**ACADEMIC CALENDER ( ALL SEMESTER)**

**Semester I**

**(Zoology General; CBCS)**

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| Semester I (AY 2023-2024) | | Period: Feb,2023 to July,2023 | | | |
| Paper: **DSC-1A** (**Animal Diversity**) (Theory) | | Full Marks:55 Credit:4 | | | |
| Sl. No. | **TOPICS** | | CLASSES ALLOTED | Class taken by | Remark |
| 1 | **Unit 1: Kingdom Protista**  General characters and classification up to classes; Locomotory Organelles and locomotion in Protozoa | | 4 | DEBARSHI MONDAL |  |
| 2 | **Unit 2: Phylum Porifera**  General characters and classification up to classes; Canal System in *Sycon* | | 3 | DEBARSHI MONDAL |  |
| 3 | **Unit 3: Phylum Cnidaria**  General characters and classification up to classes; Polymorphism in Hydrozoa | | 3 | DEBARSHI MONDAL |  |
| 4 | **Unit 4: Phylum Platyhelminthes**  General characters and classification up to classes; Life history of *Taenia solium* | | 3 | DEBARSHI MONDAL |  |
| 5 | **Unit 5: Phylum Nemathelminthes**  General characters and classification up to classes; Life history of *Ascaris lumbricoides* and its parasitic adaptations | | 3 | DEBARSHI MONDAL |  |
| 6 | **Unit 6: Phylum Annelida**  General characters and classification up to classes; Metamerism in Annelida | | 3 | DEBARSHI MONDAL |  |
| 7 | **Unit 7: Phylum Arthropoda**  General characters and classification up to classes; Vision in Arthropoda, Metamorphosis in Insects | | 4 | DEBARSHI MONDAL |  |
| 8 | **Unit 8: Phylum Mollusca**  General characters and classification up to classes; Torsion in gastropods | | 3 | Dr. MANIDIP SHASMAL |  |
| 9 | **Unit 9: Phylum Echinodermata**  General characters and classification up to classes; Water-vascular system in Asteroidea | | 3 | Dr. MANIDIP SHASMAL |  |
| 10 | **Unit 10: Protochordates**  General features and Phylogeny of Protochordata | | 3 | Dr. MANIDIP SHASMAL |  |
| 11 | **Unit 11: Agnatha**  General features of Agnatha and classification of cyclostomes up to classes | | 3 | Dr. MANIDIP SHASMAL |  |
| 12 | **Unit 12: Pisces**  General features and Classification up to orders; Osmoregulation in Fishes | | 3 | Dr. SUDIPTA CHAKRABORTY |  |
| 13 | **Unit 13: Amphibia**  General features and Classification up to orders; Parental care | | 3 | Dr. SUDIPTA CHAKRABORTY |  |
| 14 | **Unit 14: Reptiles**  General features and Classification up to orders; Poisonous and non-poisonous snakes, Biting mechanism in snakes | | 3 | Dr. SUDIPTA CHAKRABORTY |  |
| 15 | **Unit 15: Aves**  General features and Classification up to orders; Flight adaptations in birds | | 3 | Dr. SUDIPTA CHAKRABORTY |  |
| 16 | **Unit 17: Mammals**  Classification up to orders; Origin of mammals | | 3 | Dr. SUDIPTA CHAKRABORTY |  |

