

K. T. S. P. Mandal's
Hutatma Rajguru Mahavidyalaya, Rajgurunagar.

Department of Zoology

Teaching Plan

A.Y.-2020-2021(Semester II)

F. Y. B. Sc. Course Code: ZO-121: Animal Diversity II

Month	Title	Teacher Name
May 2nd Week	<p>Phylum Aschelminthes</p> <p>1.1 Introduction to phylum Aschelminthes</p> <p>1.2 Salient features of Phylum Aschelminthes</p> <p>1.3 Classification of Phylum Aschelminthes (Class Nematoda only with two examples – <i>Ascaris lumbricoides</i> (common round worm), <i>Wuchereria bancrofti</i> (Elephantiasis)).</p> <p>1.4 Economic importance of class Nematoda.</p>	DNB
May 3rd Week	<p>Phylum Annelida</p> <p>2.1 Introduction to Phylum Annelida</p> <p>2.2 Salient features of Phylum Annelida.</p> <p>2.3 Classification of Phylum Annelida up to classes with examples of following classes (names of examples only).</p> <p>Class Polychaeta (e.g: <i>Nereis pelagica</i> (<i>neries</i>/ sand worm, <i>Aphrodita aculeata</i> (=Aphrodite/ seamouse)</p> <p>Class Oligochaeta (e.g.: <i>Pheretima posthuma</i> (earthworm),</p> <p>Class Hirudinea (e.g: <i>Hirudinaria granulosa</i> common cattle leech)</p> <p>2.4 Economic importance of Annelida with reference to earthworms as friends of farmers and in their role in vermicomposting.</p>	DNB
May 4th Week	<p>Phylum Arthropoda</p> <p>3.1 Introduction to Phylum Arthropoda</p> <p>3.2 Salient features of Phylum Arthropoda</p> <p>3.3 Classification of Phylum Arthropoda with specific classes and mentioned examples (names only)</p> <p>Class:Crustacea:<i>Palaemon palaemon</i> (Prawn) <i>Brachyura</i> spp. crabs)</p> <p>Class: Chilopoda: <i>Scolopendra</i> sp. (centipede)</p> <p>Class: Diplopoda: <i>Julus</i> sp. (millipede)</p> <p>Class Insecta: <i>Periplaneta americana</i> (American Cockroach), <i>Anopheles stephensi</i> (mosquito).</p> <p>Class: Arachnida- Spiders, <i>Buthus</i> sp (scorpion)</p> <p>3.4 mouth parts in insects: Mandibulate (cockroach), Piercing and sucking (female <i>Anopheles</i> mosquito), chewing and lapping type (honey bee)</p>	DNB

	<p>3.5 Economic importance of Arthropoda Useful Insects: Honey bee, Lac insect, Silkworm. Harmful insects: Female Anopheles mosquito, Red cotton bug, Rice weevil</p>	
June 1st Week	<p>Phylum Mollusca 4.1 Introduction to Phylum Mollusca 4.2 Salient features of Phylum Mollusca 4.3 Classification of Phylum Mollusca with specific classes and mentioned examples (names only) Class Gastropoda e.g <i>Pila globosa</i> (apple snail) Class Pelecypoda e.g <i>Lamellidens marginalis</i>(Bivalve) Class Polyplacophora e.g <i>Chiton</i> Class: Cephalopoda e.g: <i>Octopus vulgaris</i> (common octopus), <i>Sepia officinalis</i> (common Cuttle fish) 4.4 Economic importance of Mollusca.</p>	DNB
June 2nd Week	<p>Study of Phylum Echinodermata 5.1 Introduction to Phylum Echinodermata 5.2 Salient features of Phylum Echinodermata. 5.3 Classification of Phylum Echinodermata with specific classes and mentioned examples (names only) <ul style="list-style-type: none"> • Class Asterozoa (<i>Asterias rubens</i> sea stars or starfish) • Class: Holothurozoa. <i>Holothuria sp.</i> sea cucumbers) • Class: Echinozoa (<i>Echinus esculentus</i> common sea urchins) • Class: Crinozoa (sea lilies or feather stars) 5.4 Type study: <i>Asterias rubens</i> (Sea Star): Classification, Habit Habitat, External Morphology, Digestive system, Water vascular System and autotomy and regeneration 5.5 Pedicellaria in Echinodermata: straight, crossed, valvate, tridactylous, globigerous. 5.6 Economic importance of Echinodermata.</p>	DNB

Prof. D. N. Birhade

K.T. S. P. Mandal's
Hutatma Rajguru Mahavidyalaya, Rajgurunagar.

