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CURRICULAR PLAN 2021-22

DEPARTMENT OF ZOOLOGY & FISHERIES

I B.Sc. Zoology; Paper-I, Semester –I

ANIMAL DIVERSITY- BIOLOGY OF NON CHORDATES

(Ch. Durga Bhavani)

S.No	Month	Week	Syllabus	Additional input/ Value addition	Curricular Activity		Co-Curricular Activity	
					Activity	Hours Allotted	Activity	Hours Allotted
1.	Nov	III week	Principles of Taxonomy – Binomial nomenclature – Rules of nomenclature Whittaker's five kingdom concept and classification of Animal Kingdom.	Seminar	Teaching	8	Assignment	1
		IV week	General characters and Classification up to classes with suitable examples Locomotion, Nutrition and Reproduction in Protozoans *Elphidium* (type study					
2.	Dec	I week	General characters and Classification up to classes with suitable examples Skeleton in Sponges, Canal system in sponge	Group Discussion	Teaching	16	Assignment	1
		II week	General characters and Classification up to classes with suitable examples Metagenesis in *Obelia* Polymorphism in Coelenterates Corals and coral reef					

		III week	PHYLUM CTENOPHORA General characters and Evolutionary significance (Affinities					
		IV week	PHYLUM PLATYHELMINTHES General characters and Classification up to classes with suitable examples Life cycle and pathogenicity of *Fasciola hepatica* Parasitic adaptations in Helminthes					
3.	Jan	I week	PHYLUM NEMATHELMINTHES General characters and Classification up to classes with suitable examples Life cycle and pathogenicity of *Ascaris lumbricoides*	Quiz	Teaching	16	Slip test Assignment	1 1
		II week	PHYLUM ANNELIDA General characters and Classification up to classes with suitable examples Evolution of Coelom and Coelom					
		III week	Vermiculture – Scope, Significance, Earthworm species, processing, Vermicompost, economic importance of vermicompost					
		IV week	PHYLUM ARTHROPODA General characters and Classification up to classes with suitable examples Vision and respiration in Arthropoda					
	Feb	I week	Metamorphosis in Insects *Peripatus* - Structure and affinities	Seminar	Teaching	16	Slip test	1

4.		II week	Social life in Bees and Termites				Assignment	1 1
		III week	PHYLUM: MOLLUSCA General characters and Classification					
		IV week	Pearl formation in Pelecypoda Sense organs in Mollusca					
5.	March	I week	PHYLUM: ECHINODERMATA General characters and Classification up to classes with suitable examples		Teaching	16	Slip test Assignment	1 1
		II week	Water vascular system in star fish Larval forms of Echinodermata					
		III week	PHYLUM HEMICHORDATA General characters and Classification up to classes with suitable examples					
		IV week	*Balanoglossus* - Structure and affinities					

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CURRICULAR PLAN 2021-22

DEPARTMENT OF ZOOLOGY & FISHERIES

I B.Sc. zoology; Paper-II, Semester –II

Animal diversity-biology of chordates

(Ch. Durga Bhavani)

S.No	Month	Week	Syllabus	Additional input/ Value addition	Curricular Activity		Co-Curricular Activity	
					Activity	Hours Alloted	Activity	Hours Alloted
1.	May	III week	General characters and classification of Chordata up to classes Protochordata – Salient features of Cephalochordata, Affinities of Cephalochordata.	Charts Making	Teaching	8	Assignment Guest lecture	1
		IV week	Salient features of Urochordata Structure and life history of Herdmania Retrogressive metamorphosis – Process and Significance					
		V week	Cyclostomata, General characters, Comparison of *Petromyzon* and *Myxine* Pisces - General characters of Fishes					
2.	June	I week	*Scoliodon*: External features, Digestive system, Respiratory system, structure and functions of Heart, Structure and functions of the Brain. Migration in Fishes	Quiz	Teaching	16	Slip test Assignments Quiz	1 1 1
		II week	Types of Scales Dipnoi					

