

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

Department of Zoology

Teaching Plan

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

F. Y. B. Sc. :- Course Code: ZO-111-Animal Diversity I

Month	Title	Name of Teacher
Jul & Aug	<p>1. Principles of Classification: Taxonomy & Systematics 1.1 Taxonomy: Basic terminology and Introduction Alpha, Beta and Gamma levels of taxonomy, Micro-taxonomy</p> <p>Macro taxonomy: Phenetics (numerical taxonomy, Cladistics (Phylogenetic systematics), Evolutionary taxonomy (evolutionary systematics)</p> <p>Classical taxonomy and experimental or neo taxonomy (biochemical taxonomy and Cytotaxonomy)</p> <p>Significance of Taxonomy 1.2 Systematics: definition introduction 1.3 Linnaean system of classification (Six level classification: Phylum, class, order, family, genus, species) 1.4 Concept of Species: Biological & Evolutionary 1.5 Introduction to Binomial Nomenclature. 1.6 Introduction to Five kingdom system</p>	DNB
Aug & Sept	<p>2. General Features of kingdom Animalia 2.1 General characters of Kingdom Animalia, Grades of organization 2.2 Symmetry.</p> <p>3. Kingdom Protista (Phylum: Protozoa) 3.1 Introduction to Phylum Protozoa 3.2 Salient features of Phylum Protozoa 3.3 Classification of Phylum Protozoa up to classes with two examples of each class (names only). Class Rhizopoda (e.g :<i>Entamoeba histolytica</i>, <i>Arcella</i>), Class Mastigophora (e.g: <i>Euglena viridis</i>, <i>Trypanosoma gambiense</i>), Class Ciliata (e.g <i>Paramecium caudatum</i>, <i>Opalina ranarum</i>), Class Sporozoa (e.g <i>Plasmodium vivax</i>, <i>Toxoplasma gondii</i>) 3.4 Locomotion in Protozoa: Amoeboid, Ciliary and Flagellar with</p>	DNB

	<p>suitable examples</p> <p>3.5 Type Study: <i>Paramecium caudatum</i>: Classification, Habit and Habitat, External morphology, Feeding and digestion, Excretion, Reproduction (binary fission and conjugation)</p> <p>3.6. Economic importance of Protozoa (three harmful and one useful protozoan)</p> <p>3.6.1-Harmful Protozoa: <i>Plasmodium vivax</i> (malarial parasite), <i>Entamoeba histolytica</i> (Amoebic dysentery), <i>Trypanosoma gambiense</i> (Gambian sleeping sickness).</p> <p>3.6.2- Useful Protozoa: <i>Trichonympha</i></p>	
<p>Sept</p> <p>&</p> <p>Oct</p>	<p>4. Origin of Metazoa</p> <p>4.1 Introduction Origin and importance of Metazoa</p> <p>5. Phylum Porifera</p> <p>5.1. Introduction to Phylum Porifera</p> <p>5.2 Classification of Phylum Porifera up to classes with two examples of each class (names only, no description of specimens). Class Calcarea (e.g.: <i>Leucosolenia</i>, <i>Sycon</i> (<i>Scypha</i>)) Class Hexactinellida (e.g: <i>Euplectella</i> (venus flower basket), <i>Hyalonema</i> (glass sponge)) Class Demospongiae (e.g: <i>Chalina</i> (Mermaid’s gloves, <i>Spongilla</i> (fresh water sponge))</p> <p>5.3 Canal system in sponges: Ascon, Leucon and Rhagon type.</p> <p>5.4 Skeleton in sponges: Spicules, its types: Microscleres & Megascleres, Monoaxon – monactinal, diactinal, Amphidiscs, Triaxon, Polyaxon, Spongin fibres.</p> <p>5.5 Regeneration in sponges.</p> <p>5.6 Economic importance of Phylum Porifera.</p>	<p>DNB</p>
<p>Nov</p>	<p>6. Phylum: Cnidaria</p> <p>6.1 Introduction to Phylum Cnidaria</p> <p>6.2 Salient features of Phylum Cnidaria</p> <p>6.3 Classification of Phylum Cnidaria up to class level with given examples each class (names of examples only) Class Hydrozoa e.g.: <i>Hydra</i>, <i>Physalia</i> (Portuguese man of war) Class Scyphozoa e.g: <i>Aurelia</i> (Jelly fish), <i>Leucernaria</i> (trumpet shaped Jellyfish) Class Anthozoa: e.g; <i>Metridium</i> (Common sea anemone)</p> <p>6.4 Polymorphism in Hydrozoa: Polyps & Medusa (polyp types: gastrozooids, dactylozooids, gonozooids) and functions</p> <p>6.5 Economic importance of Cnidarians with reference to Corals and Coral reefs.</p>	<p>DNB</p>
<p>Dec</p>	<p>7. Phylum Platyhelminthes</p> <p>7.1 Introduction to Phylum Platyhelminthes</p> <p>7.2 Salient features of Phylum Platyhelminthes</p> <p>7.3 Classification of Phylum Platyhelminthes up to classes with two</p>	<p>DNB</p>