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| Semester I (AY 2023-2024) | | Period: Feb,2023 to July,2023 | | | |
| Paper: **DSC1AP** (**Animal diversity**) (Practical) | | Full Marks: 20 Credit:2 | | | |
| Sl. No. | **TOPICS** | | CLASSES ALLOTED | Class taken by | Remark |
| 1 | **1. Study of the following specimens:**  *Amoeba*, *Euglena, Plasmodium, Paramecium, Sycon*, *Hyalonema,* and *Euplectella, Obelia, Physalia, Aurelia, Tubipora, Metridium, Taenia solium,* Male and female *Ascaris lumbricoides, Aphrodite, Nereis, Pheretima, Hirudinaria, Palaemon, Cancer*, *Limulus*, *Palamnaeus, Scolopendra*, *Julus*, *Periplaneta, Apis, Chiton, Dentalium, Pila, Unio, Loligo, Sepia, Octopus, Pentaceros, Ophiura, Echinus, Cucumaria* and *Antedon, Balanoglossus, Herdmania, Branchiostoma, Petromyzon, Sphyrna, Pristis, Torpedo, Labeo, Exocoetus, Anguilla, Ichthyophis/Ureotyphlus, Salamandra, Bufo, Hyla, Chelone, Hemidactylus, Chamaeleon, Draco, Vipera, Naja, Crocodylus, Gavialis,* Any six common birds from different orders, *Sorex*, Bat, *Funambulus, Loris* | | 10 | DEBARSHI MONDAL |  |
| 2 | **2. Study of the following permanent slides:**  1. T.S. and L.S. of *Sycon*,  *2.* Study of life history stages of *Taenia,*  3. T.S. of male and female *Ascaris* | | 3 | Dr. MANIDIP SHASMAL |  |
| 3 | **3. Key for identification of poisonous and non-poisonous snakes**  An “animal album” containing photographs, cut outs, with appropriate write up about the above mentioned taxa. Different taxa/ topics may be given to different sets of students for this purpose. | | 3 | Dr. SUDIPTA CHAKRABORTY |  |

**ACADEMIC CALENDER**

**Semester II**

**(Zoology Honours; CBCS)**

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| Semester II (AY 2023-2024) | | Period: Feb,2023 to July,2023 | | | |
| Paper: DSC-1B ( Comparative Anatomy and Development Biology of Vertebrates) (Theory) | | Full Marks: 55 Credit: 4 | | | |
| Sl. No. | **TOPICS** | | CLASSES ALLOTED | Class taken by | Remark |
| 1 | **Unit 1: Integumentary System**  Derivatives of integument w.r.t. glands and digital tips | | 4 | Dr. MANIDIP SHASMAL |  |
| 2 | **Unit 2: Skeletal System**  Evolution of visceral arches | | 4 | Dr. MANIDIP SHASMAL |  |
| 3 | **Unit 3: Digestive System**  Brief account of alimentary canal and digestive glands | | 4 | Dr. MANIDIP SHASMAL |  |
| 4 | **Unit 4: Respiratory System**  Brief account of gills, lungs, air sacs and swim bladder | | 4 | Dr. MANIDIP SHASMAL |  |
| 5 | **Unit 5: Circulatory System**  Evolution of heart and aortic arches | | 5 | DEBARSHI MONDAL |  |
| 6 | **Unit 6: Urinogenital System**  Succession of kidney, Evolution of urinogenital ducts | | 5 | DEBARSHI MONDAL |  |
| 7 | **Unit 7: Nervous System**  Comparative account of brain | | 5 | DEBARSHI MONDAL |  |
| 8 | **Unit 8: Sense Organs**  Receptors and its types. | | 4 | DEBARSHI MONDAL |  |
| 9 | **Unit 9: Early Embryonic Development**  Gametogenesis: Spermatogenesis and oogenesis w.r.t. mammals, vitellogenesis in birds; Fertilization: external (amphibians), internal (mammals), blocks to polyspermy; Early development of frog and humans (structure of mature egg and its membranes, patterns of cleavage, fate map, up to formation of gastrula);types of morphogenetic movements; Fate of germ layers; Neurulation in frog embryo. | | 5 | Dr. SUDIPTA CHAKRABORTY |  |
| 10 | **Unit 10: Late Embryonic Development**  Implantation of embryo in humans, Formation of human placenta and functions, other types of placenta on the basis of histology; Metamorphic events in frog life cycle and its hormonal regulation. | | 5 | Dr. SUDIPTA CHAKRABORTY |  |
| 11 | **Unit 11: Control of Development**  Fundamental processes in development (brief idea) – Gene activation, determination, induction, Differentiation, morphogenesis, intercellular communication, cell movements and cell death | | 5 | Dr. SUDIPTA CHAKRABORTY |  |

