

Dept. of Zoology, Bankura Sammilani College

MODULE BREAKUP OF THE SYLLABUS

SESSION 2022-23

CLASS : Sem-II ( Zoology Programme)

(Theory Paper : Core T2 - Comparative anatomy and Developmental Biology of Vertebrate)

Month	Topic
July – August - September	<p><b>Unit 1: Integumentary System</b> Derivatives of integument with reference to glands and digital tips</p> <p><b>Unit 2: Skeletal System</b> Evolution of visceral arches</p> <p><b>Unit 3: Digestive System</b> Brief account of alimentary canal and digestive glands</p> <p><b>Unit 4: Respiratory System</b> Brief account of Gills, lungs, air sacs and swim bladder</p> <p><b>Unit 5: Circulatory System</b> Evolution of heart and aortic arches</p> <p><b>Unit 6: Urinogenital System</b> Succession of kidney, Evolution of urinogenital ducts</p>
October – November - December	<p><b>Unit 7: Nervous System</b> Comparative account of brain</p> <p><b>Unit 8: Sense Organs</b> Types of receptors</p> <p><b>Unit 9: Early Embryonic Development</b> Spermatogenesis and oogenesis with reference to mammals, Fertilization: external (amphibians), internal (mammals), patterns of cleavage, fate map, and gastrulation in frog embryo.</p> <p><b>Unit 10: Late Embryonic Development</b> Types of Placenta and their function; Placenta formation in Human.</p> <p><b>Unit 11: Control of Development</b> Fundamental processes in development (brief idea) – Gene activation, determination, induction, Differentiation, morphogenesis, cell movements and cell death.</p>

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**(Practical Paper : Comparative anatomy and Developmental Biology of Vertebrate)**

<b>Month</b>	<b>Topic</b>
<b>July – August - September</b>	1.Osteology: Identification of a) limb bones and girdles of Columba and Cavia b) Carapace and plastron of turtle (model/photograph) c) Mammalian skulls: Guinea pig and Dog. 2. Identification of whole mounts of developmental stages of chick through permanent slides: 24 and 48 hours of incubation.
<b>October – November - December</b>	3. Identification of different sections of placenta (epitheliochorial, endotheliochorial and hemochorial) (photomicrograph/ slides). 4. Examination of gametes - frog/rat - sperm and ova through permanent slides or photomicrographs. 5. Submission of laboratory note book

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MODULE BREAKUP OF THE SYLLABUS

SESSION 2022-23

CLASS : Sem-IV ( Zoology Programme)

(Theory Paper : Core T4 and SEC T2)

Month	Topic
July – August - September	<p><b>Core T4 Genetics and Evolutionary Biology</b></p> <p><b>Unit 1: Introduction to Genetics</b> Principles of Inheritance, Mendel’s work on transmission of traits, Progress of genetics.</p> <p><b>Unit 2: Extension of Mendelian Genetics</b> Chromosome theory of inheritance, Incomplete dominance and codominance, Multiple alleles, Lethal alleles, Epistasis, Pleiotropy, sex linked inheritance, Extra-chromosomal inheritance</p> <p><b>Unit 3: Linkage, Crossing Over and Chromosomal Mapping</b> Linkage and crossing over, Recombination frequency as a measure of linkage intensity, two factor and three factor crosses, Interference and coincidence.</p> <p><b>Unit 4: Mutations</b> Chromosomal Mutations: Deletion, Duplication, Inversion, Translocation, Aneuploidy and Polyploidy; Gene mutations; Induced versus Spontaneous mutations; Back versus Suppressor mutations,</p> <p><b>Unit 5: Sex Determination</b> Chromosomal mechanisms; dosage compensation in <i>Drosophila</i>.</p> <p><b>SEC T2 Aquarium Fish Keeping</b></p> <p>Unit 1: Introduction to Aquarium Fish Keeping Exotic and Endemic species of Aquarium Fishes</p> <p>Unit 2: Biology of Aquarium Fishes Common characters and sexual dimorphism of Fresh water and Marine Aquarium fishes such as Guppy, Molly, Sword tail, Gold fish, Angel fish, Blue morph, Anemone fish and Butterfly fish</p> <p>Unit 3: Food and feeding of Aquarium fishes Use of live fish feed organisms. Preparation and composition of formulated fish feeds, Aquarium fish as larval predator</p>

<p><b>October – November - December</b></p>	<p><b>Core T4 Genetics and Evolutionary Biology</b></p> <p><b>Unit 6: History of Life</b> Origin of Life, Geological time scale</p> <p><b>Unit 7: Introduction to Evolutionary Theories</b> Lamarckism, Darwinism, Neo-Darwinism, Modern Synthetic Theory</p> <p><b>Unit 8: Direct Evidences of Evolution</b> Types of fossils, fossilization, Incompleteness of fossil record, Dating of fossils, Evolution of horse.</p> <p><b>Unit 9: Processes of Evolutionary Change</b> Speciation; Isolating Mechanisms; Modes of speciation (Allopatric, Sympatric) Natural selection (Example: Industrial melanism); Types of natural selection (Directional, Stabilizing, Disruptive), Artificial selection</p> <p><b>Unit 10: Species Concept</b> Biological, Typological and Evolutionary species concept (Advantages and Limitations)</p> <p><b>Unit 11: Macro-evolution</b> Macro-evolutionary Principles (example: Darwin’s Finches); Basic understanding of Micro-evolution.</p> <p><b>Unit 12: Extinction</b> Mass extinction (Causes, Names of five major extinctions, K-T extinction in detail), Role of extinction in evolution, Anthropogenic extinction.</p> <p><b>SEC T2 Aquarium Fish Keeping</b></p> <p>Unit 4: Fish Transportation Live fish transport - Fish handling, packing and forwarding techniques.</p> <p>Unit 5: Maintenance of Aquarium General Aquarium maintenance - budget for setting up an Aquarium Fish Farm as a Cottage Industry</p>
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**MODULE BREAKUP OF THE SYLLABUS**

