaments and Intermediate filaments | **2** | Mr. Santanu Das | **1st week of April** |
| | Unit 6: Nucleus Structure of Nucleus: Nuclear envelope, Nucleolus Chromatin: Euchromatin and Heterochromatin and packaging (nucleosome) | **4** | Dr. Anindya Sundar Bhunia | **1st week of February** |
| | Unit 7: Cell Division<br>Mitosis and Meiosis<br>Cell cycle and its regulation<br>Mechanisms of cell death: brief overview | **5** | Dr. Anindya Sundar Bhunia | **1st week of March- End of April** |
| | Unit 8: Cell Signaling Cell signalling transduction pathways; Types of signaling molecules and receptors GPCR and Role of second messenger (cAMP) | **4** | Dr. Anindya Sundar Bhunia | **1st week of June** |
| | **CELL BIOLOGY LAB<br>PAPER CODE: ZOOACOR04P** | **30** | Dr. Anindya Sundar Bhunia<br>Dr. S Rehan Ahmad | **Acc. To Revised Syllabus 90% completed by end of June** |
| **SEM-II GENERAL** | **PHYSIOLOGY AND BIOCHEMISTRY<br>PAPER CODE: ZOOGCOR02T** | **30** | | |
| | Unit-1 Nerve and muscle<br>1.Structure of a neuron, Resting membrane potential, Graded potential, Origin of Action potential and its propagation in myelinated and non-myelinated nerve fibres.<br>2.Ultra-structure of skeletal muscle, Molecular and chemical basis of muscle contraction. | **4** | Dr. Indrajit Biswas | **1st week of May-End of March** |
| | Unit-2 Digestion<br>Absorption of carbohydrates, proteins, lipids | **2** | Dr. Indrajit Biswas | **1st week of june** |
| | Unit-3 Respiration<br>Pulmonary ventilation, Respiratory volumes and capacities, Transport of Oxygen and carbon dioxide in blood | **3** | Dr. Anindya Sundar Bhunia | **1st week of May-End of May** |
| | Unit-4 Excretion<br>Structure of nephron, Mechanism of Urine formation, Counter-current Mechanism | **3** | Dr. Anindya Sundar Bhunia | **1st week of July-End of July** |
| | Unit-5 Cardiovascular system<br>Composition of blood, Homeostasis, Structure of Heart, Origin and conduction of the cardiac impulse,<br>Cardiac cycle | **3** | Smt. Rituparna maity | **1st week of May-End of April** |
| | Unit-6 Reproduction and Endocrine Glands<br>Physiology of male reproduction: hormonal control of spermatogenesis; Physiology of female reproduction: hormonal control of menstrual cycle. Structure and function of thyroid, pancreas | **4** | Smt. Rituparna maity | **1ST week of June-1st week of July** |
| | Unit 7 Carbohydrate: Structure and Metabolism<br>Introduction to Carbohydrates, Structure & Types of Carbohydrates, Introduction to Intermediary metabolism: Glycolysis, Krebs cycle, Electron transport chain | **4** | Dr. S Rehan Ahmad | **1st week of May-End of May** |
| | Unit-8 Lipid: Structure and Metabolism<br>Introduction to Lipids: Definitions; classes of lipids; β oxidation of palmitic acid | **2** | Dr. S Rehan Ahmad | **1st week of July** |
| | Unit-9 Protein: Structure and metabolism<br>Proteins and their biological functions, functions of amino acids; primary structure of protein, secondary, tertiary and quaternary structures. Transamination, Deamination. | **2** | Mr. Santanu Das | **1st week of May** |

| | | | | |
|---|---|---|---|---|
| | Unit-10 Enzymes 4<br>Introduction, Classification of Enzymes, Mechanism of action,Enzyme Kinetics, Inhibition and Regulation | **2** | Mr. Santanu Das | **3rd week of May** |
| | **PHYSIOLOGY AND BIOCHEMISTRY LAB<br>PAPER CODE: ZOOGCOR02P** | **30** | Smt. Rituparna Maity<br>Dr. Anindya Sundar Bhunia | **Acc. To Revised Syllabus 90% completed by end of July** |
| **SEM-IV HONOURS** | **COMPARATIVE ANATOMY<br>PAPER CODE: ZOOACOR08T** | **30** | | |
| | Unit 1: Integumentary System- Structure, function and derivatives of integument in mammals | **5** | Santanu Das | **1st week of May- End of** |
| | May | | | |
| | Unit 2: Skeletal System, Jaw Suspension | **2** | Santanu Das | **1st week of june** |
| | Unit 3: Digestive System- Comparative anatomy of stomach; dentition in mammals | **4** | Smt. Rituparna maity | **1st week of May- 3rd week of May** |
| | Unit 4: Respiratory System- Respiratory organs in birds | **4** | Smt. Rituparna maity | **4th week of May- 2nd week of June** |
| | Unit 5: Circulatory System- Comparative account of heart and aortic arches | **4** | Dr. S Rehan Ahmad | **1st week of May- 3rd week of May** |
| | Unit 6: Urinogenital System- Succession of kidney | **3** | Dr. S Rehan Ahmad | **3rd week of May- 1st week of June** |
| | Unit 7: Nervous System Comparative account of brain, Cranial nerves in mammals | **4** | Dr. Indrajit Biswas | **1st week of May- End of May** |
| | Unit 8: Sense Organs Classification of receptors | **4** | Dr. Indrajit Biswas | **1st week of June- 2nd week of june** |
| | **COMPARATIVE ANATOMY LAB** | **30** | Mr. Santanu Das | **Acc. To Revised Syllabus 90% completed by end of July** |
| | **PHYSIOLOGY: LIFE SUSTANING SYSTEM<br>PAPER CODE: ZOOACOR09T** | **30** | | |
| | Unit 1: Physiology of Digestion-Mechanical and chemical digestion of food, absorption of Carbohydrates, Lipids, Proteins, Digestive enzyme | **4** | Dr. S Rehan Ahmad | **2nd week of June- 3rd week of June** |
| | Unit 2: Physiology of Respiration- Mechanism of Respiration, Respiratory volumes and capacities, transport of Oxygen and Carbon dioxide in blood, Dissociation curves and the factors influencing it, | **6** | Dr. S Rehan Ahmad | **3rd week of June- 1st week of July** |
| | Unit 3: Physiology of Circulation- Components of Blood and their functions; Structure and functions of haemoglobin; Blood clotting system, Blood groups; ABO and Rh factor | **4** | Dr. Anindya Sundar Bhunia | **1st week of May- 3rd week of May** |
| | Unit 4: Physiology of Heart- Structure of mammalian heart, Origin and conduction of cardiac impulses; Cardiac Cycle and cardiac output; Blood pressure and its regulation | **6** | Dr. Anindya Sundar Bhunia | **4th week of May- 2nd week of June** |
| | Unit 5: Thermoregulation & Osmoregulation Physiological classification based on thermal biology. Thermal biology of endotherms; Osmoregulation in aquatic vertebrates; | **4** | Smt. Rituparna maity | **3rd week of June- 1st week of July** |
| | Unit 6: Renal Physiology Structure of Kidney and its functional unit, Mechanism of urine formation, Regulation of acid-base balance | **6** | Smt. Rituparna maity | **1st week of July- 4th week of July** |

| | | | | |
|---|---|---|---|---|
| | **PHYSIOLOGY: LIFE SUSTAINING SYSTEM LAB**<br>**PAPER CODE: ZOOACOR09T** | **30** | Dr. Anindya Sundar Bhunia<br>Smt.Rituparna Maity | **Acc. To Revised Syllabus 90% completed by end of July** |
| | **IMMUNOLOGY**<br>**PAPER CODE: ZOOACOR10T** | **30** | | |
| | Unit 1: Overview of Immune System-Organs (Primary & Secondary lymphoid organs and its importance) and Cells of the Immune system | **1** | Dr. Indrajit Biswas | **3rd week of June** |
| | Unit 2: Innate and Adaptive Immunity<br>Principle of Innate and Adaptive Immunity.<br>Components of innate immunity<br>– Epithelial barriers (skin and mucosal membranes [concept])<br>– Cellular mechanisms (phagocytes, NK cells, mast cells, eosinophils, inflammation [concept])<br>– Humoral mechanisms (complement, cytokines, chemokines etc. [concept])<br>Components of adaptive immunity<br>– Cellular mechanisms (Cell-Mediated Immune System (CMIS) or T-Cell Immunity [concept])<br>– Humoral mechanisms (Formation of Plasma B cells and Memory B cells [concept]) | **5** | Dr. Indrajit Biswas | **3rd week of June-2nd week of July** |
| | Unit 3: Antigen, Antigen presentation & MHC Concept of Antigen, Immunogen, Allergen & Pathogen. Adjuvants and haptens, Factors influencing immunogenicity, Epitope. Types of Antigen Presenting Cells (APC), Co-stimulatory molecules on APC. | **4** | Dr. Anindya Sundar Bhunia | **3rd week of June-End of June** |
| | Unit 4: T Cell development Structure of T cell receptors, Co-stimulatory molecules on T cells, Central differentiation of T cells; T cell selection in thymus Peripheral differentiation of T cells; Th1 & Th2 | **4** | Dr. Anindya Sundar Bhunia | **1st week of July-3rd week of July** |
| | Unit 5: Immunoglobulins Structure and functions of different classes of immunoglobulins, Antigen- antibody interactions, Immunoassays (ELISA and RIA), Hybridoma technology, Monoclonal antibody production | **4** | Mr.Santanu Das | **2nd week of June-4th week of June** |
| | Unit 6: Cytokines & Chemokines Brief concept on types of Cytokines & Chemokines Cytokines (source & function of IL-1, IL-2, IL-4, IL-5, IL-6, IL-8, IL-10, IL-12, Interferons, Tumor Necrosis Factors, Tumor Growth Factors, GMCSF, M-CSF). | **4** | Mr. Santanu Das | **End of June-2nd week of July** |
| | Unit 7: Complement System<br>Components and pathways of complement activation. | **2** | Smt. Rituparna maity | **End of July** |
| | Unit 8: Hypersensitivity<br>Gell and Coombs' classification and brief description of various types of hypersensitivities. | **2** | Smt. Rituparna maity | **End of July** |
| | Unit 9: Immunology of diseases<br>Malaria, Visceral Leishmaniasis, Filariasis, Dengue and Tuberculosis. | **2** | Smt. Rituparna maity | **End of July** |
| | Unit 10: Vaccines<br>Various types of vaccines. Active & passive immunization (Artificial and natural). | **2** | Dr. S Rehan Ahmad | **2nd week of July** |

| | | | | |
|---|---|---|---|---|
| | **IMMUNOLOGY LAB**<br>**PAPER CODE: ZOOACOR10T** | **30** | Dr. Anindya Sundar Bhunia<br>Dr. Indrajit Biswas | **Acc. To Revised Syllabus 90% completed by end of July** |

| | | | | |
|---|---|---|---|---|
| **SEM-IV GENERAL** | **ENVIRONMENT AND PUBLIC HEALTH**<br>**PAPER CODE: ZOOGCOR04T** | **30** | | |
| | Unit 1: Introduction<br>Sources of Environmental hazards, Hazard identification and accounting, Fate of toxic and persistent substances in the environment, Dose response evaluation, Exposure assessment | **8** | Dr. Indrajit Biswas | **1st week of May-End of July** |
| | Unit 2: Climate Change<br>Greenhouse gases and global warming, Acid rain, Ozone layer destruction, Effect of climate change on public health | **6** | Dr. Anindya Sundar Bhunia | **1st week May-end of June** |
| | Unit 3: Pollution<br>Air, water pollution: sources and effects, Pollution control | **8** | Smt. Rituparna Maity | **1st week of May-End of July** |
| | Unit 4: Waste Management Technologies<br>Sources of waste, types and characteristics, Sewage disposal and its management, Solid waste disposal, Biomedical waste handling and disposal. | **4** | Dr. S Rehan Ahmad | **1st week of May-End of June** |
| | Unit 5: Diseases<br>Causes, symptoms and control of tuberculosis, Asthma, Cholera. | **2** | Mr Santanu Das | **1st week of May-4th week of May** |
| | **ENVIRONMENT AND PUBLIC HEALTH**<br>**PAPER CODE: ZOOGCOR04P** | **30** | Dr. Indrajit Biswas<br>Dr. S Rehan Ahmad | **Acc. To Revised Syllabus 90% completed by end of July** |

| BSC. /YEAR PART/MODULE | WBSU BSc. 3-Year Syllabus Under (1+1+1) System- Part-III SYLLABUS - PAPER | NO OF LECTURES | NAME OF TEACHER | TENTATIVE SCHEDULE |
|---|---|---|---|---|
| **BSc. (Hons')**<br><br>**PART-III** | **Paper VII: Theory** | | | |
| Module 701: Animal Physiology | 1. Transport across cell surface membrane, Donnan membrane equilibrium;2. Functions of mammalian blood: Oxygen transport and $CO_2$ transport;3. Neurophysiology: Generation of action potential and propagation of nerve impulse in myelinated and non-myelinated nerve fibers. Synaptic and neuro-mascular junctions: structure and functions ;4. Respiration: gill respirations in fishes, respiration in air-breathing fishes, respiration in avian lungs;5. General architecture of skeletal (striated) muscle and smooth muscle; Ultrastructure of skeletal muscle sarcomere, molecular structure of actin and myosin, Muscle contraction: sliding filament theory ;6. Swim bladder and its functions in teleost fishes;7. Water and osmotic regulations: problems in marine cyclostomes, elasmobranchs and teleosts, freshwater teleosts, in hot desert environments(camel) and examples of significant adaptations solving it by different animal groups;8. Urine formation in human kidney;9. Bioluminescence: occurrence, mechanism of production | | Dr. Anindya Sundar Bhunia | |
| Module 702: Endocrinology and Reproductive biology | 1. Classification of vertebrate hormones based on chemical nature and mechanism of action (names and examples only).;2. Hormone delivery systems: Endocrine, neuroendocrine, paracrine, neurocrine, autocrine (Definitions and examples only); 3. Feedback control of hormone secretion: negative and positive. 4. Hormone biosynthesis (including sites of synthesis, outlines only): Thyroid hormones (T3, T4), testosterone, estrogen, progesterone, adreno-cortical hormones, Insulin, Adrenal catecholamines. 5. Physiologic functions of hormones: Insulin, glucagon. T3 and T4.;6. Hormonal control of spermatogenesis;7. Hormonal control of mammalian ovarian cycle, differences between estrous and menstrual cycle. 8. Mechanism of hormone actions (outlines only): cytoplasmic receptor, nuclear receptor, membrane Receptor, HRE, HSP, CAMP, cGMP, IP3-DAG, tyrosine kinase, calcium-calmodulin 9. Endocrine disorders (symptoms and causes | | Smt. Jayashree Shit | |

| | | | | |
|---|---|---|---|---|
| | only): Diabetes insipidus; IDDM & NIDDM. Hypothyroidism and hyperthyroidism, Conn's and Cushing's syndrome. | | | |
| Module 703: Histology | 1.Basic tissue types: epithelial, connective, cardiac and nervous tissue(typical structure of neuron and types of neuron, glial cells etc);2.Membrane specializations of epithelia. (Intercellular surface [cell junctions], luminal surfaces and Basal surfaces.).; 3.Exocrine glands: Types and discharge of secretory products (merocrine, apocrine, holocrine).;4.Principles of tissue fixation, staining,;5.Histology of: stomach, pancreas, testis, ovary, thyroid, lymph node. (Outline of structures). 6. Histological structure of mammalian nephron and functions of each regions. | | Dr. Amrita Banerjee | |
| | **Paper VIII: Theory** | | | |
| Module 801: Developmental Biology | 1.Outlines of historical concepts and experiments in the emergence of developmental biology- Induction,Fate map, Spemann and Mangold's organizer transplant experiments, von Baer's laws.; 2. Germ layers and its contributions to the development of different tissues in vertebrates;. 3.Origin of germ cells, Structural features of sperms and eggs in sea urchins and in mammals,Gametogenesis in mammals,; 4. Fertilization: external fertilization in sea urchins, internal fertilization in mammals (in depth molecular Details not required); 5.Cleavage Types of cleavage found in animals and animal groups that exhibit a type, outlines of cleavage process in C. elegans, Zebrafish and Xenopus and chick; 6.Gastrulation: generalized patterns, brief outlines of the process in C. elegans, Zebra fish, Xenopus and chick; 7.Organogenesis: development of brain in chicken; 8. Conceptual outlines (very brief) of – Cell potency and Stem Cells, Sex determination in Drosophila and Man, Environmental sex determination in reptiles. HOX genes in development | | Dr. Amrita Banerjee | |
| Module 802: Environmental Pollutions and Toxicology | 1. Environmental pollutions (nature and sources of pollutants. Impacts on ecosystems and humans, remedies): water, soil, air and sound pollutions;2.Environmental laws: major ones applicable in West Bengal;3.Toxicology: including its significance as a branch of Science;4.Dose-response relationships;5.In vivo and In vitro toxicity test;6.Introduction to the concepts of detoxication mechanisms | | Smt. Rituparna Maity | |

| | | | | |
|---|---|---|---|---|
| Module 805: Medical Zoology | 1. Mosquito-borne diseases: Malaria and Filaria- causative agents, their life cycle, modes of infections in man, major modes of treatments, major vector species in India, their ecology and life cycles, control measures; 2. Mosquito-borne diseases: Dengue and DHF, Chikungunya- causative virus, symptoms and treatments;3. Visceral Leishmaniasis (Kala-azar)- causative species and vectors in West Bengal; 4. Common ticks and mites in human surroundings and diseases caused by them | | Dr. Indrajit Biswas | |
| Module 806: Economic Zoology | 1. Fishes and fishery: diversity of indigenous freshwater, estuarine, marine fishes and shell fishes in West Bengal. Invasive and exotic species of fishes in West Bengal. Techniques of modern pisciculture and prawn culture. Problems related to wild prawn seed collections in Sunderbans, fish productivities in India and West Bengal, ecology and degradation of freshwater fish habitats and decrease in wild fish stocks (very brief idea); 2. Sericulture: silks and silk worms, sericulture practices- methods, scopes and problems; 3. Apiculture: Honey bees and their behaviours in relation to bee-keeping, popular methods of bee keeping, scopes and problems; 4. Lac culture: Lac and lac insects, host plants and lac cultivation, scopes and problems; 5. Poultry birds: different breeds, their advantages and disadvantages, importance of indigenous breeds 6. Cattle, goats and lambs: different breeds, their advantages and disadvantages, importance of Indigenous breeds | | Dr. Indrajit Biswas<br>Smt Jayashree Shit<br>Smt Rituparna Maity | |
| | **Paper IX: Practical**<br>**Group A**<br>**Group B** | | Dr. Anindya Sundar Bhunia & Dr. Indrajit Biswas<br>Smt. Jayashree Shit &<br>Dr. Amrita Banerjee | |
| **BSc. General Part-III** | **Paper-IV A** | | | |
| | Aquaculture Principles, definition and scope. Fisheries resources of India (inland and off-shore). Exotic fishes their merits and demerits. Induced breeding and its importance. Basic principles of different aquaculture system (Polyculture and Integrated farming). Marine pearl culture, culture of prawn and shrimps; Sericulture Characteristics of sericulture industry and its scope; kinds of silk worm, host plants. Life history and rearing of Bombyx mori, | | Dr. Indrajit Biswas | |

| | | | | |
|---|---|---|---|---|
| | harvesting and processing of cocoon, reeling and extraction of silk, pest on mulberry plants and diseases of Bombyx mori and control measures.Problems and prospects.; Apiculture Types of honey bees, modern methods of apiary management, products and its uses Pest and Pest Management – Pest – definition, types, life history and control i) Scirpophaga, ii) Sitophilus and iii) Bandicoota, Concept on IPM.; Poultry and Poultry Management – Duck and fowl – Types of breeds, rearing and disease management. Wild life and Biodiversity- 1. Conservation of Wild life- Importance and strategies, Concept of Biosphere Reserve, National Park and Wild life Sanctuary. 2. Basic concept of Biodiversity, Biodiversity hotspot.3. Endangered Indian mammals, Animal Cruelty Prevention Act. Biotechnology and Immunology –1.Basic concept of genetic engineering and cloning; 2.Concept of immunity; 3.Outline structure and classification of immunoglobulin; antigen-antibody reaction; 4. Basic principle of vaccination. | | | |
| | **Paper-IV B- Practical** | | Dr. Indrajit Biswas, Dr. Anindya Sundar Bhunia & Smt. Jayashree Shit | |