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| Semester II (AY 2023-2024) | | Period: Feb,2023 to July,2023 | | | |
| Paper: **DSC1BP** (**Comparative Anatomy and Developmental Biology of Vertebrates** ) (Practical) | | Full Marks: 20 Credit: 2 | | | |
| Sl. No. | **TOPICS** | | CLASSES ALLOTED | Class taken by | Remark |
| 1 | 1. Osteology: a) Disarticulated skeleton of fowl and rabbit  b) Carapace and plastron of turtle /tortoise  c) Mammalian skulls: One herbivorous and one carnivorous animal. | | 3 | Dr. SUDIPTA CHAKRABORTY |  |
| 2 | 2. Frog - Study of developmental stages - whole mounts and sections through permanent slides – cleavage stages, blastula, gastrula neurula, tail bud stage, tadpole external and internal gill stages. | | 4 | Dr. SUDIPTA CHAKRABORTY |  |
| 3 | 3. Study of the different types of placenta- histological sections through permanent slides or photomicrographs. | | 3 | DEBARSHI MONDAL |  |
| 4 | 4. Study of placental development in humans by ultrasound scans. | | 3 | Dr. MANIDIP SHASMAL |  |
| 5 | 5. Examination of gametes - frog/rat - sperm and ova through permanent slides or photomicrographs | | 3 | Dr. MANIDIP SHASMAL |  |

**ACADEMIC CALENDER**

**Semester III**

**(Zoology Honours; CBCS)**

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| Semester III (AY 2023-2024) | | Period: Feb,2023 to July,2023 | | | |
| Paper: **DSC1CT**  (**Physiology and Biochemistry** ) (Theory) | | Full Marks: 55 Credit: 4 | | | |
| Sl. No. | **TOPICS** | | CLASSES ALLOTED | Class taken by | Remark |
| 1 | **Unit 1: Nerve and muscle**  Structure of a neuron, Resting membrane potential, Graded potential, Origin of Action potential and its propagation in myelinated and non-myelinated nerve fibres, Ultra-structure of skeletal muscle, Molecular and chemical basis of muscle contractio | | 5 | DEBARSHI MONDAL |  |
| 2 | **Unit 2: Digestion**  Physiology of digestion in the alimentary canal; Absorption of carbohydrates, proteins, lipids | | 5 | DEBARSHI MONDAL |  |
| 3 | **Unit 3: Respiration**  Pulmonary ventilation, Respiratory volumes and capacities, Transport of oxygen and carbon dioxide in blood. | | 5 | DEBARSHI MONDAL |  |
| 4 | **Unit 4: Excretion**  Structure of nephron, Mechanism of Urine formation, Counter-current Mechanism | | 5 | Dr. SUDIPTA CHAKRABORTY |  |
| 5 | **Unit 5: Cardiovascular system**  Composition of blood, Hemostasis, Structure of Heart, Origin and conduction of the cardiac impulse,Cardiac cycle | | 5 | Dr. SUDIPTA CHAKRABORTY |  |
| 6 | **Unit 6: Reproduction and Endocrine Glands**  Physiology of male reproduction: Hormonal control of spermatogenesis; Physiology of female reproduction: hormonal control of menstrual cycle Structure and function of pituitary, thyroid, parathyroid, pancreas and adrenal | | 5 | Dr. SUDIPTA CHAKRABORTY |  |
| 7 | **Unit 7: Carbohydrate Metabolism**  Glycolysis, Krebs Cycle, Pentose phosphate pathway, Gluconeogenesis, Glycogen metabolism, Review of electron transport chain | | 5 | Dr. MANIDIP SHASMAL |  |
| 8 | **Unit 8: Lipid Metabolism**  Biosynthesis and β oxidation of palmitic acid | | 5 | Dr. MANIDIP SHASMAL |  |
| 9 | **Unit 9: Protein metabolism**  Transamination, Deamination and Urea cycle | | 5 | Dr. MANIDIP SHASMAL |  |
| 10 | **Unit 10: Enzymes**  Introduction, Mechanism of action, Enzyme kinetics, inhibition and regulation | | 5 | DEBARSHI MONDAL |  |