Department of Zoology

Teaching Plan

A.Y.-2020-2021(Semester II)

Course Title: Cell biology Course Code: ZO122 Semester II

Month	Title	Teacher Name
May 1st Week	Introduction: 1.1 Introduction cell biology, 1.2 Cell as basic unit of life. 1.3 Importance of Cell Biology and its applications in industry. Overview of Cells 1.3 Introduction to Prokaryotic and Eukaryotic cells. 1.4 Structure and function of Prokaryotic (<i>E. coli</i>) 1.5 Structure and function of Eukaryotic cells (Animal and Plant Cell)	DRB
May 2nd Week	Techniques in Cell Biology: 3.1 Introduction 3.2 Microscopy: Basic Principle, Simple, Compound and applications of Electron Microscope. 3.3 Stains and dyes: Types of Stain: Acidic, basic and neutral. Dye (Preparation and chemistry of dyes not expected) 3.4 Micrometry.	DRB
May 3rd Week	Plasma Membrane: 4.1 Introduction 4.2 Structure of plasma membrane: Fluid mosaic model. 4.3 Transport across membranes: Active and Passive transport, Facilitated transport, exocytosis, endocytosis, phagocytosis – vesicles and their importance in transport. 4.4 Other functions of Cell membrane in brief Protection, cell recognition, shape, storage, cell signalling. 4.5 Cell Junctions: Tight junctions, gap junctions, Desmosomes.	DRB
May	Nucleus: Structure and function	

4th Week	5.1 Introduction to Nucleus 5.2 Structure of Nucleus: Nuclear envelope, Nuclear pore complex, Nucleoplasm, Nucleolus 5.3 Chromatin: Eu-chromatin and Hetro-chromatin, nature and differences. 5.4 Functions of nucleus apparatus, Lysosomes and vacuoles.	DRB
June 1st Week	Endomembrane System 6.1 Introduction 6.2 Structure, location and Functions: Endoplasmic Reticulum, Golgi Mitochondria and Peroxisomes 7.1 Introduction 7.2 Mitochondria: ultrastructure and function of mitochondrion.	DRB
June 2nd Week	7.3 Peroxisomes Cell Division 7.1 Introduction 7.2 Cell cycle (G1, S, G2, M phases), 7.3 Mitosis. 7.4 Meiosis.	DRB

S. Y. B. Sc. Course Title: Animal Diversity - IV Course Code: ZO – 241

Month	Title	Teacher Name
May 4 th Week	<p>Introduction to class –Reptilia</p> <p>1.1 Salient features of class Reptilia with one example (name only) – <i>Chelone, Calotes</i>.</p> <p>1.2 Venomous and Non-venomous snakes – Cobra, Russell’s viper, Rat snake, Grass snake.</p> <p>1.3 Snake venom, symptoms, effect and cure of snake bite, first aid treatment of snakebite.</p> <p>1.4 Desert adaptations in reptiles in brief.</p>	DNB
June 1 st Week	<p>Introduction to class –Aves</p> <p>2.1 Salient features of class Aves with two examples (names only) – Sparrow, Parrot.</p> <p>2.2 Flight adaptations in birds.</p> <p>2.3 Types of Beaks and feet in birds.</p> <p>2.4 Migration in birds – Altitudinal, Latitudinal</p>	DNB
June 2 nd Week	<p>3. Introduction to class - Mammalia.</p> <p>3.1 Salient features of class Mammalia with two examples (names only) – Rat, Rabbit.</p> <p>3.2 Egg laying mammals.</p> <p>3.3 Aquatic adaptations in mammals.</p> <p>3.4 Flying adaptations in mammals.</p> <p>3.5 Cursorial and fossorial adaptation in mammals</p>	DNB
June 3 rd Week	<p>4. Study of Rat</p> <p>4.1 Systematic position, habit and habitat.</p> <p>4.2 External characters.</p> <p>4.3 Digestive system, food and feeding.</p> <p>4.4 Respiratory system.</p> <p>4.5 Blood vascular system – Structure of Heart.</p> <p>4.6 Nervous system – Central Nervous system only.</p> <p>4.7 Sense organs – Structure and functions of Eye & Ear.</p> <p>4.8 Reproductive system</p>	DNB