**ACADEMIC CALENDAR**

**DEPARTMENT OF ZOOLOGY**

**June2020/ July 2020 - December/ January 2021**

**1st, 3rd and 5th Semester**

| Semester/ Year | Syllabus Module/ Unit | No. of Lecture | Teacher Name | Distribution Tentative |
|---|---|---|---|---|
| **SEM-I HONOURS** | **Non-Chordates I**<br>**Paper Code: ZOOACOR01T** | **30** | | |
| | **Unit 1: Protista, Parazoa and Metazoa**<br>General characteristics and Classification up to classes, Study of *Paramoecium* Life cycle and pathogenicity of *Entamoeba histolytica* and *Plasmodium vivax* | **6** | Dr. Indrajit Biswas | **January'21-February'21** |
| | **Unit 2: Porifera**<br>General characteristics and Classification up to classes Canal system and spicules in sponges | **5** | Dr. Indrajit Biswas | **February'-March'(1st Week)** |
| | **Unit 3: Cnidaria**<br>General characteristics and Classification up to classes Polymorphism in CnidariaCorals and coral reefs: types, formation, distribution, conservation significance | **6** | Santanu Das | **January-February'** |
| | **Unit 4: Ctenophora**<br>General characteristics | **2** | Santanu Das | **February** |
| | **Unit 5: Platyhelminthes**<br>General characteristics and Classification up to classes, Life cycle and pathogenicity of *Fasciola hepatica* and *Taenia solium* | **6** | Dr. Anindya Sundar Bhunia | **January-February'21** |
| | **Unit 6: Nemathelminthes**<br>General characteristics and Classification up to classes, Life cycle, and pathogenicity of *Ascaris lumbricoides,* Parasitic adaptations in helminths | **5** | Dr. Anindya Sundar Bhunia | **-March'21(1st Week)** |
| | **Non-Chordates I Lab**<br>**Paper Code: ZOOACOR01P** | **30** | Dr. Indrajit Biswas<br>Santanu Das | **January'21-March'21(1st Week)** |
| | **ECOLOGY**<br>**PAPER CODE: ZOOACOR02T** | **30** | | |
| | **Unit 1: Introduction to Ecology**<br>History of ecology, Autecology and synecology, Levels of organization, Laws of limiting factors, Study of Physical factors, The Biosphere. | **6** | Rituparna Maity | **January'21-February'21** |

| | | | | |
|---|---|---|---|---|
| | **Unit 2: Population**<br>life tables, survivorship curves, exponential and logistic growth, r and K strategies Population regulation - density dependent and independent factors | **10** | Rituparna Maity | **February'-March'(1st Week)** |
| | **Unit 3: Community**<br>Community characteristics: species diversity, abundance, dominance, richness, Ecotone, Ecological succession and example of it. | **5** | Dr. S Rehan Ahmed | **January'-Febrrary'** |
| | **Unit 4: Ecosystyem**<br>Food chain: Detritus and grazing food chains,Food web, Energy flow through the ecosystem, Ecological pyramids and Ecological efficiencies | **6** | Dr. S Rehan Ahmed | **February'-March'(1st Week)** |

| | | | | |
|---|---|---|---|---|
| | **Unit 5: Applied Ecology**<br>Wildlife Conservation (in-situ and ex-situ conservation). Wild life protection act (1972) | **3** | Santanu Das | **February'-March'1st Week)** |
| | **ECOLOGY LAB**<br>**PAPER CODE: ZOOACOR02P** | **30** | Rituparna Maity | **January'21-March'21(1st Week)** |
| **SEM-I GENERAL** | **ANIMAL DIVERSITY**<br>**PAPER CODE: ZOOGCOR01T** | **30** | | |
| | **Unit-1 Kingdom Protista**<br>General characters and classification of Subkingdom Protozoa up to Phylum (Levine et al., 1980) | **2** | Dr. Indrajit Biswas | **January'21-** |
| | **Unit-2 Phylum Porifera**<br>General character and classification up to classes; Canal System in Sycon | **2** | Dr. Indrajit Biswas | **January-February'** |
| | **Unit-3 Phylum Cnidaria**<br>General characters and classification up to classes | **1** | Dr. Indrajit Biswas | **WITHIN Febraary'21** |
| | **Unit-4 Phylum Platyhelminthes**<br>General characters and classification up to classes; Life history of Taenia solium | **3** | Dr. Indrajit Biswas | **-March(1st Week)** |
| | **Unit-5 Phylum Nematoda**<br>General characters and classification up to classes; Life history of Ascaris lumbricoides | **3** | Dr. Anindya Sundar Bhunia | **WITHIN January'21** |
| | **Unit-6 Phylum Annelida**<br>General characters and classification up to classes | **1** | Dr. Anindya Sundar Bhunia | **WITHIN January'** |
| | **Unit-6 Phylum Annelida**<br>General characters and classification up to classes; | **1** | Dr. Anindya | **-WITHIN Febraary'21** |

| | | | | |
|---|---|---|---|---|
| | | | Sundar Bhunia | |
| | **Unit 7 Phylum Arthropoda**<br>General characters and classification up to classes Metamorphosis in Insects | **2** | Dr. Anindya Sundar Bhunia | **February'21-Febraary'21** |
| | **Unit-8 Phylum Mollusca**<br>General characters and classification up to classes; Respiration in Pila | **2** | Dr. Anindya Sundar Bhunia | **February'21-March'21(1st Week** |
| | **Unit-9 Phylum Echinodermata**<br>General characters and classification up to classes; Water vascular system in Asterias | **2** | Rituparna Maity | **February'21-March'21(1st Week)** |
| | **Unit-10 Protochordates**<br>General features | **1** | Rituparna Maity | **January'21-January'21** |
| | **Unit-11 Agnatha**<br>General features and classification up to classes (Young, 1981) | **1** | Rituparna Maity | **January'21-February'21** |
| | **Unit-12 Pisces**<br>General features and Classification up to Subclasses (Romer, 1959); Osmoregulation in Fishes | **2** | Rituparna Maity | **February'21-Febraary'21** |
| | **Unit-13 Amphibia**<br>General features and Classification up to living orders (Duellman & Trueb, 1986); Metamorphosis in Toad | **2** | Santanu Das | **January'21-February'21** |
| | **Unit-14 Reptiles**<br>General features and Classification up to living Subclass (Young, 1981); Poisonous and non-poisonous snakes | **2** | Santanu Das | **February'21-Febraary'21** |
| | **Unit-15 Aves**<br>General features and Classification up to orders (Young, 1981); Flight adaptations in birds | **2** | Dr. S Rehan Ahmed | **January'21-February'21** |
| | **Unit-16 Mammals**<br>Classification up to Subclasses (Young, 1981) | **1** | Dr. S Rehan Ahmed | **February'21-Febraary'21** |

| | | | | |
|---|---|---|---|---|
| | **ANIMAL DIVERSITY**<br>**PAPER CODE: ZOOGCOR01P** | **30** | Rituparna Maity<br>Dr. Anindya Sundar Bhunia | **January'21-March'21(1st Week)** |
| **SEM-III** | **CHORDATES** | **60** | | |

| HONOURS | PAPER CODE: ZOOACOR05T | | | |
|---|---|---|---|---|
| | **Unit 1: Introduction to Chordates**<br>General characteristics and outline classification of Phylum Chordata | **4** | Rituparna Maity | **June'20-June'20** |
| | **Unit 2: Protochordata**<br>General characteristics and classification of sub-phylum Urochordata and Cephalochordata up to Classes. Metamorphosis in Ascidia Chordate Features and Feeding in Branchiostoma | **8** | Rituparna Maity | **June'20-July'20** |
| | **Unit 3: Origin of Chordata**<br>Dipleurula concept and the Echinoderm theory of origin of chordates Advanced features of vertebrates over Protochordata | **5** | Rituparna Maity | **July'20-July'20** |
| | **Unit 4: Agnatha**<br>General characteristics and classification of cyclostomes up to order | **2** | Rituparna Maity | **August'20** |
| | **Unit 5: Pisces**<br>General characteristics and classification of Chondrichthyes and Osteichthyes up to Subclasses Accessory respiratory organ, Advanced features of vertebrates over Protochordata,migration and parental care in fishes Swim bladder in fishes. Classification up to Sub-Classes | **10** | Rituparna Maity | **August'20-October'21** |
| | **Unit 6: Amphibia**<br>General characteristics and classification up to living Orders Metamorphosis with parental care | **5** | Dr. S Rehan Ahmed | **June'20-June'20** |
| | **Unit 7: Reptilia**<br>General characteristics and classification up to living Orders Poison apparatus and Biting mechanism in Snake | **7** | Dr. S Rehan Ahmed | **June'20-July'20** |
| | **Unit 8: Aves**<br>General characteristics and classification up to Sub-Classes, Exoskeleton and migration in Birds, Principles and aerodynamics of flight | **7** | Dr. S Rehan Ahmed | **July'20-August'20** |
| | **Unit 9: Mammals**<br>General characters and classification up to living orders, Phylogenetic significance of Prototheria Exoskeleton derivatives of mammals Adaptive radiation in mammals with reference to locomotory appendages Echolocation in Microchiropteransand Cetaceans | **10** | Dr. S Rehan Ahmed | **August'20-September'20-** |
| | **Unit 10: Zoogeography**<br>Zoogeographical realms, Plate tectonic and Continental drift theory, Distribution of birds and mammals in different realms | **2** | Dr. S Rehan Ahmed | **September'20** |

| | | | | |
|---|---|---|---|---|
| | **CHORDATES LAB**<br>**PAPER CODE: ZOOACOR05P** | **60** | Santanu Das<br>Rituparna Maity | **Acc. To Revised Syllabus 90% completed by end of November** |
| | **PHYSIOLOGY**<br>**PAPER CODE: ZOOACOR06T** | **60** | | |

| | | | | |
|---|---|---|---|---|
| | **Unit 1: Tissues**<br>Structure, locations, classification and functions of epithelial tissues, connective tissues, muscular tissues and nerve tissues | **10** | Dr. Indrajit Biswas | **June'20-July20** |
| | **Unit 2: Bone and Cartilage**<br>Structure and types of bones and cartilages,Ossification | **5** | Dr. Indrajit Biswas | **July'20-August'20** |
| | **Unit 3: Nervous System**<br>Structure of neuron, resting membrane potential, Origin of action potential and its propagation across the myelinated and unmyelinated nerve fibers; Types of synapse, Synaptic transmission and Neuromuscular junction,Reflex action and its types | **15** | Dr. Indrajit Biswas | **August'20-November'20** |
| | **Unit 4: Muscular system**<br>Histology of different types of muscle; Ultra structure of skeletal muscle; Molecular and chemical basis of muscle contraction, Characteristics of muscle fiber | **10** | Santanu Das | **June'20-July'20** |
| | **Unit 5: Reproductive System**<br>Histology of testis and ovary; Physiology of Reproduction | **5** | Santanu Das | **August'20-september'20** |
| | **Unit 6: Endocrine System**<br>Histology and function of pituitary,thyroid,Pancreas, and adrenal. Classification of hormones; Mechanism of Hormone action; Signal transduction pathways for Steroidal and Non-steroidal hormones; Hypothalamus (neuroendocrine gland) - principal nuclei involved in neuroendocrine control of anterior pituitary and endocrine system; Placental hormones | **15** | Dr. S Rehan Ahmed | **September'20-December'20(1st Week)** |
| | **PHYSIOLOGY LAB**<br>**PAPER CODE: ZOOACOR06T** | **60** | Dr. Anindya Sundar Bhunia<br>Dr. S Rehan Ahmed | **Acc. To Revised Syllabus 90% completed by end of November** |
| | **BIOCHEMISTRY**<br>**PAPER CODE: ZOOACOR07T** | **60** | | |

| | | | | |
|---|---|---|---|---|
| | **Unit 1: Fundamentals of biochemical reactions and metabolism**<br>Ionization of water, weak acids and bases, buffering and pH changes in living systems, Metabolism: Catabolism and Anabolism, Compartmentalization of metabolic pathways Shuttle systems and membrane transporters; ATP as "Energy Currency of cell"; coupled reactions; Use of reducing equivalents and cofactors; Intermediary metabolism and regulatory mechanisms | **10** | Dr. S Rehan Ahmed | **June'20-July'20** |
| | **Unit 2: Carbohydrates**<br>Structure and Biological importance: Monosaccharides, Disaccharides, Polysaccharides; Derivatives of Monosachharides, Carbohydrate metabolism: Glycolysis, Citric acid cycle, Pentose phosphate pathway, Gluconeogenesis | **10** | Dr. S Rehan Ahmed | **July'20-September'20** |
| | **Unit 3: Lipids**<br>Structure and Significance: Physiologically important saturated and unsaturated fatty acids, Triacylglycerols, Phospholipids, Sphingolipid, Glycolipids, Steroids, Eicosanoids and terpinoids. Lipid metabolism: β-oxidation of fatty acids; Fatty acid biosynthesis | **4** | Dr. S Rehan Ahmed | **October'20-November'20** |

| | | | | |
|---|---|---|---|---|
| | **Unit 4: Proteins**<br>Amino acids Structure, Classification, General and Electro chemical properties of α-amino acids; Physiological importance of essential and non-essential amino acids Proteins Bonds stabilizing protein structure; Levels of organization, Protein metabolism: Transamination, Deamination, Urea cycle, Fate of C-skeleton of Glucogenic and Ketogenic amino acids | **14** | Dr. Anindya Sundar Bhunia | **June'20-August'20** |
| | **Unit 5: Nucleic Acids**<br>Structure: Purines and pyrimidines, Nucleosides, Nucleotides, Nucleic acids Types of DNA and RNA, Complementarity of DNA, Hypo- Hyperchromaticity of DNA Outlines of nucleotide metabolism | **4** | Dr. Indrajit Biswas | **June'20-July'20** |
| | **Unit 6: Enzymes**<br>Nomenclature and classification; Cofactors; Specificity of enzyme action; Isozymes, Mechanism of enzyme action; Enzyme kinetics; Derivation of Michaelis-Menten equation, Lineweaver- Burk plot; Factors affecting rate of enzyme catalyzed reactions; Enzyme inhibition; Allosteric enzymes and their kinetics;-Strategy of enzyme action- Catalytic and Regulatory (Basic concept with one example each) | **12** | Dr. Anindya Sundar Bhunia | **September'20-October'20** |

| | | | | |
|---|---|---|---|---|
| | **Unit 7: Oxidative Phosphorylation**<br>Redox systems; Review of mitochondrial respiratory chain, Inhibitors and un-couplers of Electron Transport System | **6** | Dr. Anindya Sundar Bhunia | **November'20-December'20(1st week)** |
| | **BIOCHEMISTRY LAB**<br>**PAPER CODE: ZOOACOR07T** | **60** | Dr. Anindya Sundar Bhunia<br>Dr. S Rehan Ahmed | **Acc. To Revised Syllabus 90% completed by end of November** |
| **SEM-III GENERAL** | **INSECT VECTOR AND DISEASES**<br>**PAPER CODE: ZOOGCOR03T** | **60** | | |
| | **Unit-1 Introduction to Insect**s General Features of Insects, Morphological features, Head – Eyes, Types of antennae Mouth parts with respect to feeding habit | **4** | Dr. Indrajit Biswas | **June'20-July20** |
| | **Unit-2 Concept of Vectors**<br>Brief introduction to Vectors (mechanical and biological), Reservoirs, Host-vector relationship, Adaptations as vectors, Host specificity | **6** | Dr. Anindya Sundar Bhunia | **June-July'20** |
| | **Unit-3 Insects as Vectors**<br>Detailed features of insect orders as vectors – Diptera, Siphonoptera, Siphunculata, Hemiptera | **6** | Dr. S Rehan Ahmed | **June'20-July'20** |
| | **Unit-4 Dipteran as Disease Vector**<br>Study of important Dipteran vectors – Mosquitoes, Sand fly, Houseflies vectors Study of mosquito-borne diseases – Malaria, Dengue, Chikungunya, Viral encephalitis, Filariasis Control of mosquitoes | **16** | Rituparna Maity | **Sepetember'20-December'20(1st Week)** |
| | **Unit-5 Siphonaptera as Disease Vectors**<br>Fleas as important insect vectors; Host-specificity, Study of Flea-borne diseases – Plague, Typhus fever; Control of fleas | **10** | Rituparna Maity | **June'20-August'20** |
| | **Unit-6 Siphunculata as Disease Vectors**<br>Human louse (Head, Body and Pubic louse) as important insect vectors; Control of human louse | **8** | Santanu Das | **June'20-August'20** |

| | | | | |
|---|---|---|---|---|
| | **Unit-7 Hempitera as Disease Vectors**<br>Bugs as insect vectors; Blood-sucking bugs; Chagas disease, Bed bugs as mechanical vectors, Control and prevention measures | **10** | Santanu Das | **September'20-November'20** |
| | **INSECT VECTORE AND DISEASES**<br>**PAPER CODE: ZOOGCOR03P** | **60** | Dr. Indrajit Biswas | **Acc. To Revised Syllabus 90% completed by end of** |

| | | | | |
|---|---|---|---|---|
| | | | | **November** |
| **SEM-V HONOURS** | **MOLECULAR BIOLOGY PAPER CODE: ZOOACOR11T** | **60** | | |
| | **Unit 1: Nucleic Acids** Salient features of DNA and RNA Watson and Crick Model of DNA | **2** | Dr. Anindya Sundar Bhunia | **June'20-June'20** |
| | **Unit 2: DNA Replication** Mechanism of DNA Replication in Prokaryotes, Semi conservative, bidirectional and discontinuous Replication, RNA priming, Replication of telomeres | **6** | Dr. Anindya Sundar Bhunia | **June'20-July'20** |
| | **Unit 3: Transcription** Mechanism of Transcription in prokaryotes and eukaryotes, Transcription factors, Difference between prokaryotic and eukaryotic transcription. | **8** | Dr. Anindya Sundar Bhunia | **August'20-September'20** |
| | **Unit 4: Translation** Mechanism of protein synthesis in prokaryotes, Ribosome structure and assembly in prokaryotes, fidelity of protein synthesis, aminoacyl tRNA synthetases and charging of tRNA; Proteins involved in initiation, elongation and termination of polypeptide chain; Genetic code, Degeneracy of the genetic code and Wobble Hypothesis; Inhibitors of protein synthesis; Difference between prokaryotic and eukaryotic translation | **14** | Dr. Indrajit Biswas | **June'20-August'20** |
| | **Unit 5: Post Transcriptional Modifications and Processing of Eukaryotic RNA** Capping and Poly A tail formation in mRNA; Split genes: concept of introns and exons, splicing mechanism, alternative splicing, exon shuffling, and RNA editing, Processing of tRNA | **10** | Dr. Indrajit Biswas Dr. Anindya Sundar Bhunia | **August'20-September'20** |
| | **Unit 6: Gene Regulation** Regulation of Transcription in prokaryotes: lac operon and trp operon; Regulation of Transcription in eukaryotes | **5** | Dr. Indrajit Biswas | **Septembar'20-Octobar'20** |
| | **Unit 7: DNA Repair Mechanisms** Types of DNA repair mechanisms, RecBCD model in prokaryotes, nucleotide and base excision repair, SOS repair | **9** | Rituparna Maity | **June'20-August'20** |
| | **Unit 8: Molecular Lab Techniques** PCR, Western and Southern blot, Northern Blot,Sanger DNA sequencing, cDNA technology | **5** | Rituparna Maity | **August'20-September'20** |
| | **MOLECULAR BIOLOGY LAB PAPER CODE: ZOOACOR11P** | **60** | Dr. Anindya Sundar Bhunia | **Acc. To Revised Syllabus 90% completed by** |