		III week	General characters of Amphibia Classification of Amphibia up to orders with examples.					
3.	July	I week	*Rana hexadactyla*: External features, Digestive system, Respiratory system, Structure and functions of Heart.	PPT	Teaching	16	Slip test Assignments	1 1
		II week	Reptilia: General characters of Reptilia, Classification of Reptilia up to orders with examples. Classification of Reptilia up to orders with examples					
		III week	*Calotes*: External features, Digestive system, Respiratory system, Structure and function of Heart, Structure and function of Brain Identification of Poisonous snakes and skull in reptiles.					
		IV week	AVES: General characters of Aves *Columba livia*: External features,					
4.	Aug	I week	Migration in Birds Flight adaptation in birds	Seminar	Teaching	16	Slip test Assignments	1
		II week	Columba livia Digestive system, Respiratory system. Structure and function of Heart, Structure and function of Brain					
		III week	General characters of Mammalia Classification of Mammalia up to sub - classes with examples					
		IV week	Comparison of Prototherians, Metatheria's and Eutherians Dentition in mammals					

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CURRICULAR PLAN 2021-22

DEPARTMENT OF ZOOLOGY & FISHERIES

II B.Sc. zoology; Paper-III, Semester –III

Cytology, genetics and evolution

(Dr.P.Y.V.Satyanarayana, K.S.S.V.N.Lakshmi)

S.No	Month	Week	Syllabus	Additional input/ Value addition	Curricular Activity		Co-Curricular Activity	
					Activity	Hours Allotted	Activity	Hours Allotted
1.	Dec	III week	Definition, history, prokaryotic and eukaryotic cells. Electron microscopic structure of eukaryotic cell.	Group discussion	Teaching	8	Assignment	1
		IV week	Plasma membrane –Fluid Mosaic model of plasma membrane.					
2.	Jan	I week	Structure and functions of Endoplasmic Reticulum Structure and functions of Golgi apparatus	Quiz	Teaching	16	Assignment	1
		II week	Structure and functions of Lysosomes Structure and functions of Ribosomes Structure and functions of Mitochondria					
		III week	Nucleus Chromosomes - Structure, types, function					
		IV week	Mendel's work on transmission on traits Principles of inheritance					

3.	Feb	II week	Incomplete dominance and co-dominance Epistasis, Pleiotropy	Seminar	Teaching	12	Assignments	1
		III week	Sex determination Sex linked inheritance					
		IV week	Extra chromosomal inheritance Human Karyotyping					
4.	March	I week	Lamarckism, Darwinism, Neo – Darwinism, Hardy-Weinberg Equilibrium	Seminar	Teaching	16	Slip test Assignments	1 1
		II week	Variations, isolating mechanisms, natural selection Types of natural selection (directional, stabilizing, disruptive					
		III week	Speciation (Allopatric and Sympatric)					
		IV week	Macro evolutionary principles (Example: Darwin's finches)					

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CURRICULAR PLAN 2021-22

DEPARTMENT OF ZOOLOGY & FISHERIES

II B.Sc. Zoology; Paper-IV, Semester –IV

EMBRYOLOGY, PHYSIOLOGY AND ECOLOGY

(Dr.P.Y.V.Satyanarayana, K.S.S.V.N.Lakshmi)

S.No	Month	Week	Syllabus	Additional input/Value addition	Curricular Activity		Co-Curricular Activity	
					Activity	Hours Alloted	Activity	Hours Alloted
1.	May	I week	Gametogenesis Fertilization Types of eggs	Seminar	Teaching	12	Slip test	1
		II week	Types of cleavages Formation and functions of Foetal membrane in chick embryo Types and functions of Placenta in mammals					
		III week	Elementary study of process of digestion Absorption of digested food					
2.	June	I week	Respiration - Transport of oxygen and carbon dioxide Circulation - Structure and functioning of heart, Cardiac cycle Excretion - Structure of nephron, urine formation, counter current mechanism	Quiz	Teaching	12	Slip test	1

		II week	Nerve impulse transmission - Resting membrane potential, origin and propagation of action potentials along myelinated and non-myelinated nerve fibers.					
		III week	Muscle contraction - Ultra structure of muscle fibre, molecular and chemical basis of muscle contraction.					
3.	July	I week	Endocrine glands - Structure, secretions and the functions (of hormones) of pituitary, thyroid, parathyroid, adrenal glands and pancreas Hormonal control of reproduction in a mammal	Quiz	Teaching	12	Assignment	1
		II week	Meaning and scope of EcologyImportant abiotic factors of Ecosystem - Temperature, light, water, oxygen and Carbon dioxyde. Nutrient cycles - Nitrogen, Carbon and phosphores					
		III week	Components of Ecosystem (lake), food chains and food web, energy flow in Ecosystem. Habitat and ecological niche					
		IV week	Community interactions - Mutualism, commensalism, parasitism, competition predation. Ecological succession Population studies					
4.	Aug	I week	Zoogeographical regions Study of physical and faunal peculiarities of Oriental, Australian and Ethiopian regions.	Seminar	Teaching	04	Assignment	1