	<p>examples each class (names of examples only). Class: Turbellaria (e.g: <i>Dugesia</i>, <i>Bipallium</i>) Class: Trematoda (e.g: <i>Fasciola hepatica</i>, <i>Schistosoma haematobium</i>) Class Cestoda: (<i>Taenia solium</i> (pork tape worm), <i>Echinococcus granulosus</i> (dog tapeworm)) 7.4 Parasitic adaptations in Platyhelminthes: structural and physiological. 7.5 Economic importance of Platyhelminthes</p>	
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Prof. D. N. Birhade



F. Y. B. Sc.:- Course Code: ZO 112-Animal Ecology

Month	Title	Name of Teacher
Sept	1. Introduction to Ecology 1.1 Concepts of Ecology, Environment, Population, Community, Ecosystem, Biosphere, Autecology and synecology. 2. Ecosystem 2.1 Types of ecosystems: Aquatic (Freshwater, estuarine, Marine and terrestrial (Forest, Grassland and Desert) 2.2 Structure and Composition of Ecosystem (Abiotic components and biotic components. 2.3 Food chain: Detritus and grazing food chains, Food web, Energy flow through the ecosystem, Ecological pyramids: Number, Biomass, and Energy. 2.4 concept of Eutrophication in lakes and rivers.	APS
Oct	3 Population 3.1Characteristic of population: Density, Natality, Mortality, Fecundity tables, survivorship curves, age ratio, sex ratio, dispersal and dispersion. 3.2Exponential and logistic growth, 3.3 Population regulation – density-dependent and independent factors. Population interactions, Gause’s Principle with laboratory and field interactions, 3.4 Quadrate, line and belt transect methods.	APS
Nov	4. Community 4.1Community characteristics: species richness, dominance, diversity, abundance, vertical stratification, Eco tone and edge effect; Ecological succession with one example.	APS
Dec	5. Animal interactions 5.1Introduction to Animal interactions 5.2 Types of Animal interactions with at least to suitable examples of each 5.2.1-Competition: Interspecific and intraspecific	APS



S. Y. B. Sc Course Code: ZO – 231 Course Title: Animal Diversity – III

Month	Title	Name of Teacher
Jul	<p>1. Introduction to Phylum Chordata – 1.1 Origin & Ancestry of Chordates. 1.2 Comparative account of fundamental characters of Chordates with Non Chordates. 1.3 Salient features of Phylum Chordata. 1.4 Classification of Phylum Chordata upto classes – Pisces, Amphibia, Reptilia, Aves, Mammalia.</p>	DNB
Aug	<p>2. Introduction to Group – Protochordata. 2.1 Salient features of Protochordata. 2.2 Salient features of subphylum with two example each - Names only. Hemichordata – <i>Balanoglossus</i> and <i>Rhabdopleura</i>, Urochordata - <i>Herdmania</i> and <i>Salpa</i>, Cephalochordata – <i>Branchiostoma</i> (Amphioxus) and <i>Asymmetron</i>.</p>	DNB
Oct	<p>3. Introduction to subphylum – Vertebrata 3.1 Salient features of Vertebrata. 3.2 Introduction and General characters of sections with two examples - Names only. Agnatha – <i>Petromyzon</i> & <i>Myxine</i> & Gnathostomata – Frog & <i>Labeo</i>.</p>	DNB
Oct	<p>4. Introduction to Class – Pisces 4.1 Salient features of Class – Pisces. 4.2 Introduction and Salient features of sections with two examples - Names only. Class – Chondrichthyes – <i>Scoliodon</i> and <i>Chimaera</i> & Osteichthyes – <i>Labeo</i> and <i>Catla</i> 4.3 Types of Scales in Fishes. 4.4 Types of Fins in Fishes.</p>	DNB
Nov	<p>5. Introduction to Class – Amphibia 5.1 Salient features of Class – Amphibia. 5.2 Introduction to order – Apoda – <i>Ichthyophis</i>, Urodela – <i>Salamandra</i> (Salamander) and Annura - <i>Rana</i>. 5.3 Parental care in Amphibia</p>	DNB
Nov &	<p>6. Study of <i>Scoliodon</i> <i>Scoliodon</i> – 6.1 - Systematic position, Geographical distribution, Habit, Habitat 6.2 - External characters 6.3 - Digestive System, Food</p>	DNB