| | | | | |
|---|---|---|---|---|
| | | | Dr. Indrajit Biswas | **end of November** |
| | **GENETICS<br>PAPER CODE: ZOOACOR12T** | **60** | | |
| | **Unit 1: Mendelian Genetics and its Extension**<br>Background of Mendel's experiments Principles of Mendelian inheritance, | **12** | Santanu Das | **June'20-July'20** |

| | | | | |
|---|---|---|---|---|
| | Incomplete dominance and co-dominance, Epistasis, Multiple alleles, Lethal alleles, Pleiotropy, Sex-linked, sex influenced and sex-limited inheritance, Polygenic Inheritance | | | |
| | **Unit 3: Mutations**<br>1.Types of gene mutations (Classification), Types of chromosomal aberrations (Classification with one suitable example of each), Chromosomal aberrations, gene mutations and human diseases (Down's, Klienfelter's, Turner's, Cri du Chat, Sickle cell, Haemophilia, Thallassimia, Albinism only genetical aspects here, details of physiological consequences not required), Sex<br>chromosomes and sex-linked inheritance<br>Non-disjunction and variation in chromosome number; Molecular basis of mutations in relation to UV light and chemical mutagen | **12** | Santanu Das | **August'20-Sepetember'20** |
| | **Unit 4: Sex Determination**<br>Mechanisms of sex determination in Drosophila with reference to alternative splicing Sex determination in mammals, Dosage compensation in Drosophila & Human | **12** | Dr. Indrajit Biswas | **October"20** |
| | **Unit 5: Extra-chromosomal Inheritance**<br>Criteria for extra chromosomal inheritance, Antibiotic resistance in Chlamyadomonas, Kappa particle in Paramoecium Shell spiralling in snail | **8** | Dr. S Rehan Ahmed | **June'20-July'20** |
| | **Unit 6: Recombination in Bacteria and Viruses**<br>Conjugation, Transformation, Transduction, Complementation test in Bacteriophage | **8** | Dr. S Rehan Ahmed | **July'20-August'20** |
| | **Unit 7: Transposable Genetic Elements**<br>Transposons in bacteria,<br>Ac-Ds elements in maize and P elements in Drosophila, LINE, SINE, Alu elements in humans | **8** | Dr. S Rehan Ahmed | **August'20-September'20** |
| | **GENETICS LAB<br>PAPER CODE: ZOOACOR12P** | **60** | Dr. S Rehan Ahmed | **Acc. To Revised Syllabus 90% completed by end of** |

| | | | | |
|---|---|---|---|---|
| | | | | **November** |
| | **ENTOMOLOGY**<br>**PAPER CODE: ZOOADSEO2T** | **60** | | |
| | **Unit 1: Introduction**<br>General Features of Insects Distribution and Success of Insects on the Earth | **2** | Dr. Indrajit Biswas | **June'20** |
| | **Unit 2: Insect Diversity and Classifications**<br>Classifications of Arthropods with special reference to Insects (Insects are to be classified up to order) with estimated species richness of the orders globally, in India and in West Bengal.<br>Conspicuous/important families/Genera/species of each order have to be noted with their peculiar habits and habitats) | **4** | Dr. Indrajit Biswas | **June'20-July'20** |
| | **Unit 3: General Morphology of Insects (brief outlines)**<br>External Features; Head – Eyes, Types of antennae, Mouth parts w.r.t. feeding habits<br>Thorax: Wings and wing types, Types of Legs adapted to diverse habitats, Peculiar Abdominal appendages and genitalia- only brief introduction. | **12** | Dr. Indrajit Biswas | **July'20-August'20** |
| | **Unit 4: Physiology of Insects**<br>Structure and physiology of Insect body systems - Integumentary, digestive, excretory, circulatory, | **16** | Dr. Indrajit Biswas | **September'20-October'20** |

| | | | | |
|---|---|---|---|---|
| | respiratory, endocrine, reproductive, and nervous system (brief outlines only) Photoreceptors: Types, Structure and Function (brief introductions)<br>Metamorphosis: Types and Neuroendocrine control of metamorphosis (introductory) | | | |
| | **Unit 5: Insect Society**<br>Social insects: different types of social insects with brief outlines of their social systems Trophallaxis in social insects such as ants, termites and bees | **8** | Dr. Indrajit Biswas | **October'20-November'20** |
| | **Unit 6: Insect Plant Interaction**<br>Outline of the concept of co-evolution, role of allo chemicals in host plant mediation, Host-plant selection by phytophagous insects; Major insect pests in paddy (brief introductions) | **14** | Dr. Indrajit Biswas | **November'20** |
| | **Unit 7: Insects as Vectors**<br>Insects as mechanical and biological vectors, Brief discussion on houseflies and mosquitoes as important vectors | **4** | Dr. Indrajit Biswas | **End In 1st Week of December'20** |

| | | | | |
|---|---|---|---|---|
| | **BIOLOGY OF INSECTS LAB**<br>**PAPER CODE: ZOOADSE02P** | **60** | Dr. Indrajit Biswas | **Acc. To Revised Syllabus 90% completed by end of November** |
| | **ENDOCRINOLOGY**<br>**PAPER CODE: ZOOADSE03T** | **60** | | |
| | **Unit 1: Introduction to Endocrinology**<br>General idea of Endocrine systems, Classification, Characteristic and Transport of Hormones Neurosecretions and Neurohormones | **12** | Rituparna Maity | **September'20-november'20** |
| | **Unit 2: Epiphysis, Hypothalamo-hypophysial Axis**<br>Structure of pineal gland, Secretions and their functions in biological rhythms and reproduction; Structure and functions of hypothalamus and Hypothalamic nuclei, Regulation of neuroendocrine glands, Feedback mechanisms; Structure of pituitary gland, Hormones and their functions, Hypothalamo-hypophysial portal system, Disorders of pituitary gland. | **18** | Santanu Das | **September'20-November'20** |
| | **Unit 3: Peripheral Endocrine Glands**<br>Structure, Hormones, Functions and Regulation of Thyroid gland, , Parathyroid, Adrenal, Pancreas, Ovary and Testis; Hormones in homeostasis,Disorders of endocrine glands | **16** | Dr. Anindya Sundar Bhunia | **September'20-1stWeek of december'20** |
| | **Unit 4: Regulation of Hormone Action**<br>Mechanism of action of steroidal, non-steroidal hormones with receptors Bioassays of hormones using ELISA and RIA; Estrous cycle in rat and menstrual cycle in human Multifaceted role of Vasopressin & Oxytocin; Hormonal regulation of parturition | **14** | Dr. S Rehan Ahmed | **September'20-1stWeek of december'20** |
| | **ENDOCRINOLOGY LAB**<br>**PAPER CODE: ZOOADSE03P** | **60** | Dr. Indrajit Biswas<br>Dr. Anindya Sundar Bhunia | **Acc. To Revised Syllabus 90% completed by end of November** |
| **SEM-V GENERAL** | **APPLIED ZOOLOGY**<br>**PAPER CODE: ZOOGDSE01T** | **60** | | |
| | **Unit-1 Introduction to Host-parasite Relationship** Host, Definitive host, Intermediate host, Parasitism, Symbiosis, Commensalism, Reservoir, Zoonosis | **2** | Dr. Indrajit Biswas | **June'20-June'20** |
| | **Unit-2 Epidemiology of Diseases**<br>Transmission, Prevention and control of | **4** | Dr. Indrajit Biswas | **June'20-july'20** |

| | | | | |
|---|---|---|---|---|
| | diseases: Tuberculosis, Typhoid | | | |
| | **Unit-3 Rickettsia and Spirochetes**<br>Brief account of Rickettsia prowazekii, Borrelia recurrentis and Treponema pallidum | **6** | Dr. S Rehan Ahmed | **June'20-July'20** |
| | **Unit-4 Parasitic Protozoa**<br>Life history and pathogenicity of Entamoeba histolytica, Plasmodium vivax and Trypanosoma gambiense | **8** | Dr. Anindya Sundar Bhunia | **June'20-August'20** |
| | **Unit-5 Parasitic Helminthes**<br>Life history and pathogenicity of Ancylostoma duodenale and Wuchereria bancrofti | **4** | Dr. Anindya Sundar Bhunia | **September'20-October'20** |
| | **Unit-6 Insects of Economic Importance**<br>Biology, Control and damage caused by Helicoverpa armigera, Pyrilla perpusilla and Papilio demoleus, Callosobruchus chinensis, Sitophilus oryzae and Tribolium castaneum | **12** | Dr. S Rehan Ahmed | **August'20-November'20** |
| | **Unit-7 Insects of Medical Importance**<br>Medical importance and control of Pediculus humanus corporis, Anopheles, Culex, Aedes, Xenopsylla cheopis | **8** | Dr. Indrajit Biswas | **August'20-October'20** |
| | **Unit-8 Animal Husbandry**<br>Preservation of semen and artificial insemination in cattle | **6** | Rituparna Maity | **June'20-July'20** |
| | **Unit-9 Poultry Farming**<br>Principles of poultry breeding, Management of breeding stock and broilers, Processing and preservation of eggs Unit | **6** | Rituparna Maity | **August'20-September'20** |
| | **Unit-10 Fish Technology**<br>Genetic improvements in aquaculture industry; Induced breeding and transportation of fish seed | **4** | Rituparna Maity | **October'20-November'20** |
| | **APPLIED ZOOLOGY LAB**<br>**PAPER CODE: ZOOGDSE01P** | **60** | Santanu Das | **Acc. To Revised Syllabus 90% completed by end of November** |

**ACADEMIC CALENDAR**

**DEPARTMENT OF ZOOLOGY**

**January/ February 2021 - June/July 2021**

**2nd, 4th and 6th Semester**

| Semester/ Year | Syllabus Module/ Unit | No. of Lecture | Teacher Name | Distribution Tentative |
|---|---|---|---|---|
| **SEM-II HONOURS** | **Non-Chordates II Paper Code: ZOOACOR03T** | **30** | | |
| | Unit 1: Introduction to Coelomates Evolution of coelom and metamerism | **3** | Dr. Indrajit Biswas | 1st week May |
| | Unit 2: Annelida General characteristics and Classification up to classes Excretion in Annelida | **4** | Dr. Indrajit Biswas | 2nd week May |
| | Unit 3: Arthropoda General characteristics and Classification up to classes,Metamorphosis in Insects Social life in bees and termites | **8** | Dr. Indrajit Biswas | 3rd Week of May 3rd week of June |
| | Unit 4: Onychophora General characteristics | **2** | | |
| | Unit 5: Mollusca General characteristics and Classification up to classes Respiration in Mollusca Torsion and detorsion in Gastropoda | **6** | Santanu Das | 1st week of May 3rd week of May |
| | Unit 6: Echinodermata General characteristics and Classification up to classes Water-vascular system in Asteroidea Larval forms in Echinodermata | **4** | Mr. Santanu Das | 4th week of May – 1st week of June |
| | Unit 7: Hemichordata General characteristics of phylum Hemichordata. Phylogenetic relationship with non-chordates and chordates (only recent concept) | **3** | Smt. Rituparna maity | 1st week of May 4th week of May |
| | **Non-Chordates II Lab Paper Code: ZOOACOR03P** | **30** | Dr. Indrajit Biswas Smt. Rituparna Maity | Acc. To Revised Syllabus 90% completed by end of July |
| | **CELL BIOLOGY PAPER CODE: ZOOACOR04T** | **30** | | |
| | Unit 1: Overview of Cells Prokaryotic and Eukaryotic cells, Virus, Viroids | **2** | Dr. S Rehan Ahmad | 1st week of May |

| | | | | |
|---|---|---|---|---|
| | Unit 2: Plasma Membrane Various models of plasma membrane structure Transport across membranes: Active and Passive transport, facilitated transport, Cell junctions: Tight junctions, Desmosomes, Gap junctions | **5** | Dr. S Rehan Ahmad | 2nd week of May 1st week of June |
| | Unit 3: Endomembrane System Structure and Functions: Endoplasmic Reticulum, Golgi Apparatus, Lysosomes | **4** | Dr. S Rehan Ahmad | 2nd week June-end of June |
| | Unit 4: Mitochondria and Peroxisomes Mitochondria: Structure, Semi-autonomous nature, Mitochondrial Respiratory Chain, Peroxisomes | **4** | Mr.Santanu Das | 2nd week of June 3rd week of June |

| | | | | |
|---|---|---|---|---|
| | Unit 5: Cytoskeleton Structure and Functions: Microtubules, Microfilaments and Intermediate filaments | **2** | Mr. Santanu Das | 1st week of July |
| | Unit 6: Nucleus Structure of Nucleus: Nuclear envelope, Nucleolus Chromatin: Euchromatin and Heterochromatin and packaging (nucleosome) | **4** | Dr. Anindya Sundar Bhunia | 1st week of May - end of may |
| | Unit 7: Cell Division<br>Mitosis and Meiosis<br>Cell cycle and its regulation<br>Mechanisms of cell death: brief overview | **5** | Dr. Anindya Sundar Bhunia | 1st week of June End of june |
| | Unit 8: Cell Signaling Cell signalling transduction pathways; Types of signaling molecules and receptors GPCR and Role of second messenger (cAMP) | **4** | Dr. Anindya Sundar Bhunia | 1st week of July End of july |
| | **CELL BIOLOGY LAB<br>PAPER CODE: ZOOACOR04P** | **30** | Dr. Anindya Sundar Bhunia<br>Dr. S Rehan Ahmad | Acc. To Revised Syllabus 90% completed by end of July |
| **SEM-II GENERAL** | **PHYSIOLOGY AND BIOCHEMISTRY<br>PAPER CODE: ZOOGCOR02T** | **30** | | |
| | Unit-1 Nerve and muscle<br>1.Structure of a neuron, Resting membrane potential, Graded potential, Origin of Action potential and its propagation in myelinated and non-myelinated nerve fibres.<br>2.Ultra-structure of skeletal muscle, Molecular and chemical basis of muscle contraction. | **4** | Dr. Indrajit Biswas | **1st week of May End of May** |

| | | | | |
|---|---|---|---|---|
| | Unit-2 Digestion<br>Absorption of carbohydrates, proteins, lipids | **2** | Dr. Indrajit Biswas | **1st week of july** |
| | Unit-3 Respiration<br>Pulmonary ventilation, Respiratory volumes and capacities, Transport of Oxygen and carbon dioxide in blood | **3** | Dr. Anindya Sundar Bhunia | **1st week of May End of May** |
| | Unit-4 Excretion<br>Structure of nephron, Mechanism of Urine formation, Counter-current Mechanism | **3** | Dr. Anindya Sundar Bhunia | **1st week of July End of July** |
| | Unit-5 Cardiovascular system<br>Composition of blood, Homeostasis, Structure of Heart, Origin and conduction of the cardiac impulse, Cardiac cycle | **3** | Smt. Rituparna maity | **1st week of May End of May** |
| | Unit-6 Reproduction and Endocrine Glands<br>Physiology of male reproduction: hormonal control of spermatogenesis; Physiology of female reproduction: hormonal control of menstrual cycle. Structure and function of thyroid, pancreas | **4** | Smt. Rituparna maity | **1ST week of June 1st week of July** |
| | Unit 7 Carbohydrate: Structure and Metabolism<br>Introduction to Carbohydrates, Structure & Types of Carbohydrates, Introduction to Intermediary metabolism: Glycolysis, Krebs cycle, Electron transport chain | **4** | Dr. S Rehan Ahmad | **1st week of May End of May** |
| | Unit-8 Lipid: Structure and Metabolism<br>Introduction to Lipids: Definitions; classes of lipids; β oxidation of palmitic acid | **2** | Dr. S Rehan Ahmad | **1st week of July** |
| | Unit-9 Protein: Structure and metabolism | **2** | Mr. Santanu Das | **1st week of May** |

| | | | | |
|---|---|---|---|---|
| | Proteins and their biological functions, functions of amino acids; primary structure of protein, secondary, tertiary and quaternary structures. Transamination, Deamination. | | | |
| | Unit-10 Enzymes 4<br>Introduction, Classification of Enzymes, Mechanism of action,Enzyme Kinetics, Inhibition and Regulation | **2** | Mr. Santanu Das | **3rd week of May** |
| | **PHYSIOLOGY AND BIOCHEMISTRY LAB PAPER CODE: ZOOGCOR02P** | **30** | Smt. Rituparna Maity<br>Dr. Anindya Sundar | Acc. To Revised Syllabus 90% completed by end of July |

| | | | | |
|---|---|---|---|---|
| | | | Bhunia | |
| **SEM-IV HONOURS** | **COMPARATIVE ANATOMY PAPER CODE: ZOOACOR08T** | **30** | | |
| | Unit 1: Integumentary System- Structure, function and derivatives of integument in mammals | **5** | Santanu Das | 1st week of May End of May |
| | Unit 2: Skeletal System, Jaw Suspension | **2** | Santanu Das | 1st week of june |
| | Unit 3: Digestive System- Comparative anatomy of stomach; dentition in mammals | **4** | Smt. Rituparna maity | **1st week of May 3rd week of May** |
| | Unit 4: Respiratory System- Respiratory organs in birds | **4** | Smt. Rituparna maity | **4th week of May 2nd week of June** |
| | Unit 5: Circulatory System- Comparative account of heart and aortic arches | **4** | Dr. S Rehan Ahmad | **1st week of May 3rd week of May** |
| | Unit 6: Urinogenital System- Succession of kidney | **3** | Dr. S Rehan Ahmad | **3rd week of May 1st week of June** |
| | Unit 7: Nervous System Comparative account of brain, Cranial nerves in mammals | **4** | Dr. Indrajit Biswas | **1st week of May End of May** |
| | Unit 8: Sense Organs Classification of receptors | **4** | Dr. Indrajit Biswas | **1st week of June 2nd week of june** |
| | **COMPARATIVE ANATOMY LAB PAPER CODE: ZOOACOR08P** | **30** | Mr. Santanu Das Dr. Indrajit Biswas | Acc. To Revised Syllabus 90% completed by end of July |
| | **PHYSIOLOGY: LIFE SUSTANING SYSTEM PAPER CODE: ZOOACOR09T** | **30** | | |
| | Unit 1: Physiology of Digestion-Mechanical and chemical digestion of food, absorption of Carbohydrates, Lipids, Proteins, Digestive enzyme | **4** | Dr. S Rehan Ahmad | **2nd week of June 3rd week of June** |
| | Unit 2: Physiology of Respiration- Mechanism of Respiration, Respiratory volumes and capacities, transport of Oxygen and Carbon dioxide in blood, Dissociation curves and the factors influencing it, | **6** | Dr. S Rehan Ahmad | **3rd week of June 1st week of July** |