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CURRICULAR PLAN 2021-22

DEPARTMENT OF ZOOLOGY & FISHERIES

III B.Sc. zoology; Paper-V, Semester –V

Animal biotechnology

(Dr.P.Y.V.Satyanarayana,)

S.No	Month	Week	Syllabus	Additional input/ Value addition	Curricular Activity		Co-Curricular Activity	
					Activity	Hours Allotted	Activity	Hours Allotted
1.	Sep	IV week	Tools of Recombinant DNA technology - Enzymes and Vectors Restriction modification systems: Types I, II and III.	Seminar	Teaching	10	Assignment	1
		V week	Application of Type II restriction enzymes in Genetic Engineering. Cloning Vectors - Plasmid vectors, pBR and pUC series.					
2.	Oct	I week	Techniques of Recombinant DNA technology Gene delivery: Microinjection, Electroporation, Biolistic method (gene gun), liposome and viral-mediated delivery	Collection of diseased fish pictures	Teaching	20	Assignment	1
		II week	PCR: Basics of PCR. Hybridization techniques - Southern and Northern.					
		III week	Genomic and cDNA libraries - Preparation and Uses					
		IV week	Animal Cell Technology Cell culture media: Natural and Synthetic Cell cultures: primary culture, secondary culture, continuous cell lines, Protocols for Primary					

3.	Nov	I week	Cell Culture - Organ culture and Cryopreservation. Hybridoma Technology-Cell fusion, Production of Monoclonal antibodies (mAb), Applications of mAb	Downloaded diseased fish pictures	Teaching	20	Slip test Assignment	1 1
		II week	Stem cells: Types of stem cells, application					
		III week	Reproductive Technologies & Transgenic Animal					
		IV week	Manipulation of reproduction in animals - Artificial Insemination,					
4.	Dec	I week	*In vitro* fertilization, super ovulation, Embryo transfer, Embryo Cloning	PPT	Teaching	20	Slip test Assignment	1 1
		II week	Transgenic Animals: Strategies of Gene transfer; Transgenic - sheep, - fish and applications					
		III week	Agriculture: fisheries – monoculture in fishes,					
		IV week	polyploidy in fishes. DNA finger .printing					
5.	Jan	I week	Revision		Teaching	10	Slip test Assignment	1 1
		II week	Revision					

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DEPARTMENT OF ZOOLOGY & FISHERIES

III B.Sc. zoology; Paper-VI, Semester –V

Animal husbandry

(K.S.S.V.N.Lakshmi)

S.No	Month	Week	Syllabus	Additional input/ Value addition	Curricular Activity		Co-Curricular Activity	
					Activity	Hours Allotted	Activity	Hours Allotted
1.	Sep	IV week	General introduction to Principles of poultry housing. Poultry houses	Quiz	Teaching	10	Assignment	1
		V week	Management of chicks, growers and layers.					
2.	Oct	I week	Management of Broilers. poultry farming.	Group Discussion	Teaching	20	Assignment	1
		II week	Poultry feed management – Principles of feeding. Nutrient requirements for different stages of layers and broilers. Methods of feeding.					
		III week	Poultry diseases – viral, bacterial, fungal and parasitic (two each) symptoms, control and management.					
		IV week	Selection, care and handling of hatching eggs. Egg testing.					
3.	Nov	I week	Breeds of Dairy Cattle and Buffaloes – Definition of breed, Classification of Indian Cattle breeds, Exotic breeds and Indian buffalo breeds.	Guest Lecture	Teaching	25	Slip test Assignment	1 1
		II week	Systems of inbreeding and crossbreeding.					

		III week	Housing of dairy animals – Selection of site for dairy farm systems of housing.					
		IV week	Conventional dairy barn. Cleaning and sanitation of dairy farm.					
		V week	Weaning of calf. Deworming and Vaccination programme.					
4.	Dec	I week	Records to be maintained in a dairy farm.	Seminar	Teaching	20	Slip test Assignment	1 1 1
		II week	Care and management of dairy animals.					
		III week	Care and management of calf, heifer,					
		IV week	milk animal, dry and pregnant animal, bulls and bullocks					
5.	Jan	I week	Revision	Quiz	Teaching	10	Slip test Assignment	1 1
		II week	Revision					

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DEPARTMENT OF ZOOLOGY & FISHERIES

III B.Sc. zoology; Paper-VII, Semester –VI

Immunology

(Dr.P.Y.V.Satyanarayana,)