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| Semester III (AY 2023-2024) | | Period: Feb,2023 to July,2023 | | | |
| Paper: **DSC1CP**  (**Physiology and Biochemistry** ) (Practical) | | Full Marks: 20 Credit: 2 | | | |
| Sl. No. | **TOPICS** | | CLASSES ALLOTED | Class taken by | Remark |
| 1 | 1. Preparation of hemin and hemochromogen crystals. | | 2 | Dr. SUDIPTA CHAKRABORTY |  |
| 2 | 2. Study of permanent histological sections of mammalian pituitary, thyroid, pancreas, adrenal gland. | | 3 | DEBARSHI MONDAL |  |
| 3 | 3. Study of permanent slides of spinal cord, duodenum, liver, lung, kidney, bone, cartilage. | | 3 | DEBARSHI MONDAL |  |
| 4 | 4. Qualitative tests to identify functional groups of carbohydrates in given solutions (Glucose, Fructose, Sucrose, Lactose). | | 4 | Dr. MANIDIP SHASMAL |  |
| 5 | 5. Estimation of total protein in given solutions by Lowry’s method. | | 2 | Dr. MANIDIP SHASMAL |  |
| 6 | 6. Study of activity of salivary amylase under optimum condition | | 2 | Dr. SUDIPTA CHAKRABORTY |  |

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| Semester III (AY 2023-2024) | | Period: Feb,2023 to July,2023 | | | |
| Paper: **SEC1T**  (**Apiculture**) (Theory) | | Full Marks: 55 Credit: 4 | | | |
| Sl. No. | **TOPICS** | | CLASSES ALLOTED | Class taken by | Remark |
| 1 | **Unit 1: Biology of Bees**  History, Classification and Biology of Honey Bees. Social Organization of Bee Colony | | 10 | Dr. SUDIPTA CHAKRABORTY |  |
| 2 | **Unit 2: Rearing of Bees**  Artificial Bee rearing (Apiary), Beehives – Newton and Langstroth. Bee Pasturage. Selection of Bee Species for Apiculture. Bee Keeping Equipment. Methods of Extraction of Honey (Indigenous and Modern) | | 10 | Dr. SUDIPTA CHAKRABORTY |  |
| 3 | **Unit 3: Diseases and Enemies**  Bee Diseases and Enemies. Control and Preventive measures. | | 10 | DEBARSHI MONDAL |  |
| 4 | **Unit 4: Bee Economy**  Products of Apiculture Industry and its Uses (Honey, Bees Wax, Propolis), Pollen etc | | 10 | DEBARSHI MONDAL |  |
| 5 | **Unit 5: Entrepreneurship in Apiculture**  Bee Keeping Industry – Recent Efforts, Modern Methods in employing artificial. Beehives for cross pollination in horticultural gardens | | 10 | Dr. MANIDIP SHASMAL |  |