Prof. D. N. Birhade



Course Title - Applied Zoology II Course Code - ZO-242

Month	Title	Teacher Name
<p>May 4th Week</p>	<p>Apiculture: 1.1 An introduction to Apiculture, Systematic position, Study of habit, habitat and nesting behaviour of <i>Apis dorsata</i>, <i>Apis indica</i>, <i>Apis florea</i> and <i>Apis mellifera</i>. 1.2 Life cycle, Colony organization and Division of labour. 1.3 Bee behaviour and communication (Round Dance and Wag-Tail Dance) . 1.4 Bee keeping equipments : a) Bee box (Langstroth type), b) Honey extractor, c) Smoker, d) Bee-veil, e) Gloves, f) Hive tool, g) Bee Brush, h) Queen excluder</p>	<p>DRB</p>
<p>June 1st Week</p>	<p>1.5 Bee keeping and seasonal management. 1.6 Bee products (composition and uses) : a) Honey, b) Wax, c) Bee Venom, d) Propolis, e) Royal jelly, f) Pollen. 1.7 Diseases and enemies of Bees : a) Bee diseases - Protozoan (Nosema), Bacterial (American foul brood), Viral (Sac brood), Fungal (Chalk brood). b) Bee pests - Wax moth (Greater and Lesser), Wax beetle. c) Bee predators - GreenBee eater, King crow, Wasp, Lizard. 1.8 Bee pollination and management of bee colonies for pollination.</p>	<p>DRB</p>
<p>June 2nd Week</p>	<p>2. Fisheries : 2.2 An introduction to fisheries and its types (in brief) : Freshwater fisheries, Marine fisheries, Brackish water fisheries. 2.3 Habit, habitat and culture methods of following freshwater forms : a) Rohu (<i>Labeo rohita</i>) , b) Catla (<i>Catla catla</i>) , c) Mrigal (<i>Cirrhinus mrigala</i>). 2.3 Harvesting methods of following marine forms: a) <i>Harpodon</i>, b) Mackerel, c) Pearl oyster.</p>	<p>SBP</p>

June 3rd Week	2.4 Crafts and Gears in Indian Fishery: a) Crafts – Catamaran, Machwa, Dinghi. b) Gears – Gill net, Dol net, Rampani net, Cast net. 2.5 Fishery byproducts: a) Fish meal, b) Fish flour, c) Fish Liver oil, d) Fish manure, e) Fish fin soup. 2.6 Fish preservation technique: a) Chilling, b) Freezing, c) Salting, d) Drying, e) Canning	SBP
---	--	------------

Dr. S. B. Patil



T. Y. B. Sc. ZY- 341(Paper I) Biological Techniques

Month	Title	Teacher Name
<p align="center">May 2nd week</p>	<p>Introduction to biological techniques</p> <p>1.1 Solution/strengths of chemicals: percentage, normality, molarity, molality, osmolarity, osmolality, ppm, ppb</p> <p>1.2 Separation techniques: principle and applications, techniques related to isolation, purification and characterization of bio molecules</p> <p>1.2.1 Chromatography (paper, ion-exchange), gel filtration</p> <p>1.2.2 Electrophoresis-(agarose, polyacrylamide)</p> <p>1.2.3 Ultracentrifugation</p> <p>1.2.4 Colorimetry and spectroscopy</p>	<p align="center">GSK</p>
<p align="center">May 3rd Week</p>	<p>Haematological Techniques:</p> <p>2.1 Blood cell count –Total count of RBCs, WBCs and Differential count of WBCs and their significance. Examination of bone marrow. Hb%, bleeding time, clotting time and their significance</p> <p>2.2 Microscopy: simple, compound, phase contrast, electron - their principle & working</p> <p>2.3 Micrometry</p> <p>2.4 Camera Lucida</p>	<p align="center">GSK</p>
<p align="center">May 4th Week</p>	<p>Micro technique:</p> <p>3.1 Procurement of tissues and precautions to be taken to avoid tissue damage during procurement</p> <p>3.2 Fixatives: Classification of fixatives and importance of fixation of tissues</p>	<p align="center">GSK</p>

	<p>3.3 Methods of fixation</p> <p>3.4 Dehydration, clearing, impregnation and block making:</p> <p>3.4.1. Clearing and alcoholising agents</p> <p>3.4.2. Clearing and dealcoholisation</p> <p>3.4.3. Impregnation and Embedding: Types of embedding media, methods of embedding and block making. Comments on hardening of paraffin</p>	
<p>June 1st Week</p>	<p>Microtomes and Knives:</p> <p>4.1 Types of microtomes</p> <p>4.2 Types of microtome knives 4.3 Section cutting: Microtomy- steps and precautions, common faults in section cutting reasons & remedies. Mounting and spreading of ribbons</p>	<p>GSK</p>