**SESSION 2022-23**

**CLASS : Sem-IV (Zoology Programme)**

**(Practical Paper : Core T4)**

<b>Month</b>	<b>Topic</b>
<b>July – August - September</b>	<ol style="list-style-type: none"><li>1. Identification of major group of fossils from models/ pictures (Petrified fossil, molds, casts, carbon film, trace fossil)</li><li>2. Identification of Human Karyotypes (Normal karyotype, Down, Klinefelter's, Turner, Cri-du-Chat syndrome) from photograph</li><li>3. Identification of homology and analogy from suitable specimens (Birds and mammals) / pictures,</li></ol>
<b>October – November - December</b>	<ol style="list-style-type: none"><li>4. Linkage maps based on Drosophila crosses</li><li>5. Identification of Mendelian Inheritance and gene interactions (Non Mendelian Inheritance) using suitable examples. Verify the results using Chi-square test</li><li>6. Submission of Laboratory Note Book</li></ol>

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MODULE BREAKUP OF THE SYLLABUS

SESSION 2022-23

CLASS : Sem-VI ( Zoology Programme)

(Theory Paper : DSE 2a and SEC 4)

Month	Topic
July – August - September	<p><b>Aquatic biology</b></p> <p><b>UNIT 1: Aquatic Biomes</b></p> <p>Brief introduction of the aquatic biomes: Freshwater ecosystem (lakes, wetlands, streams and rivers), marine ecosystem; estuaries; intertidal zones, oceanic pelagic zone, marine benthic zone and coral reefs.</p> <p><b>UNIT 2: Freshwater Biology</b></p> <p><b>Lakes:</b> 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.</p> <p><b>Streams:</b> Different stages of stream development, Physico-chemical environment, Adaptation of hill-stream fishes.</p> <p><b>Medical Techniques</b></p> <p><b>Unit 1:</b></p> <p>Introduction to Medical Diagnostics and its Importance</p> <p><b>Unit 2:</b></p> <p>Diagnostics Methods Used for Analysis of Blood Blood composition, Preparation of blood smear and Differential Leucocyte Count (D.L.C) using Leishman's stain, Platelet count using haemocytometer, Erythrocyte Sedimentary Rate (E.S.R), Packed Cell Volume (P.C.V.)</p> <p><b>Unit 3:</b></p> <p>Diagnostic Methods Used for Urine Analysis Urine Analysis: Physical characteristics: Abnormal constituents</p> <p><b>Unit 4:</b></p> <p>Non-infectious Diseases diagnosis and prevention of Diabetes (Type I and Type II), Hypertension (Primary and secondary), Testing of blood glucose using Glucometer/Kit</p>

<b>October – November - December</b>	<p><b>Aquatic biology</b></p> <p><b>UNIT 3: Marine Biology</b></p> <p>Salinity and density of Sea water, Continental shelf, Adaptations of deep sea organisms, Coral reefs, Sea weeds.</p> <p><b>UNIT 4: Management of Aquatic Resources</b></p> <p>Causes of pollution: Agricultural, Industrial, Sewage, Thermal and Oil spills, Eutrophication, Management and conservation (legislations), Sewage treatment ;Water quality assessment- BOD and COD</p> <p><b>Medical Techniques</b></p> <p><b>Unit 5:</b></p> <p>Infectious Diseases Causes, types, symptoms, diagnosis and prevention of Tuberculosis and Hepatitis, Malarial parasite (Microscope based and ELISA based)</p> <p><b>Unit 6:</b> Clinical Biochemistry LFT, Lipid profiling</p> <p><b>Unit 7:</b> Tumours Types (Benign/Malignant), Detection and metastasis: Medical imaging: X-Ray of Bone fracture, PET, MRI and CT Scan (using photographs).</p> <p>.</p>
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**SESSION 2022-23**  
**CLASS : Sem-VI (Zoology Programme)**  
**(Practical Paper : DSE 2a Aquatic biology Lab)**

Month	Topic
<b>July – August - September</b>	<ol style="list-style-type: none"> <li>1. Identify the important zooplanktons present in a lake ecosystem.</li> <li>2. Determine the pH, turbidity/transparency, dissolved Oxygen, and free Carbon dioxide, alkalinity (carbonates &amp; bicarbonates) in water collected from a nearby lake / water body.</li> </ol>
<b>October – November - December</b>	<ol style="list-style-type: none"> <li>3. Instruments used in limnology (Secchi disc, Van Dorn Bottle, Conductivity meter, Turbidity meter, PONAR grab sampler) and their significance.</li> <li>4. A Project Report on a visit to a Sewage treatment plant/Marine bio-reserve/Fisheries Institute/ Pond Ecosystem</li> <li>5. Submission of Laboratory Note Book</li> </ol>