**ACADEMIC CALENDER**

**Semester IV**

**(Zoology Honours; CBCS)**

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| Semester IV (AY 2023-2024) | | Period: Feb,2023 to July,2023 | | | |
| Paper: **DSC-1D**  (**Genetics and Evolutionary Biology**  ) (Theory) | | Full Marks: 55 Credit: 4 | | | |
| Sl. No. | **TOPICS** | | CLASSES ALLOTED | Class taken by | Remark |
| 1 | **Unit 1: Introduction to Genetics**  Mendel’s work on transmission of traits, Genetic Variation, Molecular basis of genetic information | | 4 | DEBARSHI MONDAL |  |
| 2 | **Unit 2: Mendelian Genetics and its Extension**  Principles of Inheritance, Chromosome theory of inheritance, Incomplete dominance and codominance, Multiple alleles, Lethal alleles, Epistasis, Pleiotropy, sex linked inheritance, extra-chromosomal inheritance | | 4 | DEBARSHI MONDAL |  |
| 3 | **Unit 3: Linkage, Crossing Over and Chromosomal Mapping**  Linkage and crossing over, Recombination frequency as a measure of linkage intensity, two factor and three factor crosses, Interference and coincidence, Somatic cell genetics – an alternative approach to gene mapping | | 5 | DEBARSHI MONDAL |  |
| 4 | **Unit 4: Mutations**  Chromosomal Mutations: Deletion; Duplication; Inversion; Translocation; Aneuploidy and Polyploidy; Gene mutations: Induced versus Spontaneous mutations, Back versus Suppressor mutations, | | 4 | DEBARSHI MONDAL |  |
| 5 | **Unit 5: Sex Determination**  Chromosomal mechanisms, dosage compensation | | 4 | DEBARSHI MONDAL |  |
| 6 | **Unit 6: History of Life**  Major Events in History of Life | | 4 | Dr. SUDIPTA CHAKRABORTY |  |
| 7 | **Unit 7: Introduction to Evolutionary Theories**  Lamarckism, Darwinism, Neo-Darwinism | | 4 | Dr. SUDIPTA CHAKRABORTY |  |
| 8 | **Unit 8: Direct Evidences of Evolution**  Types of fossils, Incompleteness of fossil record, Dating of fossils, Phylogeny of horse | | 4 | Dr. SUDIPTA CHAKRABORTY |  |
| 9 | **Unit 9: Processes of Evolutionary Change**  Organic variations; Isolating Mechanisms; Natural selection (Example: Industrial melanism); Types of natural selection (Directional, Stabilizing, Disruptive), Artificial selection | | 4 | Dr. SUDIPTA CHAKRABORTY |  |
| 10 | **Unit 10: Species Concept**  Biological species concept (Advantages and Limitations); Modes of speciation (Allopatric, Sympatric) | | 5 | Dr. MANIDIP SHASMAL |  |
| 11 | **Unit 11: Macro-evolution**  Macro-evolutionary Principles (example: Darwin’s Finches) | | 4 | Dr. MANIDIP SHASMAL |  |
| 12 | **Unit 12: Extinction**  Mass extinction (Causes, Names of five major extinctions, K-T extinction in detail), Role of extinction in evolution | | 4 | Dr. MANIDIP SHASMAL |  |

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| Semester IV (AY 2023-2024) | | Period: Feb,2023 to July,2023 | | | |
| Paper: **DSC1DP**  (**Genetics and Evolutionary Biology**  ) (Practical) | | Full Marks: 20 Credit: 2 | | | |
| Sl. No. | **TOPICS** | | CLASSES ALLOTED | Class taken by | Remark |
| 1 | 1. Study of Mendelian inheritance and gene interactions (Non- Mendelian inheritance) using suitable examples. Verify the results using Chi-square test. | | 3 | Dr. SUDIPTA CHAKRABORTY |  |
| 2 | 2. Study of Linkage, recombination, gene mapping using the data. | | 2 | Dr. SUDIPTA CHAKRABORTY |  |
| 3 | 3. Study of Human Karyotypes (normal and abnormal). | | 3 | DEBARSHI MONDAL |  |
| 4 | 4. Study of fossil evidences from plaster cast models and pictures | | 2 | DEBARSHI MONDAL |  |
| 5 | 5. Study of homology and analogy from suitable specimens/ pictures | | 2 | DEBARSHI MONDAL |  |
| 6 | 6. Charts: a. Phylogeny of horse with diagrams/ cut outs of limbs and teeth of horse ancestors  b. Darwin’s Finches with diagrams/ cut outs of beaks of different species | | 3 | Dr. MANIDIP SHASMAL |  |
| 7 | 7. Visit to Natural History Museum and submission of report | | 1 | Dr. MANIDIP SHASMAL |  |