T.Y. B. Sc ZY- 342 (Paper II) Mammalian Physiology & Endocrinology

Month	Title	Teacher Name
<p>May 2nd week</p>	<p>Introduction: Definition and scope</p> <p>2 Nutrition: 2.1 Concept of nutrition and energy requirements</p> <p>2.2 Physiology of digestion: digestive enzymes and their actions- salivary, gastric and intestinal digestion. Role of liver and pancreas in digestion</p>	<p>DLT</p>
<p>May 3rd Week</p>	<p>Circulation : 3.1 Cardiac Cycle- systole, diastole and pacemakers</p> <p>3.2 Cardiac output and blood pressure</p> <p>3.3 Definitions and significance of electrocardiogram, colour doppler, angioplasty, angiography, angina pectoris, and coronary bypass</p> <p>Respiration:</p> <p>4.1 Definition and types- Pulmonary and tissue respiration</p> <p>4.2 Mechanism of transport of gases</p> <p>(a) Transport of Oxygen- Oxyhaemoglobin formation</p> <p>(b) Transport of Carbon-dioxide</p> <p>(c) Respiratory Quotient and BMR</p>	<p>DLT</p>
<p>May 4th Week</p>	<p>Excretion:</p> <p>5.1 Physiology of Urine formation- ultrafiltration, reabsorption, tubular secretion 5.2 Counter-Current Multiplier theory for urine concentration</p> <p>5.3 Role of ADH, and Renin angiotensin system</p> <p>5.4 Definitions and clinical significance of- renal failure, renal calculi, dialysis</p> <p>Muscles:</p> <p>6.1 Ultrastructure of striated muscle</p> <p>6.2 Sliding filament theory of muscle contraction – physical and</p>	<p>DLT</p>

	<p>chemical changes</p> <p>6.3 Response of muscles to stimulation- simple muscle twitch, muscle fatigue and rigor</p> <p>mortis</p>	
<p>June 1st Week</p>	<p>Nervous Excitation:</p> <p>7.1 Origin and conduction of nerve impulse, saltatory conduction</p> <p>7.2 Synapse- ultrastructure and transmission of nerve impulse</p> <p>7.3 Definitions/concepts: impulse, stimulation, conduction, response, EEG, epilepsy</p>	<p>DLT</p>



T.Y. B. S. ZY -343 (Paper III) Genetics and Molecular Biology

Month	Title	Teacher Name
<p>May 2nd week</p>	<p>1. Linkage, crossing over and molecular basis of recombination</p> <p>2. Gene Mutation</p> <p>2.1 Definition</p> <p>2.2 Types of mutations: spontaneous, induced, somatic, gametic, forward, reverse. Types of point mutation- deletion, insertion, substitution, transversion, transition</p> <p>2.3 Mutagenic agents.</p> <p>a) UV radiation and ionising radiation</p> <p>b) Base analogs, alkylating and intercalating agents</p>	<p>DNB</p>
<p>May 3rd Week</p>	<p>3. Population Genetics</p> <p>3.1 Basic Concepts in population genetics: Mendelian population, gene pool, gene frequency, chance mating (Panmictic mating)</p> <p>3.2 Hardy Weinberg law and its equilibrium</p>	<p>DNB</p>
<p>May 4th Week</p>	<p>4. Molecular Biology</p> <p>4.1. DNA as genetic material- evidences (Griffith's, Avery et al and Hershey and Chase experiment), RNA as genetic material-TMV</p> <p>4.2. Chromatin-Heterochromatin, Euchromatin, histones, nucleosome arrangement, packaging of DNA</p>	<p>DNB</p>
<p>June</p>	<p>5. Central Dogma of Molecular Biology</p>	<p>DNB</p>

1st Week	<p>5.1. DNA Replication-Semiconservative (Messelson and Stahl experiment) Mechanisim in prokaryotes and eukaryotes</p> <p>5.2. Transcription- Transcriptional unit, RNA polymerase, transcription in prokaryotes and eukaryotes, post transcriptional modification (splicing- mRNA, modifications at 3' and 5' end) 5</p> <p>5.3. Translation-Genetic code, properties of genetic code, ribosome structure</p> <p>[prokaryotes and eukaryotes], protein synthesis–initiation, elongation, termination</p> <p>and concept of post translational modification (glycosylation)</p>	
-----------------	--	--