S.No	Month	Week	Syllabus	Additional input/ Value addition	Curricular Activity		Co-Curricular Activity	
					Activity	Hours Allotted	Activity	Hours Allotted
1.	Sep	I week	Introduction to basic concepts in Immunology	Group discussion	Teaching	24	Assignment	1
		II week	Cells and organs of Immune system					
		III week	Cells of immune system					
		IV week	Basic properties of antigens B and T cell epitopes, haptens and adjuvants					
2.	Oct	I week	Factors influencing immunogenicity	Seminar	Teaching	24	Assignments	1
		II week	Structure of antibody Classes and functions of antibodies					
		III week	Monoclonal antibodies					
		IV week	Structure and functions of major histocompatibility complexes					
3.	Nov	I week	Exogenes and Endogenes pathways of antigen presentation and processing		Teaching	24	Slip test Assignments	1 1
		II week	Basic properties and functions of cytokines					

		III week	Innate and adaptive immunity					
		IV week	Organs of immune system					
		V week	Classification and brief description of various types of hyper sensitivities					
4.	Dec	I week	Introduction to concepts of autoimmunity and immunodeficiency	Field Visit				
		II week	General introduction to vaccines					
		III week	Types of vaccines					
		IV week	Revision					
5.	Jan	I week	Revision	Visiting local market				
		II week	Revision					

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DEPARTMENT OF ZOOLOGY & FISHERIES

III B.Sc. zoology; Semester –VI

CLUSTER ELECTIVE PAPER: VIII - (1)

PRINCIPLES OF AQUACULTURE

(Dr.P.Y.V.Satyanarayana, K.S.S.V.N.Lakshmi)

S.No	Month	Week	Syllabus	Additional input/ Value addition	Curricular Activity		Co-Curricular Activity	
					Activity	Hours Allotted	Activity	Hours Allotted
1.	Sep	I week	Definition, Significance and History of Aquaculture Present status of Aquaculture – Global and National scenario	Group discussion	Teaching	24	Assignment	1
		II week	Major cultivable species for aquaculture: freshwater, brackish water and marine. Criteria for the selection of species for culture					
		III week	Concept of Monoculture, Poly culture, Composite culture, Mono sex culture and Integrated fish farming					
		IV week	Ponds, Raceways, Cages, Pens, Raft water circulating systems					
2.	Oct	I week	Traditional, extensive, modified extensive, semi intensive and intensive cultures fish and shrimp.	Seminar	Teaching	24	Assignments	1

		II week	Criteria for the selection of site for freshwater and brackish water pond farms					
		III week	Design and construction of fish and shrimp farms Seed resources					
		IV week	Natural seed resources and Procurement of seed for stocking: Carp and shrimp Nutrition and feeds					
3.	Nov	I week	Nutritional requirements of a cultivable fish and shellfish Natural food and Artificial feeds and their importance in fish and shrimp culture	Seminar	Teaching	24	Slip test Assignments	1 1
		II week	Culture of Indian major carps: Pre-stocking management – Dewatering, drying, ploughing / de silting Predators, weeds and algal blooms and their control, Liming and fertilization,					
		III week	Stocking management – Stocking density and stocking; Post-stocking management – Feeding,					
		IV week	water quality, growth and health care and Harvesting of ponds					
		V week	Culture of giant freshwater prawn, *Macro brachium rosenbergii*					
4.	Dec	I week	1Culture of shrimp (*Penaeus monodon* or *Litopenaeus vannamei*)	Field Visit				
		II week	Culture of pearl oysters					
		III week	Culture of seaweeds-species cultured, culture techniques, important by-products, prospects					
		IV week	Culture of ornamental fishes – Setting up and maintenance of aquarium; and breeding					
5.	Jan	I week	Revision	Visiting local market				
		II week	Revision					

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DEPARTMENT OF ZOOLOGY & FISHERIES

III B.Sc. zoology; Semester –VI

CLUSTER ELECTIVE PAPER: VIII - (2)

AQUACULTURE MANAGEMENT

(Dr.P.Y.V.Satyanarayana, G.Sunitha)