| | | | | |
|---|---|---|---|---|
| | Unit 3: Physiology of Circulation- Components of Blood and their functions; Structure and functions of haemoglobin; Blood clotting system, Blood groups; ABO and Rh factor | **4** | Dr. Anindya Sundar Bhunia | **1st week of May 3rd week of May** |
| | Unit 4: Physiology of Heart- Structure of mammalian heart, Origin and conduction of cardiac impulses; Cardiac Cycle and cardiac output; Blood pressure and its regulation | **6** | Dr. Anindya Sundar Bhunia | **4th week of May 2nd week of June** |

| | | | | |
|---|---|---|---|---|
| | Unit 5: Thermoregulation & Osmoregulation Physiological classification based on thermal biology. Thermal biology of endotherms; Osmoregulation in aquatic vertebrates; | **4** | Smt. Rituparna maity | **3rd week of June 1st week of July** |
| | Unit 6: Renal Physiology Structure of Kidney and its functional unit, Mechanism of urine formation, Regulation of acid-base balance | **6** | Smt. Rituparna maity | **1st week of July 4th week of July** |
| | **PHYSIOLOGY: LIFE SUSTAINING SYSTEM LAB PAPER CODE: ZOOACOR09T** | **30** | Dr. Anindya Sundar Bhunia Smt. Rituparna maity | Acc. To Revised Syllabus 90% completed by end of July |
| | **IMMUNOLOGY PAPER CODE: ZOOACOR10T** | **30** | | |
| | Unit 1: Overview of Immune System-Organs (Primary & Secondary lymphoid organs and its importance) and Cells of the Immune system | **1** | Dr. Indrajit Biswas | **3rd week of June** |
| | Unit 2: Innate and Adaptive Immunity Principle of Innate and Adaptive Immunity. • Components of innate immunity– Cellular mechanisms (phagocytes, NK cells, mast cells, eosinophils, inflammation [concept]) – Humoral mechanisms (complement, cytokines, chemokines etc. [concept]) • Components of adaptive immunity – Cellular mechanisms (Cell-Mediated Immune System (CMIS) or T- Cell Immunity [concept]) – Humoral mechanisms (Formation of Plasma B | **5** | Dr. Indrajit Biswas | **3rd week of June 2nd week of July** |

| | | | | |
|---|---|---|---|---|
| | cells and Memory B cells [concept] | | | |
| | Unit 3: Antigen, Antigen presentation & MHC Concept of Antigen, Immunogen, Allergen & Pathogen. Adjuvants and haptens, Factors influencing immunogenicity, Epitope. Types of Antigen Presenting Cells (APC), Co-stimulatory molecules on APC. | **4** | Dr. Anindya Sundar Bhunia | **3rd week of June End of June** |
| | Unit 3: T Cell development Structure of T cell receptors, Co-stimulatory molecules on T cells, Central differentiation of T cells; T cell selection in thymus Peripheral differentiation of T cells; Th1 & Th2 | **4** | Dr. Anindya Sundar Bhunia | **1st week of July 3rd week of July** |
| | Unit 4: Immunoglobulins Structure and functions of different classes of immunoglobulins, Antigen antibody interactions, Immunoassays (ELISA and RIA), Hybridoma technology, Monoclonal antibody production | **4** | Mr.Santanu Das | **2nd week of June 4th week of June** |

| | | | | |
|---|---|---|---|---|
| | Unit 6: Cytokines & Chemokines Brief concept on types of Cytokines & Chemokines Cytokines (source & function of IL-1, IL-2, IL-4, IL-5, IL-6, IL 8, IL-10, IL-12, Interferons, Tumor Necrosis Factors, Tumor Growth Factors, GMCSF, M-CSF). | **4** | Mr. Santanu Das | **End of June-2nd week ofJuly** |
| | Unit 7: Complement System Components and pathways of complement activation | **2** | Smt. Rituparnamaity | **End of July** |
| | Unit 8: Hypersensitivity Gell and Coombs' classification and brief description of various types of hypersensitivities. | **2** | Smt. Rituparnamaity | **End of July** |
| | Unit 9: Immunology of diseases Malaria, Dengue | **2** | Dr. S Rehan Ahmad | **2nd week of July** |
| | Unit 10: Vaccines Various types of vaccines. Active & passive immunization (Artificial and natural). | **2** | Dr. S Rehan Ahmad | **End of July** |

| | | | | |
|---|---|---|---|---|
| | **IMMUNOLOGY LAB<br>PAPER CODE: ZOOACOR10T** | **30** | Dr. Anindya Sundar Bhunia<br>Dr. Indrajit Biswas | Acc. To Revised Syllabus 90% completed by end of July |
| **SEM-IV GENERAL** | **ENVIRONMENT AND PUBLIC HEALTH PAPER CODE: ZOOGCOR04T** | **30** | | |
| | Unit 1: Introduction<br>Sources of Environmental hazards, Hazard identification and accounting, Fate of toxic and persistent substances in the environment, Dose response evaluation, Exposure assessment | **8** | Dr. Indrajit Biswas | **1st week of May End of July** |
| | Unit 2: Climate Change<br>Greenhouse gases and global warming, Acid rain, Ozone layer destruction, Effect of climate change on public health | **6** | Dr. Anindya Sundar Bhunia | **1st week May-end of June** |
| | Unit 3: Pollution<br>Air, water pollution: sources and effects, Pollution control | **8** | Smt. Rituparna maity | **1st week of May End of July** |
| | Unit 4: Waste Management Technologies<br>Sources of waste, types and characteristics, Sewage disposal and its management, Solid waste<br>disposal, Biomedical waste handling and disposal. | **4** | Dr. S Rehan Ahmad | **1st week of May End of June** |
| | Unit 5: Diseases<br>Causes, symptoms and control of tuberculosis, Asthma, Cholera. | **2** | Mr Santanu Das | **1st week of May 4th week of May** |
| | **ENVIRONMENT AND PUBLIC HEALTH PAPER CODE: ZOOGCOR04P** | **30** | Dr. Indrajit Biswas<br>Dr. S Rehan Ahmad | Acc. To Revised Syllabus 90% completed by end of July |
| **SEM-VI HONOURS** | **DEVELOPMENTAL BIOLOGY<br>PAPER CODE: ZOOACOR13T** | **30** | | |
| | Unit 1: Introduction Basic concepts: Phases of Development, Cell-cell interaction, Differentiation and growth | **4** | Smt. Rituparna maity | **1st week of May 3rd week of May** |

| | | | | |
|---|---|---|---|---|
| | Unit 2: Early Embryonic Development Gametogenesis, Spermatogenesis, Oogenesis; Fertilization (External and Internal): Changes in gametes, Blocks to polyspermy; Planes and patterns of cleavage; Types of Blastula; Fate maps (including Techniques); Early development of chick up to gastrulation; Embryonic induction and organizers | **8** | Mr. Santanu Das | **1st week of May End of May** |
| | Unit 3: Late Embryonic Development Fate of Germ Layers; Implantation of embryo in humans, Placenta (Structure, types and functions of placenta) | **6** | Dr. S Rehan Ahmad | **1st week of May 4th week of May** |
| | Unit 4: Post Embryonic Development Development of brain and Eye in Vertebrate | **6** | Dr. S Rehan Ahmad | **4th week of May 2nd week of June** |
| | Unit 5: Implications of Developmental Biology Teratogenesis: Teratogenic agents and their effects on embryonic development; In vitro fertilization, Stem cell (ESC), Amniocentesis | **6** | Smt. Rituparnamaity | **4th week of May 1st week of June** |
| | **DEVELOPMENTAL BIOLOGY LAB PAPER CODE: ZOOACOR13P** | **30** | Dr. S Rehan Ahmad Mr.Santanu Das | Acc. To Revised Syllabus 90% completed by end of July |
| | **EVOLUTIONARY BIOLOGY PAPER CODE: ZOOACOR14T** | **30** | | |
| | Unit 1: Origin of earliest life- Chemogeny, RNA world, Biogeny, Origin of photosynthesis, Evolution of eukaryotes, three domains of life | **2** | Dr. Indrajit Biswas | **1st week of May** |
| | Unit 2: Historical review of evolutionary concept-Pre Darwinian Concepts and theories including Lamarckism, Darwininan Theory Neo-Darwinian Synthesis | **4** | Dr. Indrajit Biswas | **2nd week of May End of May** |
| | Unit 3: Evidences in favour of Evolution-Fossil records: types of fossils, geological time scale, transitional forms: | **2** | Dr. S Rehan Ahmad | **3rd week of June** |

| | | | | |
|---|---|---|---|---|
| | Unit 5: Population genetics- Concept of Populations and calculation of allele frequencies in a population Hardy-Weinberg Law and equilibrium (derivations, applications of law to find gene and genotype frequencies in human Populations) Evolutionary forces disrupting H-W equilibriumNatural selection: Definition as the non-differential rate of reproductions and survivals of competing alleles, concept of fitness, selection coefficient, Types of natural selection with examples- Disrupting, Stabilizing, Directional. Genetic Drift- outline of its mechanism, basic concepts and examples of founder's effect, bottleneck phenomenon; | **8** | Mr.Santanu Das | **1st week of June End of june** |
| | Unit 6: Products of evolution Inter-population variations: clines, races, Species concepts and modes of speciation (just outlines of Allopatric, Sympatric isolating mechanisms Adaptive radiations) | **5** | Smt. Rituparna maity | **2nd week June-4th week 0f June** |

| | | | | |
|---|---|---|---|---|
| | Unit 8: Origin and evolution of man-Unique hominin characteristics contrasted with primate characteristics (including social and cultural ones), Molecular evidences of human origin and migrations (brief outline) | **6** | Dr. Anindya Sundar Bhunia | **1st week of May 4th week of May** |
| | Unit 9: Molecular Phylogeny-Neutral theory of molecular evolution, molecular clock (brief introductions) Example of evolution in vertebrate globin genes | **4** | Dr. Anindya Sundar Bhunia | **End of May-1st week of June** |
| | **EVOLUTIONARY BIOLOGY LAB PAPER CODE: ZOOACOR14P** | **30** | Dr. Indrajit Biswas Santanu Das | |
| | **FISH AND FISHERY PAPER CODE: ZOOADSEO4T** | **30** | | |
| | Unit 1: Introduction and Classification-Feeding habit, habitat and manner of reproduction Classification of fish (up to Subclasses) with important examples | **2** | Dr. Indrajit Biswas | **1st week of July** |
| | Unit 2: Morphology and Physiology Types of fins,Types of Scales, Use of scales in Classification and determination of age of fish; Gills and gas exchange; Swim Bladder: Types and role in | **8** | Dr. S Rehan Ahmad | **4th week of June 2nd week of july** |

| | | | | |
|---|---|---|---|---|
| | Respiration, buoyancy, Bioluminescence | | | |
| | Unit 3: Fisheries Inland Fisheries; Marine Fisheries; Environmental factors influencing the seasonal variations in fish catches in the Arabian Sea and the Bay of Bengal; Fishing crafts and Gears; Depletion of fishery resources; Application of remote sensing and GIS in fisheries; | **8** | Mr.Santanu Das | **1st week of July 3rd week of July** |
| | Unit 4: Aquaculture Sustainable Aquaculture; Extensive, semi-intensive and intensive culture of fish; Pen and cage culture; Polyculture; Composite fish culture; Brood stock management; Induced breeding of fish, Fish diseases | **10** | Smt. Rituparna maity | **End of June-3rd week of July** |
| | Unit 5: Fish in research Transgenic fish | **2** | Dr. Anindya Sundar Bhunia | **2nd week of June** |
| | **FISH AND FISHERYLAB PAPER CODE: ZOOADSE04P** | **30** | Dr. S Rehan Ahmad Smt. Rituparna maity | Acc. To Revised Syllabus 90% completed by end of July |
| | **PARASITOLOGY PAPER CODE: ZOOADSE05T** | **30** | | |
| | Unit 1: Introduction to Parasitology Brief introduction of Parasitism and other animal associations, Parasite, Parasitoid and Vectors (mechanical and biological vector) Host parasite relationship and zoonosis | **2** | Smt. Rituparna maity | **4th week of July** |
| | Unit 2: Parasitic Protists Study of Morphology, Life Cycle, Prevalence, Epidemiology, Pathogenicity, Diagnosis, Prophylaxis and Treatment of *Entamoeba histolytica, Giardia intestinalis, Leishmania donovani, Plasmodium vivax* | **10** | Dr. Indrajit Biswas | **2nd week of July End of July** |

| | | | | |
|---|---|---|---|---|
| | Unit 3: Parasitic Platyhelminthes Study of Morphology, Life Cycle, Prevalence, Epidemiology, Pathogenicity, Diagnosis, Prophylaxis and Treatment of *Fasciola hepatica, Schistosoma haematobium, Taenia solium* | **8** | Mr. Santanu Das | **3rd week of July end of July** |

| | | | | |
|---|---|---|---|---|
| | Unit 4: Parasitic Arthropoda Mosquitoes, as vectors of human pathogen Biology,importance and control of myiasis causing diptera Biology, importance and control of ticks, mites, *Pediculus humanus* (head and body louse), | **8** | Dr. Anindya Sundar Bhunia | **3rd week of June end of July** |
| | **PARASITOLOGY LAB**<br>**PAPER CODE: ZOOADSE05P** | **30** | Dr. S Rehan Ahmad<br>Smt. Rituparna maity | Acc. To Revised Syllabus 90% completed by end of July |
| **SEM-VI GENERAL** | **IMMUNOLOGY**<br>**PAPER CODE: ZOOGDSE04T** | **30** | | |
| | Unit-1 Overview of the Immune System<br>Introduction to basic concepts in immunology, components of immune system, principles of innate and adaptive immune system | **4** | Dr. S Rehan Ahmad | **1st week of May End of May** |
| | Unit-2 Cells and Organs of the Immune System<br>Cells of immune system and organs (primary and secondary lymphoid organs) of the immune system | **4** | Dr. Anindya Sundar Bhunia | **1st week of May End of May** |
| | Unit-3 Antigens<br>Basic properties of antigens, B and T cell epitopes, haptens and adjuvants | **6** | Dr. S Rehan Ahmad | **End of May-end of June** |
| | Unit-4 Antibodies<br>Structure, classes and function of antibodies, antigen antibody interactions as tools for research and diagnosis | **4** | Smt. Rituparna maity | **1st week of May End of May** |
| | Unit-5 Working of the immune system<br>Structure and functions of MHC, exogenous and endogenous pathways of antigen presentation and processing, Basic properties and functions of cytokines, | **4** | Santanu Das | **1st week of May End of May** |
| | Unit-6 Immune system in health and disease<br>Gell and Coombs' classification and brief description of various types of hypersensitivities, Introduction to concepts of autoimmunity and immunodeficiency | **6** | Dr. Indrajit Biswas | **1st week of May 2nd week of June** |
| | Ùnit-7 Vaccines<br>General introduction to vaccines, Types of vaccines | **2** | Dr. Indrajit Biswas | **3rd week of June** |
| | **IMMUNOLOGY LAB**<br>**PAPER CODE: ZOOGDSE04P** | **30** | Dr. Anindya Sundar Bhunia<br>Mr. Santanu Das | Acc. To Revised Syllabus 90% completed by end of July |

# ACADEMIC CALENDAR

## DEPARTMENT OF ZOOLOGY

**July'21/Sepetember'21- December'21/January'22**

**1st, 3rd and 5th Semester**

| Semester/ Year | Syllabus Module/ Unit | No. of Lecture | Teacher Name | Distribution Tentative |
|---|---|---|---|---|
| **SEM-I HONOURS** | **Non-Chordates I<br>Paper Code: ZOOACOR01T** | **30** | | |
| | **Unit 1: Protista, Parazoa and Metazoa**<br>General characteristics and Classification up to classes, Study of *Paramoecium* Life cycle and pathogenicity of *Entamoeba histolytica* and *Plasmodium vivax* | **6** | Dr. Indrajit Biswas | **Sepetember'21-November'21** |
| | **Unit 2: Porifera**<br>General characteristics and Classification up to classes Canal system and spicules in sponges | **5** | Dr. Indrajit Biswas | **November'21-1st week of January'22** |
| | **Unit 3: Cnidaria**<br>General characteristics and Classification up to classes<br>Polymorphism in CnidariaCorals and coral reefs: types, formation, distribution, conservation significance | **6** | Santanu Das | **September'21-November'21** |
| | **Unit 4: Ctenophora**<br>General characteristics | **2** | Santanu Das | **November'21-November'21** |
| | **Unit 5: Platyhelminthes**<br>General characteristics and Classification up to classes, Life cycle and pathogenicity of *Fasciola hepatica* and *Taenia solium* | **6** | Dr. Anindya Sundar Bhunia | **September'21-November'21** |
| | **Unit 6: Nemathelminthes**<br>General characteristics and Classification up to classes, Life cycle, and pathogenicity of *Ascaris lumbricoides,* Parasitic adaptations in helminths | **5** | Dr. Anindya Sundar Bhunia | **November'21-1st week of January'22** |
| | **Non-Chordates I Lab<br>Paper Code: ZOOACOR01P** | **30** | Dr. Indrajit Biswas<br>Santanu Das | **September'21-1st week of January'22** |
| | **ECOLOGY<br>PAPER CODE: ZOOACOR02T** | **30** | | |

| | | | | |
|---|---|---|---|---|
| | **Unit 1: Introduction to Ecology**<br>History of ecology, Autecology and synecology, Levels of organization, Laws of limiting factors, Study of Physical factors, The Biosphere. | **6** | Rituparna Maity | **September'21-November'21** |
| | **Unit 2: Population**<br>life tables, survivorship curves, exponential and logistic growth, r and K strategies Population regulation - density- dependent and independent factors | **10** | Rituparna Maity | **November'21-1st week of January'22** |
| | **Unit 3: Community**<br>Community characteristics: species diversity, abundance, dominance, richness, Ecotone, Ecological succession and example of it. | **5** | Dr. S Rehan Ahmed | **September'21-1st week of January'22** |

| | | | | |
|---|---|---|---|---|
| | **Unit 4: Ecosystyem**<br>Food chain: Detritus and grazing food chains,Food web, Energy flow through the ecosystem, Ecological pyramids and Ecological efficiencies | **6** | Dr. S Rehan Ahmed | **November'21-1st week of January'22** |
| | **Unit 5: Applied Ecology**<br>Wildlife Conservation (in-situ and ex-situ conservation). Wild life protection act (1972) | **3** | Santanu Das | **November'21-1st week of January'22** |
| | **ECOLOGY LAB**<br>**PAPER CODE: ZOOACOR02P** | **30** | Rituparna Maity | **September'21-1st week of January'22** |
| **SEM-I GENERAL** | **ANIMAL DIVERSITY**<br>**PAPER CODE: ZOOGCOR01T** | **30** | | |
| | **Unit-1 Kingdom Protista**<br>General characters and classification of Subkingdom Protozoa up to Phylum (Levine et al., 1980) | **2** | Dr. Indrajit Biswas | **September'21- September'21** |
| | **Unit-2 Phylum Porifera**<br>General character and classification up to classes; Canal System in Sycon | **2** | Dr. Indrajit Biswas | **September'21-November'21** |
| | **Unit-3 Phylum Cnidaria**<br>General characters and classification up to classes | **1** | Dr. Indrajit Biswas | **November'21 1st week of January'22** |
| | **Unit-4 Phylum Platyhelminthes**<br>General characters and classification up to classes; Life history of Taenia solium | **3** | Dr. Indrajit Biswas | **November'21-1st week of January'22** |