Dec	and feeding mechanism. 6.4 - Respiratory System – Structure of Holobranch only. 6.5- External & Internal Structure of heart, Working of heart. 6.6 - Nervous System – Brain only. 6.7 - Male urinogenital system & Female reproductive System. 6.8- Yolk sac placenta.	
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Prof. D. N. Birkhade



S. Y. B. Sc. Course Code - ZO – 232 Course Title - Applied Zoology I

Month	Title	Name of Teacher
Jul	<p>1) Sericulture:</p> <p>1.1 An introduction to Sericulture, Study of different types of silk moths, their distribution, Taxonomic position and varieties of silk produced in India : Mulberry, Tassar, Eri and Muga silk moths.</p> <p>1.2 External Morphology and life cycle of <i>Bombyxmori</i>.</p>	SPB
Aug & Sept	<p>1.3 Cultivation of mulberry :</p> <p>a) Varieties for cultivation, b) Rain fed and irrigated mulberry cultivation- Fertilizer schedule, Pruning methods and leaf yield.</p> <p>1.4 Harvesting of mulberry : a) Leaf plucking, b) Branch cutting, c) Whole shoot cutting.</p> <p>1.5 Silk worm rearing : a) Varieties for rearing, b) Rearing house, c) Rearing techniques, d) Important diseases and pests.</p>	SPB
Oct & Nov	<p>1.6 Preparation of cocoons for marketing.</p> <p>1.7 Post harvest processing of cocoons :</p> <p>a) Stiffling, sorting, storage, deflossing and riddling, b) Cocoon cooking, reeling equipment and rereeling, washing and polishing.</p> <p>1.8 Biotechnological and biomedical applications of silk.</p>	SBP
Nov & Dec	<p>2) Agricultural Pests and their control:</p> <p>2.1 An introduction to Agricultural Pests, types of pests (agricultural, store grain, veterinary).</p> <p>2.1 Major insect pests of agricultural importance (Marks of identification, life cycle, nature of damage and control measures). a) Jowar stem borer, b) Red cotton bug, c) Brinjal fruit borer, d) Mango stem borer, e) Blister beetle, f) Rice weevil, g) Pulse beetle, h) Tick.</p>	SBP

	<p>2.3 Non insect pests: Rats, Crabs, Snails, and Squirrels</p> <p>2.4 Pest control practices in brief: Cultural control, Physical control, Mechanical control, Chemical control, Biological control, Pheromonal control, Autocidal control and Concept of IPM in brief.</p> <p>2.5 Plant protection appliances: Shoulder type Rotary duster, Knapsack sprayer, Cynogas Pump.</p>	
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Dr. S. B. Patil

T. Y. B. Sc (Zoology) PAPER I : Animal Systematics and Diversity- V

Month	Topics	Teacher
Jul & Aug	Study of Pila globosa with reference to the following: Systematic position, habit, habitat and external characters. Body wall & pallial complex. Functional anatomy: digestive, respiratory, circulatory, excretory, reproductive, nervous system & sense organs	DNB
Aug &	Study of the following groups with reference to: Protozoa : locomotion & nutrition. Porifera : skeleton and canal system, Coelenterata : polymorphism and corals. Hemichordata : affinities	DNB
Sept	Study of Calotes versicolor with reference to the following : Systematic position, habit, habitat and External characters. Functional Anatomy - Digestive, Circulatory, Excretory, Reproductive, Nervous system and Sense organs	DNB
Oct	Comparative study of following topics in vertebrates Integument: Skin of Scoliodon, Frog, Calotes, Pigeon & Rat Heart: Structure of heart of Scoliodon, Frog, Calotes, Pigeon & Rat Kidney: Evolution of Archinephros, Pronephros, Mesonephros, Metanephros Brain: Morphological variation in the different regions of the brain of Scoliodon, Frog, Calotes, Pigeon and Rat/Rabbit	DNB
Nov & Dec	Study of following groups with reference to Pisces : Dipnoi, Accessory respiratory organs , Electric organs Reptilia : Temporal vacuities, General characters of Rhynchocephalia Mammalia : Dentition in mammals	DNB