S.No	Month	Week	Syllabus	Additional input/ Value addition	Curricular Activity		Co-Curricular Activity	
					Activity	Hours Allotted	Activity	Hours Allotted
1.	Sep	I week	Bundh Breeding and Induced breeding of carp by Hypophysation and use of synthetic hormones	Group discussion	Teaching	24	Assignment	1
		II week	Types of fish hatcheries; Hatchery management of Indian major carps					
		III week	Breeding and Hatchery management of *Penaeus monodon/ Litopenaeus vannamei*					
		IV week	Breeding and Hatchery management of giant freshwater prawn.					
2.	Oct	I week	Water quality and soil characteristics suitable for fish and shrimp culture Identification of oxygen depletion problems and control mechanisms in culture ponds	Seminar	Teaching	24	Assignments	1

		II week	Aeration: Principles of aeration and Emergency aeration					
		III week	Liming materials, Organic manures and Inorganic fertilizers commonly used and their implications in fish ponds					
		IV week	Live Foods and their role in shrimp larval nutrition. Supplementary feeds, Principal foods in artificial diets, Types of feeds, feed additives and Preservatives, role of probiotics					
3.	Nov	I week	Feed formulation and manufacturing, Feed storage, feeding strategies. Feeding devices, feeding schedules and ration size, Feed Evaluation - feed conversion efficiencies and ratios		Teaching	24	Slip test Assignments	1 1
		II week	Principles of disease diagnosis and health management Prophylaxis, Hygiene and Therapy of fish diseases					
		III week	Specific and non-specific defense systems in fish, Fish immunization and vaccination					
		IV week	Etiology, Symptoms, prophylaxis and therapy of common fish diseases in fish ponds and common shrimp diseases in shrimp ponds					
		V week	Principles of aquaculture economics – Capital costs, variable costs, cost-benefit analysis					
4.	Dec	I week	Fish marketing methods in India. Basic concepts in demand and price analysis. Fisheries Extension	Field Visit				
		II week	Fisheries training and education in India. Role of extension in community development.					
		III week	Genetic improvement of fish stocks Hybridization of fish.					
		IV week	Gynogenesis, Androgenesis, Polyploidy, Transgenic fish, Cryopreservation of gametes, Production of monosex and sterile fishes and their significance in aquaculture.					
5.	Jan	I week	Revision	Visiting local market				
		II week	Revision					

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DEPARTMENT OF ZOOLOGY & FISHERIES

III B.Sc. zoology; Semester –VI

CLUSTER ELECTIVE PAPER: VIII - (3)

POST HARVEST TECHNOLOGY

(K.S.S.V.N.Lakshmi)

S.No	Month	Week	Syllabus	Additional input/ Value addition	Curricular Activity		Co-Curricular Activity	
					Activity	Hours Allotted	Activity	Hours Allotted
1.	Sep	I week	Handling of fresh fish, storage and transport of fresh fish, post mortem changes (rigor mortis and spoilage), spoilage in marine fish and freshwater fish	Group discussion	Teaching	24	Assignment	1
		II week	Principles of preservation– cleaning, lowering of temperature, rising of temperature, denudation, use of salt, use of fish preservatives,exposure to low radiation of gamma rays					
		III week	Methods of fish Preservation: Traditional methods - sun drying, salt curing, pickling and smoking.					
		IV week	Advanced methods – chilling or icing, refrigerated sea water, freezing, canning, Irradiation and Accelerated Freeze drying (AFD).					

2.	Oct	I week	Fish products – fish minced meat, fish meal, fish oil, fish liquid (ensilage), fish	Seminar	Teaching	24	Assignments	1
		II week	Fish by-products – fish glue, isinglass, chitosan, pearl essence, shark fins, fish leather and fish maws.					
		III week	Seaweed Products: Preparation of agar, algin and carrageen.					
		IV week	Sanitation in processing plants - Environmental hygiene and Personal hygiene in processing plants.					
3.	Nov	I week	Quality Control of fish and fishery products – pre-processing control, control during processing and control after processing		Teaching	24	Slip test Assignments	1 1
		II week	Use of seaweeds as food for human consumption, in disease treatment and preparation of therapeutic drugs					
		III week	protein concentrate, fish chowder, fish cake, fish sauce, fish salads, fish powder, pet food from trash fish, fish manure.					
		IV week	1Seafood Quality Assurance and Systems: Good Manufacturing Practices (GMPs)					
		V week	Good Laboratory Practices (GLPs); Standard Operating Procedures (SOPs);					
4.	Dec	I week	Concept of Hazard Analysis and Critical Control Points (HACCP) in seafood safety.	Field Visit				
		II week	National and International standards					
		III week	ISO 9000: 2000 Series of Quality Assurance System, *Codex Alimentarius*.					
		IV week	Revision					
5.	Jan	I week	Revision	Visiting local market				
		II week	Revision					