| | | | | |
|---|---|---|---|---|
| | **Unit-5 Phylum Nematoda**<br>General characters and classification up to classes; Life history of Ascaris lumbricoides | **3** | Dr. Anindya Sundar Bhunia | **September'21-September'21** |
| | **Unit-6 Phylum Annelida**<br>General characters and classification up to classes | **1** | Dr. Anindya Sundar Bhunia | **September'21-September'21** |
| | **Unit-6 Phylum Annelida**<br>General characters and classification up to classes; | **1** | Dr. Anindya Sundar Bhunia | **November'21-1st week of January'22** |
| | **Unit 7 Phylum Arthropoda**<br>General characters and classification up to classes Metamorphosis in Insects | **2** | Dr. Anindya Sundar Bhunia | **November'21-1st week of January'22** |
| | **Unit-8 Phylum Mollusca**<br>General characters and classification up to classes; Respiration in Pila | **2** | Dr. Anindya Sundar Bhunia | **November'21-1st week of January'22** |
| | **Unit-9 Phylum Echinodermata**<br>General characters and classification up to classes; Water-vascular system in Asterias | **2** | Rituparna Maity | **November'21-1st week of January'21(1st Week)** |
| | **Unit-10 Protochordates**<br>General features | **1** | Rituparna Maity | **September'21-September'21** |
| | **Unit-11 Agnatha**<br>General features and classification up to classes (Young, 1981) | **1** | Rituparna Maity | **September'21-November'21** |
| | **Unit-12 Pisces**<br>General features and Classification up to Subclasses (Romer, 1959); Osmoregulation in Fishes | **2** | Rituparna Maity | **November'21-Febraary'21** |
| | **Unit-13 Amphibia**<br>General features and Classification up to living orders (Duellman & Trueb, 1986); Metamorphosis in Toad | **2** | Santanu Das | **September'21-November'21** |

| | | | | |
|---|---|---|---|---|
| | **Unit-14 Reptiles**<br>General features and Classification up to living Subclass (Young, 1981); Poisonous and non poisonous snakes | **2** | Santanu Das | **November'21-1st week of January'22** |
| | **Unit-15 Aves**<br>General features and Classification up to orders (Young, 1981); Flight adaptations in | **2** | Dr. S Rehan Ahmed | **September'21-November'21** |

| | | | | |
|---|---|---|---|---|
| | birds | | | |
| | **Unit-16 Mammals**<br>Classification up to Subclasses (Young, 1981) | **1** | Dr. S Rehan Ahmed | **November'21-** |
| | **ANIMAL DIVERSITY**<br>**PAPER CODE: ZOOGCOR01P** | **30** | Rituparna Maity<br>Dr. Anindya Sundar Bhunia | **September'21-1st week of January'22** |
| **SEM-III HONOURS** | **CHORDATES**<br>**PAPER CODE: ZOOACOR05T** | **60** | | |
| | **Unit 1: Introduction to Chordates**<br>General characteristics and outline classification of Phylum Chordata | **4** | Rituparna Maity | **September"21-September"21** |
| | **Unit 2: Protochordata**<br>General characteristics and classification of sub phylum Urochordata and Cephalochordata up to Classes. Metamorphosis in Ascidia Chordate Features and Feeding in Branchiostoma | **8** | Rituparna Maity | **September"21-October"21** |
| | **Unit 3: Origin of Chordata**<br>Dipleurula concept and the Echinoderm theory of origin of chordates Advanced features of vertebrates over Protochordata | **5** | Rituparna Maity | **October"21-October"21** |
| | **Unit 4: Agnatha**<br>General characteristics and classification of cyclostomes up to order | **2** | Rituparna Maity | **November"21** |
| | **Unit 5: Pisces**<br>General characteristics and classification of Chondrichthyes and Osteichthyes up to Subclasses Accessory respiratory organ, Advanced features of vertebrates over Protochordata,migration and parental care in fishes Swim bladder in fishes. Classification up to Sub- Classes | **10** | Rituparna Maity | **November"21-October'21** |
| | **Unit 6: Amphibia**<br>General characteristics and classification up to living Orders Metamorphosis with parental care | **5** | Dr. S Rehan Ahmed | **September"21-September"21** |
| | **Unit 7: Reptilia**<br>General characteristics and classification up to living Orders Poison apparatus and Biting mechanism in Snake | **7** | Dr. S Rehan Ahmed | **September"21-October"21** |

| | | | | |
|---|---|---|---|---|
| | **Unit 8: Aves**<br>General characteristics and classification up to Sub Classes, Exoskeleton and migration in Birds, Principles and aerodynamics of flight | **7** | Dr. S Rehan Ahmed | **October"21-November"21** |
| | **Unit 9: Mammals**<br>General characters and classification up to living orders, Phylogenetic significance of Prototheria Exoskeleton derivatives of mammals | **10** | Dr. S Rehan Ahmed | **September"21-November"21-** |

| | | | | |
|---|---|---|---|---|
| | Adaptive radiation in mammals with reference to locomotory appendages Echolocation in Microchiropteransand Cetaceans | | | |
| | **Unit 10: Zoogeography**<br>Zoogeographical realms, Plate tectonic and Continental drift theory, Distribution of birds and mammals in different realms | **2** | Dr. S Rehan Ahmed | **January'22 (1st week)** |
| | **CHORDATES LAB**<br>**PAPER CODE: ZOOACOR05P** | **60** | Santanu Das<br>Rituparna Maity | **Acc. To Revised Syllabus 90% completed by end of November** |
| | **PHYSIOLOGY**<br>**PAPER CODE: ZOOACOR06T** | **60** | | |
| | **Unit 1: Tissues**<br>Structure, locations, classification and functions of epithelial tissues, connective tissues, muscular tissues and nerve tissues | **10** | Dr. Indrajit Biswas | **September"21-July20** |
| | **Unit 2: Bone and Cartilage**<br>Structure and types of bones and cartilages,Ossification | **5** | Dr. Indrajit Biswas | **October"21-November"21** |
| | **Unit 3: Nervous System**<br>Structure of neuron, resting membrane potential, Origin of action potential and its propagation across the myelinated and unmyelinated nerve fibers; Types of synapse, Synaptic transmission and Neuromuscular junction,Reflex action and its types | **15** | Dr. Indrajit Biswas | **November"21-November'21** |
| | **Unit 4: Muscular system**<br>Histology of different types of muscle;<br>Ultra structure of skeletal muscle;<br>Molecular and chemical basis of muscle contraction,<br>Characteristics of muscle fiber | **10** | Santanu Das | **September"21-October"21** |

| | | | | |
|---|---|---|---|---|
| | **Unit 5: Reproductive System**<br>Histology of testis and ovary; Physiology of Reproduction | **5** | Santanu Das | **November"21-september'21** |
| | **Unit 6: Endocrine System**<br>Histology and function of pituitary,thyroid,Pancreas, and adrenal. Classification of hormones; Mechanism of Hormone action; Signal transduction pathways for Steroidal and Non-steroidal hormones; Hypothalamus (neuroendocrine gland) - principal nuclei involved in neuroendocrine control of anterior pituitary and endocrine system; Placental hormones | **15** | Dr. S Rehan Ahmed | **September'21-December'21(1st Week)** |
| | **PHYSIOLOGY LAB**<br>**PAPER CODE: ZOOACOR06T** | **60** | Dr. Anindya Sundar Bhunia<br>Dr. S Rehan Ahmed | **Acc. To Revised Syllabus 90% completed by end of December** |
| | **BIOCHEMISTRY**<br>**PAPER CODE: ZOOACOR07T** | **60** | | |
| | **Unit 1: Fundamentals of biochemical reactions and metabolism**<br>Ionization of water, weak acids and bases, buffering and pH changes in living systems, | **10** | Dr. S Rehan Ahmed | **September"21-October"21** |

| | | | | |
|---|---|---|---|---|
| | Metabolism: Catabolism and Anabolism, Compartmentalization of metabolic pathways Shuttle systems and membrane transporters;-ATP as "Energy Currency of cell"; coupled reactions; Use of reducing equivalents and cofactors; Intermediary metabolism and regulatory mechanisms | | | |
| | **Unit 2: Carbohydrates**<br>Structure and Biological importance: Monosaccharides, Disaccharides, Polysaccharides; Derivatives of Monosachharides, Carbohydrate metabolism: Glycolysis, Citric acid cycle, Pentose phosphate pathway, Gluconeogenesis | **10** | Dr. S Rehan Ahmed | **October"21-September'21** |

| | | | | |
|---|---|---|---|---|
| | **Unit 3: Lipids**<br>Structure and Significance: Physiologically important saturated and unsaturated fatty acids, Triacylglycerols, Phospholipids, Sphingolipid, Glycolipids, Steroids, Eicosanoids and terpinoids. Lipid metabolism: β-oxidation of fatty acids; Fatty acid biosynthesis | **4** | Dr. S Rehan Ahmed | **October'21-November'21** |
| | **Unit 4: Proteins**<br>Amino acids Structure, Classification, General and Electro chemical properties of α-amino acids; Physiological importance of essential and non essential amino acids<br>Proteins Bonds stabilizing protein structure; Levels of organization, Protein metabolism: Transamination, Deamination, Urea cycle, Fate of C-skeleton of Glucogenic and Ketogenic amino acids | **14** | Dr. Anindya Sundar Bhunia | **September"21-November"21** |
| | **Unit 5: Nucleic Acids**<br>Structure: Purines and pyrimidines, Nucleosides, Nucleotides, Nucleic acids Types of DNA and RNA, Complementarity of DNA, Hypo-Hyperchromaticity of DNA Outlines of nucleotide metabolism | **4** | Dr. Indrajit Biswas | **September"21-October"21** |
| | **Unit 6: Enzymes**<br>Nomenclature and classification; Cofactors; Specificity of enzyme action; Isozymes, Mechanism of enzyme action; Enzyme kinetics; Derivation of Michaelis-Menten equation, Lineweaver- Burk plot; Factors affecting rate of enzyme-catalyzed reactions; Enzyme inhibition; Allosteric enzymes and their kinetics; Strategy of enzyme action Catalytic and Regulatory (Basic concept with one example each) | **12** | Dr. Anindya Sundar Bhunia | **September'21-October'21** |
| | **Unit 7: Oxidative Phosphorylation**<br>Redox systems; Review of mitochondrial respiratory chain, Inhibitors and un-couplers of Electron Transport System | **6** | Dr. Anindya Sundar Bhunia | **November'21-December'21(1st week)** |

| | | | | |
|---|---|---|---|---|
| | **BIOCHEMISTRY LAB**<br>**PAPER CODE: ZOOACOR07T** | **60** | Dr. Anindya Sundar Bhunia<br>Dr. S Rehan Ahmed | **Acc. To Revised Syllabus 90% completed by end of December** |

| | | | | |
|---|---|---|---|---|
| | **SEC: SERICULTURE** | **15** | Dr. Indrajit Biswas | **4 weeks in December'21** |
| | **SEC LAB: SERICULTURE** | **15** | Dr. Indrajit Biswas | |
| **SEM-III GENERAL** | **INSECT VECTOR AND DISEASES PAPER CODE: ZOOGCOR03T** | **60** | | |
| | **Unit-1 Introduction to Insect**s General Features of Insects, Morphological features, Head – Eyes, Types of antennae Mouth parts with respect to feeding habit | **4** | Dr. Indrajit Biswas | **September"21-October'21** |
| | **Unit-2 Concept of Vectors** Brief introduction to Vectors (mechanical and biological), Reservoirs, Host-vector relationship, Adaptations as vectors, Host specificity | **6** | Dr. Anindya Sundar Bhunia | **September'21-October"21** |
| | **Unit-3 Insects as Vectors** Detailed features of insect orders as vectors – Diptera, Siphonoptera, Siphunculata, Hemiptera | **6** | Dr. S Rehan Ahmed | **September"21-October"21** |
| | **Unit-4 Dipteran as Disease Vector** Study of important Dipteran vectors – Mosquitoes, Sand fly, Houseflies vectors Study of mosquito borne diseases – Malaria, Dengue, Chikungunya, Viral encephalitis, Filariasis Control of mosquitoes | **16** | Rituparna Maity | **Sepetember'21-December'21(1st Week)** |
| | **Unit-5 Siphonaptera as Disease Vectors** Fleas as important insect vectors; Host-specificity, Study of Flea-borne diseases – Plague, Typhus fever; Control of fleas | **10** | Rituparna Maity | **September"21-November"21** |
| | **Unit-6 Siphunculata as Disease Vectors** Human louse (Head, Body and Pubic louse) as important insect vectors; Control of human louse | **8** | Santanu Das | **September"21-November"21** |
| | **Unit-7 Hempitera as Disease Vectors** Bugs as insect vectors; Blood-sucking bugs; Chagas disease, Bed bugs as mechanical vectors, Control and prevention measures | **10** | Santanu Das | **September'21-November'21** |
| | **INSECT VECTORE AND DISEASES PAPER CODE: ZOOGCOR03P** | **60** | Dr. Indrajit Biswas | **Acc. To Revised Syllabus 90% completed by end of December** |
| **SEM-V HONOURS** | **MOLECULAR BIOLOGY PAPER CODE: ZOOACOR11T** | **60** | | |

| | | | | |
|---|---|---|---|---|
| | **Unit 1: Nucleic Acids**<br>Salient features of DNA and RNA Watson and Crick Model of DNA | **2** | Dr. Anindya Sundar Bhunia | **September"21-September"21** |
| | **Unit 2: DNA Replication**<br>Mechanism of DNA Replication in Prokaryotes, Semi-conservative, bidirectional and discontinuous Replication, RNA priming, Replication of telomeres | **6** | Dr. Anindya Sundar Bhunia | **September"21-October"21** |
| | **Unit 3: Transcription**<br>Mechanism of Transcription in prokaryotes and eukaryotes, Transcription factors, Difference between prokaryotic and eukaryotic transcription. | **8** | Dr. Anindya Sundar Bhunia | **September"21-November"21** |

| | | | | |
|---|---|---|---|---|
| | **Unit 4: Translation**<br>Mechanism of protein synthesis in prokaryotes, Ribosome structure and assembly in prokaryotes, fidelity of protein synthesis, aminoacyl tRNA synthetases and charging of tRNA; Proteins involved in initiation, elongation and termination of polypeptide chain; Genetic code, Degeneracy of the genetic code and Wobble Hypothesis; Inhibitors of protein synthesis; Difference between prokaryotic and eukaryotic translation | **14** | Dr. Indrajit Biswas | **September"21-November"21** |
| | **Unit 5: Post Transcriptional Modifications and Processing of Eukaryotic RNA**<br>Capping and Poly A tail formation in mRNA; Split genes: concept of introns and exons, splicing mechanism, alternative splicing, exon shuffling, and RNA editing, Processing of tRNA | **10** | Dr. Indrajit Biswas<br>Dr. Anindya Sundar Bhunia | **September"21-November"21** |
| | **Unit 6: Gene Regulation**<br>Regulation of Transcription in prokaryotes: lac operon and trp operon; Regulation of Transcription in eukaryotes | **5** | Dr. Indrajit Biswas | **Septembar'21-Octobar'21** |
| | **Unit 7: DNA Repair Mechanisms**<br>Types of DNA repair mechanisms, RecBCD model in prokaryotes, nucleotide and base excision repair, SOS repair | **9** | Rituparna Maity | **September"21-November"21** |
| | **Unit 8: Molecular Lab Techniques**<br>PCR, Western and Southern blot, Northern Blot,Sanger DNA sequencing, cDNA technology | **5** | Rituparna Maity | **November"21-September'21** |

| | | | | |
|---|---|---|---|---|
| | **MOLECULAR BIOLOGY LAB<br>PAPER CODE: ZOOACOR11P** | **60** | Dr. Anindya Sundar Bhunia<br>Dr. Indrajit Biswas | **Acc. To Revised Syllabus 90% completed by end of December** |
| | **GENETICS<br>PAPER CODE: ZOOACOR12T** | **60** | | |
| | **Unit 1: Mendelian Genetics and its Extension**<br>Background of Mendel's experiments Principles of Mendelian inheritance,<br>Incomplete dominance and co-dominance, Epistasis, Multiple alleles, Lethal alleles, Pleiotropy, Sex-linked, sex- influenced and sex-limited inheritance, Polygenic Inheritance | **12** | Santanu Das | **September"21-October"21** |
| | **Unit 3: Mutations**<br>1.Types of gene mutations (Classification), Types of chromosomal aberrations (Classification with one suitable example of each), Chromosomal aberrations, gene mutations and human diseases (Down's, Klienfelter's, Turner's, Cri du Chat, Sickle cell, Haemophilia, Thallassimia, Albinism only genetical aspects here, details of physiological consequences not required), Sex chromosomes and sex-linked inheritance<br>Non-disjunction and variation in chromosome number; Molecular basis of mutations in relation to UV light and chemical mutagen | **12** | Santanu Das | **November"21-Sepetember'21** |

| | | | | |
|---|---|---|---|---|
| | **Unit 4: Sex Determination**<br>Mechanisms of sex determination in Drosophila with reference to alternative splicing Sex determination in mammals, Dosage compensation in Drosophila & Human | **12** | Dr. Indrajit Biswas | **October"20** |
| | **Unit 5: Extra-chromosomal Inheritance**<br>Criteria for extra chromosomal inheritance, Antibiotic resistance in Chlamyadomonas, Kappa particle in Paramoecium Shell spiralling in snail | **8** | Dr. S Rehan Ahmed | **September"21-October"21** |
| | **Unit 6: Recombination in Bacteria and Viruses** Conjugation, Transformation, Transduction, Complementation test in Bacteriophage | **8** | Dr. S Rehan Ahmed | **October"21-November"21** |
| | **Unit 7: Transposable Genetic Elements**<br>Transposons in bacteria,<br>Ac-Ds elements in maize and P elements in | **8** | Dr. S Rehan Ahmed | **September"21-November"21** |

| | | | | |
|---|---|---|---|---|
| | Drosophila, LINE, SINE, Alu elements in humans | | | |
| | **GENETICS LAB**<br>**PAPER CODE: ZOOACOR12P** | **60** | Dr. S Rehan Ahmed | **Acc. To Revised Syllabus 90% completed by end of December** |
| | **ENTOMOLOGY**<br>**PAPER CODE: ZOOADSEO2T** | **60** | | |
| | **Unit 1: Introduction**<br>General Features of Insects-Distribution and Success of Insects on the Earth | **2** | Dr. Indrajit Biswas | **September"21** |
| | **Unit 2: Insect Diversity and Classifications**<br>Classifications of Arthropods with special reference to Insects (Insects are to be classified up to order) with estimated species richness of the orders globally, in India and in West Bengal. Conspicuous/important families/Genera/species of each order have to be noted with their peculiar habits and habitats) | **4** | Dr. Indrajit Biswas | **September"21-October"21** |
| | **Unit 3: General Morphology of Insects (brief outlines)**<br>External Features; Head – Eyes, Types of antennae, Mouth parts w.r.t. feeding habits Thorax: Wings and wing types, Types of Legs adapted to diverse habitats, Peculiar Abdominal appendages and genitalia- only brief introduction. | **12** | Dr. Indrajit Biswas | **October"21-November"21** |
| | **Unit 4: Physiology of Insects**<br>Structure and physiology of Insect body systems - Integumentary, digestive, excretory, circulatory, respiratory, endocrine, reproductive, and nervous system (brief outlines only) Photoreceptors: Types, Structure and Function (brief introductions) Metamorphosis: Types and Neuroendocrine control of metamorphosis (introductory) | **16** | Dr. Indrajit Biswas | **September'21-October'21** |
| | **Unit 5: Insect Society**<br>Social insects: different types of social insects with brief outlines of their social systems Trophallaxis in social insects such as ants, termites and bees | **8** | Dr. Indrajit Biswas | **October'21-November'21** |
| | **Unit 6: Insect Plant Interaction**<br>Outline of the concept of co-evolution, role of allo chemicals in host plant mediation, Host-plant selection by phytophagous insects; Major insect pests in paddy (brief introductions) | **14** | Dr. Indrajit Biswas | **November'21** |