PAPER II : Mammalian Histology

Month	Topics	Teacher
Jul	Introduction : Definition and scope Tissues: Definitions and review of tissues (location, structure and functions) epithelial, connective, nervous and muscular	SBP
Aug & Sept	Histological study of following organs Skin (V.S.) , Tooth (V.S.) , Tongue (C.S.) with reference to mucosa papillae and taste buds Alimentary canal: Basic histological organization with reference to: Oesophagus (T.S.), stomach (T.S.), duodenum (T.S.) Ileum (T.S.) and rectum (T.S.)	SBP
Sept & Nov	Glands associated with digestive system: Salivary glands – parotid (C.S.), submandibular (C.S.) sublingual(C.S.), liver(C.S.) and pancreas (C.S.) including both exocrine and endocrine components Respiratory organs: Trachea (T.S.) and lung (C.S.) Blood vessels: Artery (T.S.), vein (T.S.) and capillaries (T.S.) Kidney (L.S.), Structure of nephron and juxtaglomerular complex	SBP
Nov	Reproductive organs: a) Testis (T.S.) with reference to Seminiferous Tubules and cells of Leydig b) Ovary (C.S.) - primary, secondary and matured (Graffian) follicle, corpus luteum and corpus albicans	SBP
Dec	Histology of endocrine glands : Pituitary gland, Thyroid gland, Adrenal gland	SBP

Dr. S. B. Patil



PAPER III : Biological chemistry

Month	Topics	Teacher
Sept	Basic Biochemistry: Bonds –Types: Ionic, covalent, noncovalent bonds (hydrogen, hydrophobic, electrostatic, Van der Waal forces) and their functions in bio molecules. Structure of water molecule (liquid, ice and colloid). Physico-chemical properties of water. Concept of acid and base, pH, Sorenson’s scale, derivation of Henderson Hasselbalch equation and its applications. Concept of Buffer-types of buffer, buffering capacity and buffers in biological system (Phosphate, bicarbonate)	UMP
Oct	Carbohydrates: Definition and classification of carbohydrates. Isomerism in carbohydrates- Structural and stereoisomerism. Stereo chemical properties-enantiomeres, anomers, epimerism, mutarotation, racemisation, biological significance and clinical significance-hypoglycemia and hyperglycemia.	UMP
Nov	Proteins: Essential and non essential amino acids. Structure and classification of amino acids, Peptide bond, types of proteins, protein structures (primary, secondary, tertiary and quaternary structures with suitable example), bonds responsible for protein structures and Biological significance of proteins	UMP
Nov	Enzymes: Classification and properties of enzymes. Regulatory and non regulatory enzymes. Enzyme kinetics, MM equation and its importance and LB plot. Reversible and irreversible enzyme inhibition. Factors influencing enzyme activity (pH, temperature, substrate concentration, enzyme concentration). Introduction of isoenzymes, allosteric enzymes, immobilized enzymes and ribozymes. Clinical significance of enzymes- PKU and AKU	UMP
Dec	Lipids: Introduction, classification and chemistry	UMP

	Clinical significance (obesity, atherosclerosis, myocardial infarction)	
	Biological significance of lipids	



PAPER IV: Environmental Biology and Toxicology

Month	Topics	Teacher
Sept	<p>Environmental Biology</p> <p>Introduction- Definition, basic concepts and scope</p> <p>The Ecosystem</p> <p>Definition, abiotic and biotic components and their interrelationship, Energy flow in ecosystem and flow models</p> <p>Major Ecosystems: (a) natural ecosystem: e.g. fresh water, forest (b) artificial ecosystem: e.g. cropland, Food chain in ecosystem and food web, Ecological pyramids</p>	DRB
Oct	<p>Environmental Pollution:</p> <p>Definition and types of pollution, Pollutants, types of pollutants (metallic, gaseous, acids, alkalis, biocides)</p> <p>Air pollution: Definition, sources of air pollution and their effects, Air pollution and its relevance with the following, Acid rain</p> <p>Greenhouse effect, Ozone layer depletion, Water pollution: definition, sources of water pollution and their effects on ecosystem.</p> <p>Community waste with reference to following: Sewage, Industrial wastes, Agricultural wastes, Land / Soil pollution: definition, sources of land / soil pollution and their effects, Noise pollution: definition, sources of noise pollution and their effects and control measures</p>	DRB
Nov	<p>Environment and Development</p> <p>Bioindicators and environmental monitoring, Environmental challenges in India: land degradation, population explosion, urbanization and industrialization</p> <p>Natural Resources and Conservation:</p> <p>Renewable and non-renewable resources, Soil conservation, Forest conservation, Energy sources: conventional and non-conventional</p>	DRB