T.Y. B. Sc. ZY-344 (Paper IV) Organic Evolution

Month	Title	Teacher Name
May 2nd week	Introduction. 1.1 Origin of life 1.2 Origin of eukaryotic cell (Origin of mitochondria , plastids & symbionts) Evidences in favour of organic evolution: 8 Evidences from: anatomy, embryology, geographical distribution, palaeontology, physiology, biochemistry, genetics and molecular biology	DRB
May 3rd Week	Theories of organic evolution 3.1 Lamarckism 3.2 Darwinism and Neo Darwinism 3.3 Mutation Theory 3.4 Modern Synthetic theory	DRB
May 4th Week	Isolation: 4.1 Isolating mechanism 4.2 Classification of isolating mechanism: Pre-zygotic and post-zygotic Speciation: 5.1 Types of speciation(Allopatric & Sympatric) 5.2 Mechanism of speciation	DRB
June 1st Week	5.3 Patterns of speciation 5.4 Factors influencing speciation Geological Time Scale	DRB



T.Y. B. Sc. ZY-345 (Paper V) General Embryology

<p>May 2nd week</p>	<p>Introduction: 1.1 Definition and scope 1.2 Theories of preformation, pangensis, epigenesis, axial gradient and germplasm Concepts in Developmental Biology: Growth, differentiation, dedifferentiation, cell determination, cell communication, morphogenesis, induction and regeneration</p>	<p>SBP</p>
<p>May 3rd Week</p>	<p>Gametogenesis: 3.1 General aspects and origin of germ cells 3.2 Sperm: general structure, mention variations with reference to Insect, Amphioxus, Frog, Bird and Human 3.3 Ultra structure of typical sperm. (entire, T.S. through head, middle piece and tail) 3.4 Spermatogenesis: phases & spermiogenesis (nuclear and cytoplasmic changes) 3.5 Oogenesis phases: growth phase- pre-vitellogenesis, vitellogenesis and post vitellogenesis 3.6 Oocyte maturation: role of MPF (maturation promotion factor) 3.7 Ovum: general structure 3.8 Egg membranes: primary, secondary and tertiary 3.9 Types of eggs</p>	<p>SBP</p>
<p>May 4th Week</p>	<p>Fertilization: 4.1 Concept and types 4.2 Attraction of gametes: sperm activation, chemotaxis (fertilizin and antifertilizin as enzymes and gamones as hormones) 4.3 Sperm penetration: acrosome reaction, capacitation & decapacitation 4.4 Activation of ovum: fertilization cone, polyspermy prevention: fast block (fertilization potential) & slow block (cortical reaction) & perivitelline space fertilization membrane 4.5 Amphimixis 4.6 Significance of fertilization</p>	<p>SBP</p>

<p>June 1st Week</p>	<p>Cleavage 5.1 Mechanism 5.2 Planes and symmetry 5.3 Patterns / Types 5.4 Significance</p> <p>Blastula: Definition and types</p> <p>Gastrulation: 7.1 Concept 7.2 Basic cell movements in gastrulation: epiboly, emboly, convergence, invagination, ingression & involution (with reference to frog) 7.3 Organizer: primary, secondary, tertiary 7.4 Organogenesis: cell differentiation, tissue differentiation & organ formation up to rudimentary stage</p>	<p>SBP</p>
-------------------------------------	---	-------------------

Dr. S. B. Patil



T.Y. B. Sc. ZY-346 (Paper VI) Medical Entomology

May 2nd week	Fundamentals of Agricultural, Forest, Medical and Veterinary Entomology Introduction to medical entomology 2.1 Morphology and anatomy of insects	SBP
May 3rd Week	Veterinary entomology- Insects as disease spreading agents in general	SBP
May 4th Week	Insects as social groups- 4.1 Definition, intraspecific and interspecific relationships among insects 4.2 Social organization in wasps and termites 4.3 Significance of social organizations	SBP
June 1st Week	Study of following insects as causing agents of human diseases- their classification up to family, appearance, habit, brief life history, distribution, diseases caused and control measures- 6.1 Mosquito 6.2 Flea 6.3 House fly 6.4 Bed bug 6.5 Louse 6.6 Tick 6.7 Mite 6.8 Blister beetle	SBP

As per the practical syllabus of T. Y. B. Sc. All completed by Dr. S.B. Patil & G. S. Kadlag.