**ACADEMIC CALENDER**

**Semester V**

**(Zoology Honours; CBCS)**

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| Semester V (AY 2023-2024) | | Period: Feb,2023 to July,2023 | | | |
| Paper: **DSE1T**  (**Aquatic biology** ) (Theory) | | Full Marks: 55 Credit: 4 | | | |
| Sl. No. | **TOPICS** | | CLASSES ALLOTED | Class taken by | Remark |
| 1 | **UNIT 1: Aquatic Biomes**  Brief introduction of the aquatic biomes: Freshwater ecosystem (lakes, wetlands, streams and rivers), estuaries, intertidal zones, oceanic pelagic zone, marine benthic zone and coral reefs. | | 12 | DEBARSHI MONDAL |  |
| 2 | **UNIT 2: Freshwater Biology**  **Lakes**: Origin and classification, Lake as an Ecosystem, Lake morphometry, Physico–chemical Characteristics: Light, Temperature, Thermal stratification, Dissolved Solids, Carbonate, Bicarbonates, Phosphates and Nitrates, Turbidity; Dissolved gases (oxygen, carbon dioxide). Nutrient Cycles in Lakes-Nitrogen, Sulphur and Phosphorous.  **Streams:** Different stages of stream development, Physico-chemical environment, Adaptation of hill-stream fishes. | | 13 | DEBARSHI MONDAL |  |
| 3 | **UNIT 3: Marine Biology**  Salinity and density of Sea water, Continental shelf, Adaptations of deep sea organisms, Coral reefs, Sea weeds. | | 12 | Dr. SUDIPTA CHAKRABORTY |  |
| 4 | **UNIT 4: Management of Aquatic Resources**  Causes of pollution: Agricultural, Industrial, Sewage, Thermal and Oil spills, Eutrophication, Management and conservation (legislations), Sewage treatment Water quality assessment- BOD and COD. | | 13 | Dr. MANIDIP SHASMAL |  |

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| Semester V (AY 2023-2024) | | Period: Feb,2023 to July,2023 | | | |
| Paper: **DSE1P**  (**Aquatic Biology**  ) (Practical) | | Full Marks: 20 Credit: 2 | | | |
| Sl. No. | **TOPICS** | | CLASSES ALLOTED | Class taken by | Remark |
| 1 | 1. Determine the area of a lake using graphimetric and gravimetric method. | | 3 | DEBARSHI MONDAL |  |
| 2 | 2. Identify the important macrophytes, phytoplanktons and zooplanktons present in a lake ecosystem. | | 4 | DEBARSHI MONDAL |  |
| 3 | 3. Determine the amount of Turbidity/transparency, Dissolved oxygen, carbon dioxide, alkalinity (carbonates & bicarbonates) in water collected from a nearby lake/ water body. | | 5 | Dr. MANIDIP SHASMAL |  |
| 4 | 4. Instruments used in limnology (Secchi disc, Van Dorn Bottle, Conductivity meter, Turbidity meter, PONAR grab sampler) and their significance. | | 3 | Dr. SUDIPTA CHAKRABORTY |  |
| 5 | 5. A Project Report on a visit to a Sewage treatment plant/Marine bioreserve/ Fisheries Institutes | | 1 | Dr. SUDIPTA CHAKRABORTY |  |

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| Semester V (AY 2023-2024) | | Period: Feb,2023 to July,2023 | | | |
| Paper: **SEC3T**  (**Medical Diagnostics**) (Theory) | | Full Marks: 55 Credit: 4 | | | |
| Sl. No. | **TOPICS** | | CLASSES ALLOTED | Class taken by | Remark |
| 1 | **Unit 1: Introduction to Medical Diagnostics and its Importance** | | 8 | Dr. MANIDIP SHASMAL |  |
| 2 | **Unit 2: Diagnostics Methods Used for Analysis of Blood**  Blood composition, Preparation of blood smear and Differential Count (D.C) using Leishman's stain, Platelet count using haemocytometer, Erythrocyte Sedimentary Rate (E.S.R), Packed Cell Volume (P.C.V.) | | 10 | Dr. SUDIPTA CHAKRABORTY |  |
| 3 | **Unit 3: Diagnostic Methods Used for Urine Analysis**  Urine Analysis: Physical characteristics; Abnormal constituents | | 8 | Dr. SUDIPTA CHAKRABORTY |  |
| 4 | **Unit 4:Non-infectious Diseases**  Causes, types, symptoms, complications, diagnosis and prevention of Diabetes (Type I and Type II), Hypertension (Primary and secondary), Testing of blood glucose using Glucometer/Kit | | 8 | Dr. MANIDIP SHASMAL |  |
| 5 | **Unit 5: Infectious Diseases**  Causes, types, symptoms, diagnosis and prevention of Tuberculosis and Hepatitis | | 8 | Dr. MANIDIP SHASMAL |  |
| 5 | **Unit 6: Tumours**  Types (Benign/Malignant), Detection and metastasis; Medical imaging: X-Ray of Bone fracture, PET, MRI and CT Scan (using photographs). | | 8 | DEBARSHI MONDAL |  |