	Wildlife Management:	
Nov &	Definition, causes of wildlife depletion, Importance of wildlife management in India, Endangered species, vulnerable species, rare species and threatened species, Wild life conservation	DRB
Dec	Toxicants and Toxicity: Definition of toxicology, scope and branches, Types of toxicants Factors influencing toxicity (pH, temperature, reproductive status, age, physiological state), Dose, LD50, LC50	
	Toxicants of Public Health and Hazards:	
Dec	Pesticides, heavy metals, fertilizers, food additives and radioactive substances	DRB



PAPER V : Parasitology

Month	Topics	Teacher
Sept	<p>Introduction: Scope and branches of Parasitology</p> <p>Definition: host, parasite, vector, commensalisms, mutualism and parasitism</p> <p>Types of parasites: ectoparasites, endoparasites and their subtypes</p>	GSK
Oct	<p>Types of hosts: intermediate and definitive, paratenic, reservoir</p> <p>Host-Parasite relationship: Host specificity- definition, structural specificity, physiological specificity and ecological specificity</p> <p>Study of the following parasites with reference to habit, habitat, Life cycle, Mode of Infection, pathogenicity and control measures - Plasmodium vivax, Entamoeba histolytica,</p>	GSK
Nov	<p>Ascaris lumbricoides and Taenia solium</p> <p>Study of the following parasites with reference to morphology, life cycle, pathogenicity</p> <p>and control measures: Head louse, Tick, Mite (Sarcoptes scabiei)</p> <p>Parasitological significance of Zoonosis: Bird flu, Rabies and Toxoplasmosis</p>	GSK
Dec	<p>Control measures of arthropod vectors of human diseases: Malaria (Anopheles stephensi, A culicifacies), Dengue, Haemorrhagic fever (Aedes aegypti, A. albopictus),</p> <p>Filariasis (Culex pipiens fatigans)</p>	GSK



PAPER VI: b) Cell Biology

Month	Topics	Teacher
Sept	<p>Introduction to Cell biology: Definition and scope, Prokaryotic and eukaryotic cell: size, shape and structure.</p> <p>Plasma membrane:</p> <p>Unit membrane concept, Models: Lipid membrane, Protein-Lipid (Danielli-Davson) and Fluid Mosaic, Membrane receptors, Membrane transport: Passive and Active Exocytosis and Endocytosis (Phagocytosis and Pinocytosis)</p>	DLT
Oct	<p>Endoplasmic reticulum:</p> <p>Occurrence and ultrastructure, Type: smooth and rough, Functions</p> <p>Golgi complex:</p> <p>Origin, occurrence and morphology, Ultrastructure and functions</p>	DLT
Oct & Nov	<p>Lysosomes:</p> <p>Origin, occurrence and morphology, Ultrastructure, polymorphism and functions</p> <p>Mitochondria:</p> <p>Origin, occurrence and morphology, Ultrastructure and functions (explanation of the cycles not expected)</p>	DLT
Nov & Dec	<p>Nucleus:</p> <p>Shape, Size, number and position, Ultrastructure of nuclear membrane and pore complex, Nucleolus: general organization, chemical composition and functions, Nuclear sap/ nuclear matrix</p> <p>Nucleocytoplasmic interactions</p> <p>Cytoskeleton:</p> <p>Microfilaments: location, ultrastructure, biochemical composition and functions, Intermediate Filament: location, ultrastructure, biochemical composition and functions, Microtubules: location, ultrastructure,</p>	DLT

	<p>biochemical composition and functions</p> <p>Cell cycle and cell division:</p> <p>Various phases of cell cycle, mitosis, meiosis & role of centriole in the cell division</p>	
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