| | | | | |
|---|---|---|---|---|
| | **Unit 7: Insects as Vectors**<br>Insects as mechanical and biological vectors, Brief discussion on houseflies and mosquitoes as important vectors | **4** | Dr. Indrajit Biswas | **End In 1st Week of January'22** |
| | **BIOLOGY OF INSECTS LAB**<br>**PAPER CODE: ZOOADSE02P** | **60** | Dr. Indrajit Biswas | **Acc. To Revised Syllabus 90% completed by 1st Week of January'22** |
| | **ENDOCRINOLOGY**<br>**PAPER CODE: ZOOADSE03T** | **60** | | |
| | **Unit 1: Introduction to Endocrinology**<br>General idea of Endocrine systems, Classification, Characteristic and Transport of Hormones Neurosecretions and Neurohormones | **12** | Rituparna Maity | **September'21-november'21** |
| | **Unit 2: Epiphysis, Hypothalamo-hypophysial Axis** Structure of pineal gland, Secretions and their functions in biological rhythms and reproduction; Structure and functions of hypothalamus and Hypothalamic nuclei, Regulation of neuroendocrine glands, Feedback mechanisms; Structure of pituitary gland, Hormones and their functions, Hypothalamo-hypophysial portal system, Disorders of pituitary gland. | **18** | Santanu Das | **September'21-November'21** |
| | **Unit 3: Peripheral Endocrine Glands**<br>Structure, Hormones, Functions and Regulation of Thyroid gland, Parathyroid, Adrenal, Pancreas, Ovary and Testis; Hormones in homeostasis,Disorders of endocrine glands | **16** | Dr. Anindya Sundar Bhunia | **September'21-1stWeek of december'21** |
| | **Unit 4: Regulation of Hormone Action**<br>Mechanism of action of steroidal, non-steroidal hormones with receptors Bioassays of hormones using ELISA and RIA; Estrous cycle in rat and menstrual cycle in human Multifaceted role of Vasopressin & Oxytocin; Hormonal regulation of parturition | **14** | Dr. S Rehan Ahmed | **September'21-1stWeek of December'21** |
| | **ENDOCRINOLOGY LAB**<br>**PAPER CODE: ZOOADSE03P** | **60** | Dr. Indrajit Biswas<br>Dr. Anindya Sundar Bhunia | **Acc. To Revised Syllabus 90% completed by 1st week of January '22** |
| **SEM-V GENERAL** | **APPLIED ZOOLOGY**<br>**PAPER CODE: ZOOGDSE01T** | **60** | | |

| | | | | |
|---|---|---|---|---|
| | **Unit-1 Introduction to Host-parasite Relationship** Host, Definitive host, Intermediate host, Parasitism, Symbiosis, Commensalism, Reservoir, Zoonosis | **2** | Dr. Indrajit Biswas | **September"21-September"21** |
| | **Unit-2 Epidemiology of Diseases** Transmission, Prevention and control of diseases: Tuberculosis, Typhoid | **4** | Dr. Indrajit Biswas | **September"21-October"21** |
| | **Unit-3 Rickettsia and Spirochetes** Brief account of Rickettsia prowazekii, Borrelia recurrentis and Treponema pallidum | **6** | Dr. S Rehan Ahmed | **September"21-October"21** |
| | **Unit-4 Parasitic Protozoa** Life history and pathogenicity of Entamoeba histolytica, Plasmodium vivax and Trypanosoma gambiense | **8** | Dr. Anindya Sundar Bhunia | **September"21-November"21** |

| | | | | |
|---|---|---|---|---|
| | **Unit-5 Parasitic Helminthes** Life history and pathogenicity of Ancylostoma duodenale and Wuchereria bancrofti | **4** | Dr. Anindya Sundar Bhunia | **September'21-October'21** |
| | **Unit-6 Insects of Economic Importance** Biology, Control and damage caused by Helicoverpa armigera, Pyrilla perpusilla and Papilio demoleus, Callosobruchus chinensis, Sitophilus oryzae and Tribolium castaneum | **12** | Dr. S Rehan Ahmed | **November"21-November'21** |
| | **Unit-7 Insects of Medical Importance** Medical importance and control of Pediculus humanus corporis, Anopheles, Culex, Aedes, Xenopsylla cheopis | **8** | Dr. Indrajit Biswas | **October'21-November'21** |
| | **Unit-8 Animal Husbandry** Preservation of semen and artificial insemination in cattle | **6** | Rituparna Maity | **September"21-October"21** |
| | **Unit-9 Poultry Farming** Principles of poultry breeding, Management of breeding stock and broilers, Processing and preservation of eggs Unit | **6** | Rituparna Maity | **September November"21-** |
| | **Unit-10 Fish Technology** Genetic improvements in aquaculture industry; Induced breeding and transportation of fish seed | **4** | Rituparna Maity | **October'21-November'21** |
| | **APPLIED ZOOLOGY LAB PAPER CODE: ZOOGDSE01P** | **60** | Santanu Das | **Acc. To Revised Syllabus 90% completed by end of December** |

# ACADEMIC CALENDAR

## DEPARTMENT OF ZOOLOGY

**January/February 2022 - May/June 2022**

**2nd, 4th and 6th Semester**

| Semester/ Year | Syllabus Module/ Unit | No. of Lecture | Teacher Name | Distribution Tentative |
|---|---|---|---|---|
| **SEM-II HONOURS** | **Non-Chordates II Paper Code: ZOOACOR03T** | **30** | | |
| | Unit 1: Introduction to Coelomates Evolution of coelom and metamerism | **3** | Dr. Indrajit Biswas | 2nd week February |
| | Unit 2: Annelida General characteristics and Classification up to classes Excretion in Annelida | **4** | Dr. Indrajit Biswas | 3rd week February |
| | Unit 3: Arthropoda General characteristics and Classification up to classes,Metamorphosis in Insects Social life in bees and termites | **8** | Dr. Indrajit Biswas | 3rd Week of February-3rd week of May |
| | Unit 4: Onychophora General characteristics | **2** | | |
| | Unit 5: Mollusca General characteristics and Classification up to classes Respiration in Mollusca Torsion and detorsion in Gastropoda | **6** | Santanu Das | 1st week of February-3rd week of February |
| | Unit 6: Echinodermata General characteristics and Classification up to classes Water-vascular system in Asteroidea Larval forms in Echinodermata | **4** | Mr. Santanu Das | 4th week of February – 1st week of May |
| | Unit 7: Hemichordata General characteristics of phylum Hemichordata. Phylogenetic relationship with non-chordates and chordates (only recent concept) | **3** | Smt. Rituparna Maity | 2nd week of February- 4th week of February |
| | **Non-Chordates II Lab Paper Code: ZOOACOR03P** | **30** | Dr. Indrajit Biswas Smt. Rituparna Maity | Acc. To Revised Syllabus 90% completed by end of May |
| | **CELL BIOLOGY PAPER CODE: ZOOACOR04T** | **30** | | |
| | Unit 1: Overview of Cells Prokaryotic and Eukaryotic cells, Virus, Viroids | **2** | Dr. S Rehan Ahmad | 2nd week of February |

| | | | | |
|---|---|---|---|---|
| | Unit 2: Plasma Membrane Various models of plasma membrane structure Transport across membranes: Active and Passive transport, facilitated transport, Cell junctions: Tight junctions, Desmosomes, Gap junctions | **5** | Dr. S Rehan Ahmad | 2nd week of February-1st week of May |
| | Unit 3: Endomembrane System Structure and Functions: Endoplasmic Reticulum, Golgi Apparatus, Lysosomes | **4** | Dr. S Rehan Ahmad | 2nd week May-end of May |
| | Unit 4: Mitochondria and Peroxisomes Mitochondria: Structure, Semi-autonomous nature, Mitochondrial Respiratory Chain, Peroxisomes | **4** | Mr.Santanu Das | 2nd week of May 3rd week of May |

| | | | | |
|---|---|---|---|---|
| | Unit 5: Cytoskeleton Structure and Functions: Microtubules, Microfilaments and Intermediate filaments | **2** | Mr. Santanu Das | 1st week of May |
| | Unit 6: Nucleus Structure of Nucleus: Nuclear envelope, Nucleolus Chromatin: Euchromatin and Heterochromatin and packaging (nucleosome) | **4** | Dr. Anindya Sundar Bhunia | 2nd week of February -end of February |
| | Unit 7: Cell Division<br>Mitosis and Meiosis<br>Cell cycle and its regulation<br>Mechanisms of cell death: brief overview | **5** | Dr. Anindya Sundar Bhunia | 1st week of May End of May |
| | Unit 8: Cell Signaling Cell signalling transduction pathways; Types of signaling molecules and receptors GPCR and Role of second messenger (cAMP) | **4** | Dr. Anindya Sundar Bhunia | 1st week of May End of May |
| | **CELL BIOLOGY LAB<br>PAPER CODE: ZOOACOR04P** | **30** | Dr. Anindya Sundar Bhunia<br>Dr. S Rehan Ahmad | Acc. To Revised Syllabus 90% completed by end of May |
| **SEM-II GENERAL** | **PHYSIOLOGY AND BIOCHEMISTRY<br>PAPER CODE: ZOOGCOR02T** | **30** | | |
| | Unit-1 Nerve and muscle<br>1.Structure of a neuron, Resting membrane potential, Graded potential, Origin of Action potential and its propagation in myelinated and non-myelinated nerve fibres.<br>2.Ultra-structure of skeletal muscle, Molecular and chemical basis of muscle contraction. | **4** | Dr. Indrajit Biswas | 2nd week of February-End of February |

| | | | | |
|---|---|---|---|---|
| | Unit-2 Digestion<br>Absorption of carbohydrates, proteins, lipids | **2** | Dr. Indrajit Biswas | 1st week of May |
| | Unit-3 Respiration<br>Pulmonary ventilation, Respiratory volumes and capacities, Transport of Oxygen and carbon dioxide in blood | **3** | Dr. Anindya Sundar Bhunia | 1st week of February- End of February |
| | Unit-4 Excretion<br>Structure of nephron, Mechanism of Urine formation, Counter-current Mechanism | **3** | Dr. Anindya Sundar Bhunia | 1st week of May End of May |
| | Unit-5 Cardiovascular system<br>Composition of blood, Homeostasis, Structure of Heart, Origin and conduction of the cardiac impulse, Cardiac cycle | **3** | Smt. Rituparna Maity | 1st week of February- End of February |
| | Unit-6 Reproduction and Endocrine Glands<br>Physiology of male reproduction: hormonal control of spermatogenesis; Physiology of female reproduction: hormonal control of menstrual cycle. Structure and function of thyroid, pancreas | **4** | Smt. Rituparna Maity | 1ST week of May 1st week of May |
| | Unit 7 Carbohydrate: Structure and Metabolism<br>Introduction to Carbohydrates, Structure & Types of Carbohydrates, Introduction to Intermediary metabolism: Glycolysis, Krebs cycle, Electron transport chain | **4** | Dr. S Rehan Ahmad | 1st week of February- End of February |
| | Unit-8 Lipid: Structure and Metabolism<br>Introduction to Lipids: Definitions; classes of lipids; β oxidation of palmitic acid | **2** | Dr. S Rehan Ahmad | 1st week of May |
| | Unit-9 Protein: Structure and metabolism | **2** | Mr. Santanu Das | 1st week of February |

| | | | | |
|---|---|---|---|---|
| | Proteins and their biological functions, functions of amino acids; primary structure of protein, secondary, tertiary and quaternary structures. Transamination, Deamination. | | | |
| | Unit-10 Enzymes 4<br>Introduction, Classification of Enzymes, Mechanism of action,Enzyme Kinetics, Inhibition and Regulation | **2** | Mr. Santanu Das | 3rd week of February |
| | **PHYSIOLOGY AND BIOCHEMISTRY LAB PAPER CODE: ZOOGCOR02P** | **30** | Smt. Rituparna Maity<br>Dr. Anindya Sundar | Acc. To Revised Syllabus 90% completed by end of May |

| | | | | |
|---|---|---|---|---|
| | | | Bhunia | |
| **SEM-IV HONOURS** | **COMPARATIVE ANATOMY PAPER CODE: ZOOACOR08T** | **30** | | |
| | Unit 1: Integumentary System- Structure, function and derivatives of integument in mammals | **5** | Santanu Das | 2nd week of February-End of February |
| | Unit 2: Skeletal System, Jaw Suspension | **2** | Santanu Das | 1st week of May |
| | Unit 3: Digestive System- Comparative anatomy of stomach; dentition in mammals | **4** | Smt. Rituparna Maity | 2nd week of February-3rd week of February |
| | Unit 4: Respiratory System- Respiratory organs in birds | **4** | Smt. Rituparna Maity | 4th week of February- 2nd week of May |
| | Unit 5: Circulatory System- Comparative account of heart and aortic arches | **4** | Dr. S Rehan Ahmad | 2nd week of February-3rd week of February |
| | Unit 6: Urinogenital System- Succession of kidney | **3** | Dr. S Rehan Ahmad | 3rd week of February-1st week of May |
| | Unit 7: Nervous System Comparative account of brain, Cranial nerves in mammals | **4** | Dr. Indrajit Biswas | 2nd week of February-End of February |
| | Unit 8: Sense Organs Classification of receptors | **4** | Dr. Indrajit Biswas | 1st week of May 2nd week of May |
| | **COMPARATIVE ANATOMY LAB PAPER CODE: ZOOACOR08P** | **30** | Mr. Santanu Das Dr. Indrajit Biswas | Acc. To Revised Syllabus 90% completed by end of May |
| | **PHYSIOLOGY: LIFE SUSTANING SYSTEM PAPER CODE: ZOOACOR09T** | **30** | | |
| | Unit 1: Physiology of Digestion-Mechanical and chemical digestion of food, absorption of Carbohydrates, Lipids, Proteins, Digestive enzyme | **4** | Dr. S Rehan Ahmad | 2nd week of May 3rd week of May |
| | Unit 2: Physiology of Respiration- Mechanism of Respiration, Respiratory volumes and capacities, transport of Oxygen and Carbon dioxide in blood, Dissociation curves and the factors influencing it, | **6** | Dr. S Rehan Ahmad | 3rd week of May 1st week of May |

| | | | | |
|---|---|---|---|---|
| | Unit 3: Physiology of Circulation- Components of Blood and their functions; Structure and functions of haemoglobin; Blood clotting system, Blood groups; ABO and Rh factor | **4** | Dr. Anindya Sundar Bhunia | 2nd week of February-3rd week of February |
| | Unit 4: Physiology of Heart- Structure of mammalian heart, Origin and conduction of cardiac impulses; | **6** | Dr. Anindya Sundar Bhunia | 4th week of February-2nd week of May |

| | | | | |
|---|---|---|---|---|
| | Cardiac Cycle and cardiac output; Blood pressure and its regulation | | | |
| | Unit 5: Thermoregulation & Osmoregulation Physiological classification based on thermal biology. Thermal biology of endotherms; Osmoregulation in aquatic vertebrates; | **4** | Smt. Rituparna Maity | 3rd week of May 1st week of May |
| | Unit 6: Renal Physiology Structure of Kidney and its functional unit, Mechanism of urine formation, Regulation of acid-base balance | **6** | Smt. Rituparna Maity | 1st week of May 4th week of May |
| | **PHYSIOLOGY: LIFE SUSTAINING SYSTEM LAB PAPER CODE: ZOOACOR09T** | **30** | Dr. Anindya Sundar Bhunia Smt. Rituparna Maity | Acc. To Revised Syllabus 90% completed by end of May |
| | **IMMUNOLOGY PAPER CODE: ZOOACOR10T** | **30** | | |
| | Unit 1: Overview of Immune System-Organs (Primary & Secondary lymphoid organs and its importance) and Cells of the Immune system | **1** | Dr. Indrajit Biswas | 3rd week of May |
| | Unit 2: Innate and Adaptive Immunity Principle of Innate and Adaptive Immunity. • Components of innate immunity– Cellular mechanisms (phagocytes, NK cells, mast cells, eosinophils, inflammation [concept]) – Humoral mechanisms (complement, cytokines, chemokines etc. [concept]) • Components of adaptive immunity – Cellular mechanisms (Cell-Mediated Immune System (CMIS) or T- Cell Immunity [concept]) – Humoral | **5** | Dr. Indrajit Biswas | 3rd week of May 2nd week of May |

| | | | | |
|---|---|---|---|---|
| | mechanisms (Formation of Plasma B cells and Memory B cells [concept] | | | |
| | Unit 3: Antigen, Antigen presentation & MHC Concept of Antigen, Immunogen, Allergen & Pathogen. Adjuvants and haptens, Factors influencing immunogenicity, Epitope. Types of Antigen Presenting Cells (APC), Co-stimulatory molecules on APC. | **4** | Dr. Anindya Sundar Bhunia | 3rd week of May End of May |
| | Unit 3: T Cell development Structure of T cell receptors, Co-stimulatory molecules on T cells, Central differentiation of T cells; T cell selection in thymus Peripheral differentiation of T cells; Th1 & Th2 | **4** | Dr. Anindya Sundar Bhunia | 1st week of May 3rd week of May |
| | Unit 4: Immunoglobulins Structure and functions of different classes of immunoglobulins, Antigen antibody interactions, Immunoassays (ELISA and | **4** | Mr.Santanu Das | 2nd week of May 4th week of May |

| | | | | |
|---|---|---|---|---|
| | RIA), Hybridoma technology, Monoclonal antibody production | | | |
| | Unit 6: Cytokines & Chemokines Brief concept on types of Cytokines & Chemokines Cytokines (source & function of IL-1, IL-2, IL-4, IL-5, IL-6, IL 8, IL-10, IL-12, Interferons, Tumor Necrosis Factors, Tumor Growth Factors, GMCSF, M-CSF). | **4** | Mr. Santanu Das | End of May-2nd week ofMay |
| | Unit 7: Complement System Components and pathways of complement activation | **2** | Smt. Rituparna Maity | End of May |
| | Unit 8: Hypersensitivity Gell and Coombs' classification and brief description of various types of hypersensitivities. | **2** | Smt. Rituparna Maity | End of May |
| | Unit 9: Immunology of diseases Malaria, Dengue | **2** | Dr. S Rehan Ahmad | 2nd week of May |
| | Unit 10: Vaccines Various types of vaccines. Active & passive immunization (Artificial and natural). | **2** | Dr. S Rehan Ahmad | End of May |