**ACADEMIC CALENDER**

**Semester VI**

**(Zoology GENERAL; CBCS)**

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| Semester VI (AY 2023-2024) | | Period: Feb,2023 to July,2023 | | | |
| Paper: **DSE2T**  (**Animal Biotechnology**  ) (Theory) | | Full Marks: 55 Credit: 4 | | | |
| Sl. No. | **TOPICS** | | CLASSES ALLOTED | Class taken by | Remark |
| 1 | **Unit 1: Introduction**  Concept and scope of biotechnology | | 8 | Dr. MANIDIP SHASMAL |  |
| 2 | **Unit 2: Molecular Techniques in Gene manipulation**  Cloning vectors: Plasmids, Cosmids, Phagemids, Lambda Bacteriophage, M13, BAC, YAC, MAC and Expression vectors (characteristics) Restriction enzymes: nomenclature, detailed study of Type II. Transformation techniques: Calcium chloride method and electroporation. Construction of genomic and cDNA libraries and screening by colony and plaque hybridization Southern, Northern and Western blotting; DNA sequencing: Sanger method; Polymerase Chain Reaction, DNA Finger Printing and DNA micro array | | 16 | Dr. SUDIPTA CHAKRABORTY |  |
| 3 | **Unit 3: Genetically Modified Organisms**  Production of cloned and transgenic animals: Nuclear Transplantation, Retroviral Method, DNA microinjection, Applications of transgenic animals: Production of pharmaceuticals, production of donor organs, knockout mice. Production of transgenic plants: *Agrobacterium* mediated transformation. Applications of transgenic plants: insect and herbicide resistant plants. | | 16 | Dr. MANIDIP SHASMAL |  |
| 4 | **Unit 4: Culture Techniques and Applications**  Animal cell culture, Expressing cloned genes in mammalian cells, Molecular diagnosis of genetic diseases (Cystic fibrosis, Sickle cell anemia); Recombinant DNA in medicines: Recombinant insulin and human growth hormone, Gene therapy | | 10 | DEBARSHI MONDAL |  |

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| Semester VI (AY 2023-2024) | | Period: Feb,2023 to July,2023 | | | |
| Paper: **DSE2P**  (**Animal Biotechnology**  ) (Practical) | | Full Marks: 20 Credit: 2 | | | |
| Sl. No. | **TOPICS** | | CLASSES ALLOTED | Class taken by | Remark |
| 1 | 1. Genomic DNA isolation from *E. coli* | | 2 | DEBARSHI MONDAL |  |
| 2 | 2. Plasmid DNA isolation (pUC 18/19) from *E. coli* | | 2 | Dr. SUDIPTA CHAKRABORTY |  |
| 3 | 3. Restriction digestion of plasmid DNA. | | 2 | Dr. SUDIPTA CHAKRABORTY |  |
| 4 | 4. Construction of circular and linear restriction map from the data provided. | | 3 | Dr. SUDIPTA CHAKRABORTY |  |
| 5 | 5. Calculation of transformation efficiency from the data provided. | | 2 | Dr. MANIDIP SHASMAL |  |
| 6 | 6. To study following techniques through photographs  a. Southern Blotting  b. Northern Blotting  c. Western Blotting  d. DNA Sequencing (Sanger's Method)  e. PCR  f. DNA fingerprinting  **7.** Project report on animal cell culture | | 5 | Dr. MANIDIP SHASMAL |  |