Dr. S. B. Patil



F. Y. B. Sc.
Course Title: Zoology Practical Paper
Course Code: ZO113
Semester I

Month	Title	Teacher Name
May 1st Week	1. Museum Study of phylum Protozoa: Euglena, Paramecium, Amoeba, Plasmodium sp. 2. Museum study of Phylum Porifera: <i>Sycon</i> , <i>Euplectella</i> , <i>Chalina</i> , Spongilla. 3. Museum study of phylum Cnidaria: <i>Hydra</i> , <i>Physalia</i> , <i>Aurelia</i> , <i>Metridium</i> . 4. Museum Study of phylum Platyhelminthes: <i>Planeria</i> , <i>Faciola hepatica</i> , <i>Taenia solium</i>	DRB
May 2nd Week	5. Study of Paramecium: Culture, External morphology, Conjugation and Binary fission. 6. Study of permanent slides: Spicules and Gemmules in Sponges, T.S. of <i>Sycon</i> , T.S. of <i>Hydra</i> , <i>Taeniasolium</i> : Scolex, Gravid proglottid. 7. Estimation of Dissolved oxygen from given water sample. 8. Study of microscopic fauna of freshwater ecosystem (from pond).	DRB

Course Title: Zoology Practical Paper Course Code: ZO123
Semester II

Month	Title	Teacher Name
May 3rd Week	1. Museum study of Phylum Aschelminthes: <i>Ascaris lumbricoides</i> , 2. Museum study of phylum Annelida: <i>Neries</i> , Earthworm, Leech. 3. Museum study of phylum Arthropoda: Prawn, Cockroach, Centipede, Millipede, Crab 4. Museum study of phylum Mollusca: <i>Pila</i> , <i>Chiton</i> , Bivalve, Octopus.	DRB
May 4th Week	5. Museum study of phylum Echinodermata: Sea Star, Sea urchin, Brittle Star, sea cucumber. 6. Study of Microscope: Simple and Compound 7. Temporary preparation of mitotic cell from onion roots 8. Study of Cell organelles (any three) by using microphotographs	DRB



S. Y. B. Sc.
Course Title: Zoology Practical Paper Course Code: ZO – 233
Semester – III

Month	Title	Teacher Name
May 4th Week	1. Museum study of Group Protochordata : <i>Balanoglossus, Herdmania, Petromyzon</i> . 2. Museum study of Class Pisces: <i>Labeo, Scoliodon, Hippocampus</i> . 3. Museum study of Class Amphibia : <i>Salamandra, Rana, Ichthyophis</i> . 4. Study of types of scales in fishes: Placoid scale, Cycloid scale, Ctenoid scale & Ganoid scale. 5. Study of types of tail fins in fishes: Homocercal, Heterocercal & Diphycercal.	DNB
June 1st Week	6. Study of external morphology and life-cycle of <i>Bombyx mori</i> . 7. Study of five equipments in Sericulture. 8. Study of following insect pests with respect to marks of identification, nature of damage, economic importance and control measures. a) Jowar stem borer, b) Red cotton bug, c) Brinjal fruit borer, d) Mango stem borer. 9. Study of any two non insect pests corresponding to theory course	DNB

Course Title: Zoology Practical Paper Course Code: ZO – 243
Semester – IV

Month	Title	Teacher Name
June 2nd Week	1. Museum study of Class Reptilia: Venomous & Non-venomous snake – Two each. 2. Identification of Venomous & Non-venomous snakes with the help of pictorial taxonomic keys. 3. Museum study of Class Aves: Crow, <i>Kingfisher</i> & Duck. 4. Study of types of beaks & feet in birds – Any two each. 5. Museum study of Class Mammalia: Rat, Shrew & Bat. 6. Study of external morphology, life cycle and polymorphism in Honey Bee. 7. Study of Bee keeping Equipment: Bee box, Honey extractor, Smoker, Bee-veil, queen excluder. 8. Identification, Classification and study of habit, habitat and economic importance of a) Rohu (<i>Labeo rohita</i>), b) Catla (<i>Catla catla</i>), c) Mrigal (<i>Cirrhinus mrigala</i>). (D) 9. Identification, Classification and study of habit, habitat and economic importance of a) Prawn, b) Crab, c) Lobster, d) Pearl Oyster. 	DNB