| | | | | |
|---|---|---|---|---|
| | **IMMUNOLOGY LAB<br>PAPER CODE: ZOOACOR10T** | **30** | Dr. Anindya Sundar Bhunia<br>Dr. Indrajit Biswas | Acc. To Revised Syllabus 90% completed by end of May |
| **SEM-IV GENERAL** | **ENVIRONMENT AND PUBLIC HEALTH PAPER CODE: ZOOGCOR04T** | **30** | | |
| | Unit 1: Introduction<br>Sources of Environmental hazards, Hazard identification and accounting, Fate of toxic and persistent substances in the environment, Dose response evaluation, Exposure assessment | **8** | Dr. Indrajit Biswas | 2nd week of February-End of May |
| | Unit 2: Climate Change<br>Greenhouse gases and global warming, Acid rain, Ozone layer destruction, Effect of climate change on public health | **6** | Dr. Anindya Sundar Bhunia | 2nd week February-end of May |
| | Unit 3: Pollution<br>Air, water pollution: sources and effects, Pollution control | **8** | Smt. Rituparna Maity | 2nd week of February-End of May |
| | Unit 4: Waste Management Technologies<br>Sources of waste, types and characteristics, Sewage disposal and its management, Solid waste<br>disposal, Biomedical waste handling and disposal. | **4** | Dr. S Rehan Ahmad | 2nd week of February-End of May |
| | Unit 5: Diseases<br>Causes, symptoms and control of tuberculosis, Asthma, Cholera. | **2** | Mr Santanu Das | 2nd week of February-4th week of February |
| | **ENVIRONMENT AND PUBLIC HEALTH PAPER CODE: ZOOGCOR04P** | **30** | Dr. Indrajit Biswas<br>Dr. S Rehan Ahmad | Acc. To Revised Syllabus 90% completed by end of May |
| **SEM-VI HONOURS** | **DEVELOPMENTAL BIOLOGY<br>PAPER CODE: ZOOACOR13T** | **30** | | |
| | Unit 1: Introduction Basic concepts: Phases of Development, Cell-cell interaction, Differentiation and growth | **4** | Smt. Rituparna Maity | 2nd week of February-3rd week of February |

| | | | | |
|---|---|---|---|---|
| | Unit 2: Early Embryonic Development Gametogenesis, Spermatogenesis, Oogenesis; Fertilization (External and Internal): Changes in gametes, Blocks to polyspermy; Planes and patterns of cleavage; Types of Blastula; Fate maps (including Techniques); Early development of chick up to gastrulation; Embryonic induction and organizers | **8** | Mr. Santanu Das | 2nd week of February-End of February |
| | Unit 3: Late Embryonic Development Fate of Germ Layers; Implantation of embryo in humans, Placenta (Structure, types and functions of placenta) | **6** | Dr. S Rehan Ahmad | 2nd week of February-4th week of February |
| | Unit 4: Post Embryonic Development Development of brain and Eye in Vertebrate | **6** | Dr. S Rehan Ahmad | 4th week of February-2nd week of May |
| | Unit 5: Implications of Developmental Biology Teratogenesis: Teratogenic agents and their effects on embryonic development; In vitro fertilization, Stem cell (ESC), Amniocentesis | **6** | Smt. Rituparna Maity | 4th week of February-1st week of May |
| | **DEVELOPMENTAL BIOLOGY LAB PAPER CODE: ZOOACOR13P** | **30** | Dr. S Rehan Ahmad Mr.Santanu Das | Acc. To Revised Syllabus 90% completed by end of May |
| | **EVOLUTIONARY BIOLOGY PAPER CODE: ZOOACOR14T** | **30** | | |
| | Unit 1: Origin of earliest life- Chemogeny, RNA world, Biogeny, Origin of photosynthesis, Evolution of eukaryotes, three domains of life | **2** | Dr. Indrajit Biswas | 2nd week of February |
| | Unit 2: Historical review of evolutionary concept-Pre Darwinian Concepts and theories including Lamarckism, Darwininan Theory Neo-Darwinian Synthesis | **4** | Dr. Indrajit Biswas | 2nd week of February-End of February |
| | Unit 3: Evidences in favour of Evolution-Fossil records: types of fossils, geological time scale, transitional forms: | **2** | Dr. S Rehan Ahmad | 3rd week of May |

| | | | | |
|---|---|---|---|---|
| | Unit 5: Population genetics- Concept of Populations and calculation of allele frequencies in a population Hardy-Weinberg Law and equilibrium (derivations, applications of law to find gene and genotype frequencies in human Populations) Evolutionary forces disrupting H-W equilibriumNatural selection: Definition as the non-differential rate of reproductions and survivals of competing alleles, concept of fitness, selection coefficient, Types of natural selection with examples- Disrupting, Stabilizing, Directional. Genetic Drift- outline of its mechanism, basic concepts and examples of founder's effect, bottleneck phenomenon; | **8** | Mr.Santanu Das | 1st week of May End of May |
| | Unit 6: Products of evolution Inter-population variations: clines, races, Species concepts and modes of speciation (just outlines of Allopatric, Sympatric isolating mechanisms Adaptive radiations) | **5** | Smt. Rituparna Maity | 2nd week May-4th week 0f May |

| | | | | |
|---|---|---|---|---|
| | Unit 8: Origin and evolution of man-Unique hominin characteristics contrasted with primate characteristics (including social and cultural ones), Molecular evidences of human origin and migrations (brief outline) | **6** | Dr. Anindya Sundar Bhunia | 2nd week of February-4th week of February |
| | Unit 9: Molecular Phylogeny-Neutral theory of molecular evolution, molecular clock (brief introductions) Example of evolution in vertebrate globin genes | **4** | Dr. Anindya Sundar Bhunia | End of February 1st week of May |
| | **EVOLUTIONARY BIOLOGY LAB PAPER CODE: ZOOACOR14P** | **30** | Dr. Indrajit Biswas Santanu Das | |
| | **FISH AND FISHERY PAPER CODE: ZOOADSEO4T** | **30** | | |
| | Unit 1: Introduction and Classification-Feeding habit, habitat and manner of reproduction Classification of fish (up to Subclasses) with important examples | **2** | Dr. Indrajit Biswas | 1st week of May |
| | Unit 2: Morphology and Physiology Types of fins,Types of Scales, Use of scales in Classification and determination of age of fish; Gills and gas exchange; Swim Bladder: Types and role in | **8** | Dr. S Rehan Ahmad | 4th week of May 2nd week of May |

| | | | | |
|---|---|---|---|---|
| | Respiration, buoyancy, Bioluminescence | | | |
| | Unit 3: Fisheries Inland Fisheries; Marine Fisheries; Environmental factors influencing the seasonal variations in fish catches in the Arabian Sea and the Bay of Bengal; Fishing crafts and Gears; Depletion of fishery resources; Application of remote sensing and GIS in fisheries; | **8** | Mr.Santanu Das | 1st week of May 3rd week of May |
| | Unit 4: Aquaculture Sustainable Aquaculture; Extensive, semi-intensive and intensive culture of fish; Pen and cage culture; Polyculture; Composite fish culture; Brood stock management; Induced breeding of fish, Fish diseases | **10** | Smt. Rituparna Maity | End of May-3rd week of May |
| | Unit 5: Fish in research Transgenic fish | **2** | Dr. Anindya Sundar Bhunia | 2nd week of May |
| | **FISH AND FISHERYLAB<br>PAPER CODE: ZOOADSE04P** | **30** | Dr. S Rehan Ahmad Smt. Rituparna Maity | Acc. To Revised Syllabus 90% completed by end of May |
| | **PARASITOLOGY<br>PAPER CODE: ZOOADSE05T** | **30** | | |
| | Unit 1: Introduction to Parasitology Brief introduction of Parasitism and other animal associations, Parasite, Parasitoid and Vectors (mechanical and biological vector) Host parasite relationship and zoonosis | **2** | Smt. Rituparna Maity | 4th week of May |
| | Unit 2: Parasitic Protists Study of Morphology, Life Cycle, Prevalence, Epidemiology, Pathogenicity, Diagnosis, Prophylaxis and Treatment of *Entamoeba histolytica, Giardia intestinalis, Leishmania donovani, Plasmodium vivax* | **10** | Dr. Indrajit Biswas | 2nd week of May End of May |

| | | | | |
|---|---|---|---|---|
| | Unit 3: Parasitic Platyhelminthes Study of Morphology, Life Cycle, Prevalence, Epidemiology, Pathogenicity, Diagnosis, Prophylaxis and Treatment of *Fasciola hepatica, Schistosoma haematobium, Taenia solium* | **8** | Mr. Santanu Das | 3rd week of May end of May |

| | | | | |
|---|---|---|---|---|
| | Unit 4: Parasitic Arthropoda Mosquitoes, as vectors of human pathogen Biology,importance and control of myiasis causing diptera Biology, importance and control of ticks, mites, *Pediculus humanus* (head and body louse), | **8** | Dr. Anindya Sundar Bhunia | 3rd week of May end of May |
| | **PARASITOLOGY LAB**<br>**PAPER CODE: ZOOADSE05P** | **30** | Dr. S Rehan Ahmad<br>Smt. Rituparna Maity | Acc. To Revised Syllabus 90% completed by end of May |
| **SEM-VI GENERAL** | **IMMUNOLOGY**<br>**PAPER CODE: ZOOGDSE04T** | **30** | | |
| | Unit-1 Overview of the Immune System<br>Introduction to basic concepts in immunology, components of immune system, principles of innate and adaptive immune system | **4** | Dr. S Rehan Ahmad | 2nd week of February-End of February |
| | Unit-2 Cells and Organs of the Immune System<br>Cells of immune system and organs (primary and secondary lymphoid organs) of the immune system | **4** | Dr. Anindya Sundar Bhunia | 2nd week of February-End of February |
| | Unit-3 Antigens<br>Basic properties of antigens, B and T cell epitopes, haptens and adjuvants | **6** | Dr. S Rehan Ahmad | End of February end of May |
| | Unit-4 Antibodies<br>Structure, classes and function of antibodies, antigen antibody interactions as tools for research and diagnosis | **4** | Smt. Rituparna Maity | 2nd week of February-End of February |
| | Unit-5 Working of the immune system<br>Structure and functions of MHC, exogenous and endogenous pathways of antigen presentation and processing, Basic properties and functions of cytokines, | **4** | Santanu Das | 2nd week of February-End of February |
| | Unit-6 Immune system in health and disease<br>Gell and Coombs' classification and brief description of various types of hypersensitivities, Introduction to concepts of autoimmunity and immunodeficiency | **6** | Dr. Indrajit Biswas | 2nd week of February-2nd week of May |
| | Ùnit-7 Vaccines<br>General introduction to vaccines, Types of vaccines | **2** | Dr. Indrajit Biswas | 3rd week of May |
| | **IMMUNOLOGY LAB**<br>**PAPER CODE: ZOOGDSE04P** | **30** | Dr. Anindya Sundar Bhunia<br>Mr. Santanu Das | Acc. To Revised Syllabus 90% completed by end of May |

# ACADEMIC CALENDAR

## DEPARTMENT OF ZOOLOGY

### July 2022- January2023

### 1st, 3rd and 5th Semester

| Semester | (Hons/General) | Syllabus | | No. of Lecture (Hours) | Teacher Name | Distribution |
|---|---|---|---|---|---|---|
| | | Module/ Unit | Topic | | | |
| SEM-I | HONOURS | Non-Chordates I Paper Code: ZOOACOR01T | | 30 | | |
| | | Unit 1 | **Protista, Parazoa and Metazoa** General characteristics and Classification up to classes, Study of *Paramoecium* Life cycle and pathogenicity of *Entamoeba histolytica* and *Plasmodium vivax* | 6 | Dr. Indrajit Biswas | Sepetember'22-November'22 |
| | | Unit 2 | **Porifera** General characteristics and Classification up to classes Canal system and spicules in sponges | 5 | Dr. Indrajit Biswas | November'22-1st week of January'23 |
| | | Unit 3 | **Cnidaria** General characteristics and Classification up to classes Polymorphism in CnidariaCorals and coral reefs: types, formation, distribution, conservation significance | 6 | Santanu Das | September'22-November'22 |
| | | Unit 4 | **Ctenophora** General characteristics | 2 | Santanu Das | November'22-November'22 |
| | | Unit 5 | **Platyhelminthes** General characteristics and Classification up to classes, Life cycle and pathogenicity of *Fasciola hepatica* and *Taenia solium* | 6 | Dr. Anindya Sundar Bhunia | September'22-November'22 |
| | | Unit 6 | **Nemathelminthes** General characteristics and Classification up to classes, Life cycle, and pathogenicity of *Ascaris lumbricoides,* Parasitic adaptations in helminths | 5 | Dr. Anindya Sundar Bhunia | November'22-1st week of January'23 |
| | | Non-Chordates I Lab Paper Code: ZOOACOR01P | | 30 | Dr. Indrajit Biswas Santanu Das | September'22-1st week of January'23 |
| | | ECOLOGY PAPER CODE: ZOOACOR02T | | 30 | | |
| | | | **Unit 1: Introduction to Ecology** History of ecology, Autecology and synecology, Levels of organization, Laws of limiting factors, Study of Physical factors, The Biosphere. | 6 | Rituparna Maity | September'22-November'22 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | **Unit 2: Population**<br>life tables, survivorship curves, exponential and logistic growth, r and K strategies Population regulation - density- dependent and independent factors | **10** | Rituparna Maity | **November'22-1st week of January'23** |
| | | | **Unit 3: Community**<br>Community characteristics: species diversity, abundance, dominance, richness, Ecotone, Ecological succession and example of it. | **5** | Dr. S Rehan Ahmed | **September'22-1st week of January'23** |
| | | | **Unit 4: Ecosystyem**<br>Food chain: Detritus and grazing food chains,Food web, Energy flow through the ecosystem, Ecological pyramids and Ecological efficiencies | **6** | Dr. S Rehan Ahmed | **November'22-1st week of January'23** |
| | | | **Unit 5: Applied Ecology**<br>Wildlife Conservation (in-situ and ex-situ conservation). Wild life protection act (1972) | **3** | Santanu Das | **November'22-1st week of January'23** |
| | | **ECOLOGY LAB PAPER CODE: ZOOACOR02P** | | **30** | Rituparna Maity | **September'22-1st week of January'23** |
| | **GENERAL** | **ANIMAL DIVERSITY PAPER CODE: ZOOGCOR01T** | | **30** | | |
| **SEM-I** | | **Unit-1** | **Kingdom Protista**<br>General characters and classification of Subkingdom Protozoa up to Phylum (Levine et al., 1980) | **2** | Dr. Indrajit Biswas | **September'22-September'22** |
| | | **Unit-2** | **Phylum Porifera**<br>General character and classification up to classes; Canal System in Sycon | **2** | Dr. Indrajit Biswas | **September'22-November'22** |
| | | **Unit-3** | **Phylum Cnidaria**<br>General characters and classification up to classes | **1** | Dr. Indrajit Biswas | **November'22 1st week of January'23** |
| | | **Unit-4** | **Phylum Platyhelminthes**<br>General characters and classification up to classes; Life history of Taenia solium | **3** | Dr. Indrajit Biswas | **November'22-1st week of January'23** |
| | | **Unit-5** | **Phylum Nematoda**<br>General characters and classification up to classes; Life history of Ascaris lumbricoides | **3** | Dr. Anindya Sundar Bhunia | **September'22-September'22** |
| | | **Unit-6** | **Phylum Annelida**<br>General characters and classification up to classes | **1** | Dr. Anindya Sundar Bhunia | **September'22-September'22** |
| | | | **Phylum Annelida**<br>General characters and classification up to classes; | **1** | Dr. Anindya Sundar Bhunia | **November'22-1st week of January'23** |
| | | **Unit 7** | **Phylum Arthropoda**<br>General characters and classification up to classes Metamorphosis in Insects | **2** | Dr. Anindya Sundar Bhunia | **November'22-1st week of January'23** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | **Unit-8** | **Phylum Mollusca**<br>General characters and classification up to classes; Respiration in Pila | **2** | Dr. Anindya Sundar Bhunia | **November'22-1st week of January'23** |
| | | **Unit-9** | **Phylum Echinodermata**<br>General characters and classification up to classes; Water-vascular system in Asterias | **2** | Rituparna Maity | **November'22-1st week of January'22(1st Week)** |
| | | **Unit-10** | **Protochordates**<br>General features | **1** | Rituparna Maity | **September'22-September'22** |
| | | **Unit-11** | **Agnatha**<br>General features and classification up to classes (Young, 1981) | **1** | Rituparna Maity | **September'22-November'22** |
| | | **Unit-12** | **Pisces**<br>General features and Classification up to Subclasses (Romer, 1959); Osmoregulation in Fishes | **2** | Rituparna Maity | **November'22-Febraary'22** |
| | | **Unit-13** | **Amphibia**<br>General features and Classification up to living orders (Duellman & Trueb, 1986); Metamorphosis in Toad | **2** | Santanu Das | **September'22-November'22** |
| | | **Unit-14** | **Reptiles**<br>General features and Classification up to living Subclass (Young, 1981); Poisonous and non- poisonous snakes | **2** | Santanu Das | **November'22-1st week of January'23** |
| | | **Unit-15** | **Aves**<br>General features and Classification up to orders (Young, 1981); Flight adaptations in birds | **2** | Dr. S Rehan Ahmed | **September'22-November'22** |
| | | **Unit-16** | **Mammals**<br>Classification up to Subclasses (Young, 1981) | **1** | Dr. S Rehan Ahmed | **November'22-** |
| | | **ANIMAL DIVERSITY PAPER CODE: ZOOGCOR01P** | | **30** | Rituparna Maity<br>Dr. Anindya Sundar Bhunia | **September'22-1st week of January'23** |
| **SEM-III** | **HONOURS** | **CHORDATES PAPER CODE: ZOOACOR05T** | | **60** | | |
| | | **Unit 1** | **Introduction to Chordates**<br>General characteristics and outline classification of Phylum Chordata | **4** | Rituparna Maity | **September"22-September"22** |
| | | **Unit 2** | **Protochordata**<br>General characteristics and classification of sub-phylum Urochordata and Cephalochordata up to Classes. Metamorphosis in Ascidia Chordate Features and Feeding in Branchiostoma | **8** | Rituparna Maity | **September"22-October"22** |
| | | **Unit 3** | **Origin of Chordata**<br>Dipleurula concept and the Echinoderm theory of origin of chordates Advanced features of vertebrates over Protochordata | **5** | Rituparna Maity | **October"22-October"22** |
| | | **Unit 4** | **Agnatha**<br>General characteristics and | **2** | Rituparna Maity | **November"22** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | classification of cyclostomes up to order | | | |
| | | **Unit 5** | **Pisces**<br>General characteristics and classification of Chondrichthyes and Osteichthyes up to Subclasses Accessory respiratory organ, Advanced features of vertebrates over Protochordata,migration and parental care in fishes Swim bladder in fishes. Classification up to Sub-Classes | **10** | Rituparna Maity | **November"22-October'22** |
| | | **Unit 6** | **Amphibia**<br>General characteristics and classification up to living Orders Metamorphosis with parental care | **5** | Dr. S Rehan Ahmed | **September"22-September"22** |
| | | **Unit 7** | **Reptilia**<br>General characteristics and classification up to living Orders Poison apparatus and Biting mechanism in Snake | **7** | Dr. S Rehan Ahmed | **September"22-October"22** |
| | | **Unit 8** | **Aves**<br>General characteristics and classification up to Sub-Classes, Exoskeleton and migration in Birds, Principles and aerodynamics of flight | **7** | Dr. S Rehan Ahmed | **October"22-November"22** |
| | | **Unit 9** | **Mammals**<br>General characters and classification up to living orders, Phylogenetic significance of Prototheria Exoskeleton derivatives of mammals Adaptive radiation in mammals with reference to locomotory appendages Echolocation in Microchiropteransand Cetaceans | **10** | Dr. S Rehan Ahmed | **September"22-November"22-** |
| | | **Unit 10** | **Zoogeography**<br>Zoogeographical realms,-Plate tectonic and Continental drift theory, Distribution of birds and mammals in different realms | **2** | Dr. S Rehan Ahmed | **January'23 (1st week)** |
| | | **CHORDATES LAB PAPER CODE: ZOOACOR05P** | | **60** | Santanu Das Rituparna Maity | **Acc. To Revised Syllabus 90% completed by end of November** |
| | | **PHYSIOLOGY PAPER CODE: ZOOACOR06T** | | **60** | | |
| | | **Unit 1** | **Tissues**<br>Structure, locations, classification and functions of epithelial tissues, connective tissues, muscular tissues and nerve tissues | **10** | Dr. Indrajit Biswas | **September"22-July20** |
| | | **Unit 2** | **Bone and Cartilage**<br>Structure and types of bones and cartilages,Ossification | **5** | Dr. Indrajit Biswas | **October"22-November"22** |
| | | **Unit 3** | **Nervous System** | **15** | Dr. Indrajit Biswas | **November"22-November'22** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | Structure of neuron, resting membrane potential, Origin of action potential and its propagation across the myelinated and unmyelinated nerve fibers; Types of synapse, Synaptic transmission and Neuromuscular junction,Reflex action and its types | | | |
| | | **Unit 4** | **Muscular system**<br>Histology of different types of muscle; Ultra structure of skeletal muscle; Molecular and chemical basis of muscle contraction, Characteristics of muscle fiber | **10** | Santanu Das | **September"22-October"22** |
| | | **Unit 5** | **Reproductive System**<br>Histology of testis and ovary; Physiology of Reproduction | **5** | Santanu Das | **November"22-september'22** |
| | | **Unit 6** | **Endocrine System**<br>Histology and function of pituitary,thyroid,Pancreas, and adrenal. Classification of hormones; Mechanism of Hormone action; Signal transduction pathways for Steroidal and Non-steroidal hormones; Hypothalamus (neuroendocrine gland) - principal nuclei involved in neuroendocrine control of anterior pituitary and endocrine system; Placental hormones | **15** | Dr. S Rehan Ahmed | **September'22-December'22(1st Week)** |
| | | **PHYSIOLOGY LAB PAPER CODE: ZOOACOR06T** | | **60** | Dr. Anindya Sundar Bhunia<br>Dr. S Rehan Ahmed | **Acc. To Revised Syllabus 90% completed by end of December** |
| | | **BIOCHEMISTRY PAPER CODE: ZOOACOR07T** | | **60** | | |
| | | **Unit 1** | **Fundamentals of biochemical reactions and metabolism**<br>Ionization of water, weak acids and bases, buffering and pH changes in living systems, Metabolism: Catabolism and Anabolism, Compartmentalization of metabolic pathways<br>Shuttle systems and membrane transporters;-ATP as "Energy Currency of cell"; coupled reactions; Use of reducing equivalents and cofactors; Intermediary metabolism and regulatory mechanisms | **10** | Dr. S Rehan Ahmed | **September"22-October"22** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | **Unit 2** | Carbohydrates<br>Structure and Biological importance:<br>Monosaccharides, Disaccharides, Polysaccharides;<br>Derivatives of Monosachharides,<br>Carbohydrate metabolism:<br>Glycolysis, Citric acid cycle, Pentose phosphate pathway, Gluconeogenesis | **10** | Dr. S Rehan Ahmed | **October"22-September'22** |
| | | **Unit 3** | **Lipids**<br>Structure and Significance: Physiologically important saturated and unsaturated fatty acids, Triacylglycerols, Phospholipids, Sphingolipid, Glycolipids, Steroids, Eicosanoids and terpinoids. Lipid metabolism: β-oxidation of fatty acids; Fatty acid biosynthesis | **4** | Dr. S Rehan Ahmed | **October'22-November'22** |
| | | **Unit 4** | **Proteins**<br>Amino acids Structure, Classification, General and Electro chemical properties of α-amino acids; Physiological importance of essential and non-essential amino acids Proteins Bonds stabilizing protein structure; Levels of organization, Protein metabolism: Transamination, Deamination, Urea cycle,-Fate of C-skeleton of Glucogenic and Ketogenic amino acids | **14** | Dr. Anindya Sundar Bhunia | **September"22-November"22** |
| | | **Unit 5** | **Nucleic Acids**<br>Structure: Purines and pyrimidines, Nucleosides, Nucleotides, Nucleic acids Types of DNA and RNA, Complementarity of DNA,-Hypo-Hyperchromaticity of DNA Outlines of nucleotide metabolism | **4** | Dr. Indrajit Biswas | **September"22-October"22** |
| | | **Unit 6** | **Enzymes**<br>Nomenclature and classification; Cofactors; Specificity of enzyme action; Isozymes, Mechanism of enzyme action; Enzyme kinetics; Derivation of Michaelis-Menten equation, Lineweaver- Burk plot; Factors affecting rate of enzyme-catalyzed reactions; Enzyme inhibition; Allosteric enzymes and their kinetics;-Strategy of enzyme action- Catalytic and Regulatory (Basic concept with one example | **12** | Dr. Anindya Sundar Bhunia | **September'22-October'22** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | each) | | | |
| | | **Unit 7** | **Oxidative Phosphorylation**<br>Redox systems; Review of mitochondrial respiratory chain, Inhibitors and un-couplers of Electron Transport System | **6** | Dr. Anindya Sundar Bhunia | **November'22-December'22(1st week)** |
| | | **BIOCHEMISTRY LAB PAPER CODE: ZOOACOR07T** | | **60** | Dr. Anindya Sundar Bhunia Dr. S Rehan Ahmed | **Acc. To Revised Syllabus 90% completed by end of December** |
| | | **SEC: SERICULTURE** | | **15** | Dr. Indrajit Biswas | **4 weeks in December'22** |
| | | **SEC LAB: SERICULTURE** | | **15** | Dr. Indrajit Biswas | |
| **SEM-III** | **GENERAL** | **INSECT VECTOR AND DISEASES PAPER CODE: ZOOGCOR03T** | | **60** | | |
| | | **Unit-1** | **Introduction to Insect**s General Features of Insects, Morphological features, Head – Eyes, Types of antennae Mouth parts with respect to feeding habit | **4** | Dr. Indrajit Biswas | **September"22-October'22** |
| | | **Unit-2** | **Concept of Vectors**<br>Brief introduction to Vectors (mechanical and biological), Reservoirs, Host-vector relationship, Adaptations as vectors, Host specificity | **6** | Dr. Anindya Sundar Bhunia | **September'22-October"22** |
| | | **Unit-3** | **Insects as Vectors**<br>Detailed features of insect orders as vectors – Diptera, Siphonoptera, Siphunculata, Hemiptera | **6** | Dr. S Rehan Ahmed | **September"22-October"22** |
| | | **Unit-4** | **Dipteran as Disease Vector**<br>Study of important Dipteran vectors – Mosquitoes, Sand fly, Houseflies vectors Study of mosquito-borne diseases – Malaria, Dengue, Chikungunya, Viral encephalitis, Filariasis Control of mosquitoes | **16** | Rituparna Maity | **Sepetember'22-December'22(1st Week)** |
| | | **Unit-5** | **Siphonaptera as Disease Vectors**<br>Fleas as important insect vectors; Host-specificity, Study of Flea-borne diseases – Plague, Typhus fever; Control of fleas | **10** | Rituparna Maity | **September"22-November"22** |
| | | **Unit-6** | **Siphunculata as Disease Vectors**<br>Human louse (Head, Body and Pubic louse) as important insect vectors; Control of human louse | **8** | Santanu Das | **September"22-November"22** |
| | | **Unit-7** | **Hempitera as Disease Vectors**<br>Bugs as insect vectors; Blood-sucking bugs; Chagas disease, Bed bugs as mechanical vectors, Control and prevention measures | **10** | Santanu Das | **September'22-November'22** |
| | | **INSECT VECTORE AND DISEASES PAPER CODE: ZOOGCOR03P** | | **60** | Dr. Indrajit Biswas | **Acc. To Revised Syllabus 90% completed by end of December** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **SEM-V** | **HONOURS** | **MOLECULAR BIOLOGY PAPER CODE: ZOOACOR11T** | | **60** | | |
| | | **Unit 1** | **Nucleic Acids**<br>Salient features of DNA and RNA Watson and Crick Model of DNA | **2** | Dr. Anindya Sundar Bhunia | **September"22-September"22** |
| | | **Unit 2** | **DNA Replication**<br>Mechanism of DNA Replication in Prokaryotes, Semi-conservative, bidirectional and discontinuous Replication, RNA priming, Replication of telomeres | **6** | Dr. Anindya Sundar Bhunia | **September"22-October"22** |
| | | **Unit 3** | **Transcription**<br>Mechanism of Transcription in prokaryotes and eukaryotes, Transcription factors, Difference between prokaryotic and eukaryotic transcription. | **8** | Dr. Anindya Sundar Bhunia | **September"22-November"22** |
| | | **Unit 4** | **Translation**<br>Mechanism of protein synthesis in prokaryotes, Ribosome structure and assembly in prokaryotes, fidelity of protein synthesis, aminoacyl tRNA synthetases and charging of tRNA; Proteins involved in initiation, elongation and termination of polypeptide chain; Genetic code, Degeneracy of the genetic code and Wobble Hypothesis; Inhibitors of protein synthesis; Difference between prokaryotic and eukaryotic translation | **14** | Dr. Indrajit Biswas | **September"22-November"22** |
| | | **Unit 5** | **Post Transcriptional Modifications and Processing of Eukaryotic RNA**<br>Capping and Poly A tail formation in mRNA; Split genes: concept of introns and exons, splicing mechanism, alternative splicing, exon shuffling, and RNA editing, Processing of tRNA | **10** | Dr. Indrajit Biswas<br>Dr. Anindya Sundar Bhunia | **September"22-November"22** |
| | | **Unit 6** | **Gene Regulation**<br>Regulation of Transcription in prokaryotes: lac operon and trp operon; Regulation of Transcription in eukaryotes | **5** | Dr. Indrajit Biswas | **Septembar'22-Octobar'22** |
| | | **Unit 7** | **DNA Repair Mechanisms**<br>Types of DNA repair mechanisms, RecBCD model in prokaryotes, nucleotide and base excision repair, SOS repair | **9** | Rituparna Maity | **September"22-November"22** |
| | | **Unit 8** | **Molecular Lab Techniques**<br>PCR, Western and Southern blot, Northern Blot,Sanger DNA sequencing, cDNA technology | **5** | Rituparna Maity | **November"22-September'22** |
| | | **MOLECULAR BIOLOGY LAB PAPER CODE: ZOOACOR11P** | | **60** | Dr. Anindya Sundar Bhunia | **Acc. To Revised Syllabus 90% completed by end of December** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | Dr. Indrajit Biswas | |
| | | **GENETICS PAPER CODE: ZOOACOR12T** | | **60** | | |
| | | **Unit 1** | **Mendelian Genetics and its Extension** Background of Mendel's experiments Principles of Mendelian inheritance, Incomplete dominance and co-dominance, Epistasis, Multiple alleles, Lethal alleles, Pleiotropy, Sex-linked, sex- influenced and sex-limited inheritance, Polygenic Inheritance | **12** | Santanu Das | **September"22-October"22** |
| | | **Unit 3** | **Mutations** 1.Types of gene mutations (Classification), Types of chromosomal aberrations (Classification with one suitable example of each), Chromosomal aberrations, gene mutations and human diseases (Down's, Klienfelter's, Turner's, Cri du Chat, Sickle cell, Haemophilia, Thallassimia, Albinism only genetical aspects here, details of physiological consequences not required), Sex chromosomes and sex-linked inheritance Non-disjunction and variation in chromosome number; Molecular basis of mutations in relation to UV light and chemical mutagen | **12** | Santanu Das | **November"22-Sepetember'22** |
| | | **Unit 4** | **Sex Determination** Mechanisms of sex determination in Drosophila with reference to alternative splicing Sex determination in mammals,-Dosage compensation in Drosophila & Human | **12** | Dr. Indrajit Biswas | **October"20** |
| | | **Unit 5** | **Extra-chromosomal Inheritance** Criteria for extra chromosomal inheritance, Antibiotic resistance in Chlamyadomonas, Kappa particle in Paramoecium Shell spiralling in snail | **8** | Dr. S Rehan Ahmed | **September"22-October"22** |
| | | **Unit 6** | **Recombination in Bacteria and Viruses** Conjugation, Transformation, Transduction, Complementation test in Bacteriophage | **8** | Dr. S Rehan Ahmed | **October"22-November"22** |
| | | **Unit 7** | **Transposable Genetic Elements** Transposons in bacteria, Ac-Ds elements in maize and P elements in Drosophila, LINE, SINE, Alu elements in humans | **8** | Dr. S Rehan Ahmed | **September"22-November"22** |
| | | **GENETICS LAB PAPER CODE: ZOOACOR12P** | | **60** | Dr. S Rehan Ahmed | **Acc. To Revised Syllabus 90% completed by end of December** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | **ENTOMOLOGY PAPER CODE: ZOOADSEO2T** | | **60** | | |
| | | **Unit 1** | **Introduction**<br>General Features of Insects Distribution and Success of Insects on the Earth | **2** | Dr. Indrajit Biswas | **September"22** |
| | | **Unit 2** | **Insect Diversity and Classifications**<br>Classifications of Arthropods with special reference to Insects (Insects are to be classified up to order) with estimated species richness of the orders globally, in India and in West Bengal.<br>Conspicuous/important families/Genera/species of each order have to be noted with their peculiar habits and habitats) | **4** | Dr. Indrajit Biswas | **September"22-October"22** |
| | | **Unit 3** | **General Morphology of Insects (brief outlines)**<br>External Features; Head – Eyes, Types of antennae, Mouth parts w.r.t. feeding habits<br>Thorax: Wings and wing types, Types of Legs adapted to diverse habitats, Peculiar Abdominal appendages and genitalia- only brief introduction. | **12** | Dr. Indrajit Biswas | **October"22-November"22** |
| | | **Unit 4** | **Physiology of Insects**<br>Structure and physiology of Insect body systems - Integumentary, digestive, excretory, circulatory, respiratory, endocrine, reproductive, and nervous system (brief outlines only)-Photoreceptors: Types, Structure and Function (brief introductions)<br>Metamorphosis: Types and Neuroendocrine control of metamorphosis (introductory) | **16** | Dr. Indrajit Biswas | **September'22-October'22** |
| | | **Unit 5** | **Insect Society**<br>Social insects: different types of social insects with brief outlines of their social systems Trophallaxis in social insects such as ants, termites and bees | **8** | Dr. Indrajit Biswas | **October'22-November'22** |
| | | **Unit 6** | **Insect Plant Interaction**<br>Outline of the concept of co-evolution, role of allo-chemicals in host plant mediation, Host-plant selection by phytophagous insects; Major insect pests in paddy (brief introductions) | **14** | Dr. Indrajit Biswas | **November'22** |
| | | **Unit 7** | **Insects as Vectors**<br>Insects as mechanical and biological vectors, Brief discussion on houseflies and mosquitoes as important vectors | **4** | Dr. Indrajit Biswas | **End In 1st Week of January'23** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | **BIOLOGY OF INSECTS LAB PAPER CODE: ZOOADSE02P** | | **60** | Dr. Indrajit Biswas | **Acc. To Revised Syllabus 90% completed by 1st Week of January'23** |
| | | **ENDOCRINOLOGY PAPER CODE: ZOOADSE03T** | | **60** | | |
| | | **Unit 1** | **Introduction to Endocrinology** General idea of Endocrine systems, Classification, Characteristic and Transport of Hormones Neurosecretions and Neurohormones | **12** | Rituparna Maity | **September'22-november'22** |
| | | **Unit 2** | **Epiphysis, Hypothalamo-hypophysial Axis** Structure of pineal gland, Secretions and their functions in biological rhythms and reproduction; Structure and functions of hypothalamus and Hypothalamic nuclei, Regulation of neuroendocrine glands, Feedback mechanisms; Structure of pituitary gland, Hormones and their functions, Hypothalamo-hypophysial portal system, Disorders of pituitary gland. | **18** | Santanu Das | **September'22-November'22** |
| | | **Unit 3** | **Peripheral Endocrine Glands** Structure, Hormones, Functions and Regulation of Thyroid gland, Parathyroid, Adrenal, Pancreas, Ovary and Testis; Hormones in homeostasis,Disorders of endocrine glands | **16** | Dr. Anindya Sundar Bhunia | **September'22-1stWeek of december'22** |
| | | **Unit 4** | **Regulation of Hormone Action** Mechanism of action of steroidal, non-steroidal hormones with receptors Bioassays of hormones using ELISA and RIA; Estrous cycle in rat and menstrual cycle in human Multifaceted role of Vasopressin & Oxytocin; Hormonal regulation of parturition | **14** | Dr. S Rehan Ahmed | **September'22-1stWeek of December'22** |
| | | **ENDOCRINOLOGY LAB PAPER CODE: ZOOADSE03P** | | **60** | Dr. Indrajit Biswas Dr. Anindya Sundar Bhunia | **Acc. To Revised Syllabus 90% completed by 1st week of January '23** |
| **SEM-V** | **GENERAL** | **APPLIED ZOOLOGY PAPER CODE: ZOOGDSE01T** | | **60** | | |
| | | **Unit-1** | **Introduction to Host-parasite Relationship** Host, Definitive host, Intermediate host, Parasitism, Symbiosis, Commensalism, Reservoir, Zoonosis | **2** | Dr. Indrajit Biswas | **September"22-September"22** |
| | | **Unit-2** | **Epidemiology of Diseases** Transmission, Prevention and control of diseases: Tuberculosis, Typhoid | **4** | Dr. Indrajit Biswas | **September"22-October"22** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | **Unit-3** | **Rickettsia and Spirochetes**<br>Brief account of Rickettsia prowazekii, Borrelia recurrentis and Treponema pallidum | **6** | Dr. S Rehan Ahmed | **September"22-October"22** |
| | | **Unit-4** | **Parasitic Protozoa**<br>Life history and pathogenicity of Entamoeba histolytica, Plasmodium vivax and Trypanosoma gambiense | **8** | Dr. Anindya Sundar Bhunia | **September"22-November"22** |
| | | **Unit-5** | **Parasitic Helminthes**<br>Life history and pathogenicity of Ancylostoma duodenale and Wuchereria bancrofti | **4** | Dr. Anindya Sundar Bhunia | **September'22-October'22** |
| | | **Unit-6** | **Insects of Economic Importance**<br>Biology, Control and damage caused by Helicoverpa armigera, Pyrilla perpusilla and Papilio demoleus, Callosobruchus chinensis, Sitophilus oryzae and Tribolium castaneum | **12** | Dr. S Rehan Ahmed | **November"22-November'22** |
| | | **Unit-7** | **Insects of Medical Importance**<br>Medical importance and control of Pediculus humanus corporis, Anopheles, Culex, Aedes, Xenopsylla cheopis | **8** | Dr. Indrajit Biswas | **October'22-November'22** |
| | | **Unit-8** | **Animal Husbandry**<br>Preservation of semen and artificial insemination in cattle | **6** | Rituparna Maity | **September"22-October"22** |
| | | **Unit-9** | **Poultry Farming**<br>Principles of poultry breeding, Management of breeding stock and broilers, Processing and preservation of eggs Unit | **6** | Rituparna Maity | **September-November"22-** |
| | | **Unit-10** | **Fish Technology**<br>Genetic improvements in aquaculture industry; Induced breeding and transportation of fish seed | **4** | Rituparna Maity | **October'22-November'22** |
| | | **APPLIED ZOOLOGY LAB PAPER CODE: ZOOGDSE01P** | | **60** | Santanu Das | **Acc. To Revised Syllabus 90% completed by end of December** |