DODLA KOUSALYAMMA GOVERNMENT COLLEGE FOR WOMEN

Nellore, Andhra Pradesh - 524003

Autonomous College, College with Potential For Excellence

Re-accredited with 'A' Grade by NAAC

BOARD OF STUDIES

2020-2021

DEPARTMENT OF ZOOLOGY

D.K. GOVT. COLLEGE FOR WOMEN (AUTONOMOUS), NELLORE,
SPSR NELLORE DISTRICT- 522003
ZOOLOGY SYLLABUS FOR I SEMESTER 2020-21
ZOOLOGY - PAPER - I

Course Name : Animal Diversity Biology of Non-chordates **Periods : 60**
Course Code:S0109 **Credits : 04**

UNIT I:

1.1 Principles of Taxonomy – Binomial nomenclature – Rules of nomenclature

1.2 Whittaker's five kingdom concept&classification of Animal Kingdom, Three domain system of classification

Phylum Protozoa

1.3 General Characters and classification of protozoa up to classes with suitable examples

1.4 Locomotion, nutrition and reproduction in Protozoans

1.5 Elphidium (type study)

UNIT –II:

PhylumPorifera

2.1 General characters and classification up to classes with suitable examples

2.2 Skeleton in Sponges

2.3 Canal system in sponges

PhylumCoelenterata

2.4 General characters and classification up to classes with suitable examples

2.5 Metagenesisin Obelia

2.6 Polymorphism in coelenterates

2.7 Corals and coral reefs

Phylum Ctenophora

2.8 General Characters and Evolutionary significance(affinities)

Unit – III:

PhylumPlatyhelminthes

3.1 General characters and classification up to classes with suitable examples

3.2 Life cycle and pathogenecity of Fasciola hepatica

3.3 Parasitic Adaptations in helminthes

Phylum Nemathelminthes

3.4 General characters and classification up to classes with suitable examples

Unit – IV:

Phylum Annelida

4.1 General characters and classification up to classes with suitable examples

4.2 Evolution of Coelom and Coelomoducts,

4.3 Vermiculture - Scope, significance, earthworm species, processing, Vermicompost, economic importance of vermicompost

Phylum Arthropoda

4.4 General characters and classification up to classes with suitable examples
4.5 Vision and respiration in Arthropoda
4.6 Metamorphosis in Insects
4.7 Peripatus - Structure and affinities
4.8 Social Life in Bees and Termites.
4.9 Larval forms in Crustacea

Unit – V:

Phylum Mollusca

5.1 General characters and classification up to classes with suitable examples
5.2 Pearl formation in Pelecypoda
5.3 Sense organs in Mollusca.
5.4 Evolutionary significance of trochophore larva.

PhylumEchinodermata

5.4 General characters and classification up to classes with suitable examples
5.5 Water vascular system in star fish
5.6 Larval forms of Echinodermata

PhylumHemichordata

5.7 General characters and classification up to classes with suitable examples
5.8 Balanoglossus - Structure and affinities

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ZOOLOGY SYLLABUS FOR II SEMESTER 2020-21

ZOOLOGY - PAPER - II

Course Name : Animal Diversity -Biology of Chordates **Periods : 60**

Course Code:S0209 **Credits : 04**

Unit – I:

1.1 General characters and classification of Chordata upto classes

1.2 Protochordata- Salient features of Cephalochordata, Affinities of Cephalochordata.

1.3 Salient features & classification of Urochordata

1.4 Structure and life history of Herdmania

1.5 Retrogressive metamorphosis –Process and Significance

1.6 Vertebrata – Salient features & Classification

Unit – II:

2.1 Cyclostomata, General characters, Comparison ofPetromyzon and Myxine

2.2 Pisces: General characters of Fishes

2.3 Scoliodon: External features, Digestive system, Respiratory system, Structure and function of Heart, Structure and functions of the Brain.

2.4 Migration in Fishes

2.5 Types of Scales

2.6 Dipnoi

Unit – III:

3.1 General characters of Amphibia

3.2 Classification of Amphibiaup to orders with examples.

3.3 Ranahexadactyla: External features, Digestive system, Respiratory system, Structure and function of Heart, structure and functions of the Brain

3.4 Reptilia: General characters of Reptilia, Classification of Reptilia upto orders

withexamples

3.5 Calotes:External features, Digestive system, Respiratory system, Structure of Heart, structure and of Brain

3.6 Identification of Poisonous snakes and Skull in reptiles

Unit – IV:

4.1 Aves General characters of Aves

4.2 Columba livia: External features, Digestive system, Respiratory system, of Heart, structure of Brain

4.3 Migration in Birds

4.4 Flight adaptation in birds

Unit – V:

5.1 General characters of Mammalia

5.2 Classification of Mammalia upto sub - classes with examples

5.3 Comparision of Prototherians, Metatherians and Eutherians

5.4 Dentition in mammals

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ZOOLOGY SYLLABUS FOR III SEMESTER 2020-21
ZOOLOGY - PAPER - III

Course Name: Cytology, Genetics and Evolution **Periods: 60**
Course Code: S0309 **Credits: 03**

Unit - I

1. Cytology– I

1.1Prokaryotic and Eukaryotic cells,Virus,Techniques in Cell Biology – Microscopy

1.2Electron microscopic structure of eukaryotic cell

1.3Plasma membrane –Different models of plasma membrane,Fluid mosaic model (Singer & Nicholson 1972), Chemical composition of Plasma membrane, Functions of Plasma membrane: Exocytose, Endocytosis, Phagocytosis, Pinocytosis, Active and Passive Transport.

Unit – II

2. Cell organelles

2.1 Structure and functions of Endoplasmic Reticulum

2.2 Structure and functions of Golgi apparatus

2.3 Structure and functions of Lysosomes

2.4 Structure and functions of Ribosome

2.5 Structure and functions of Mitochondria

2.6 Structure and functions Nucleus

2.7 Chromosomes - Structure, types, functions
2.8 Cell cycle- definition and different stages of cell cycle

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ZOOLOGY SYLLABUS FOR IV SEMESTER 2020-21
ZOOLOGY - PAPER - IV

Course Name: Embryology, Physiology and Ecology **Periods: 60**
Course Code: S0409 **Credits: 03**

Unit - 1

1. Developmental Biology and Embryology

1.1 Gametogenesis (Spermatogenesis and Oogenesis)
1.2 Fertilization, Development of Human Embryo up to Gastrulation (Formation of Primary germ layers)
1.3 Types of eggs
1.4 Types of cleavages
1.5 Formation and functions of Foetal membrane in chick embryo
1.6 Development, types and functions of Placenta in mammals

Unit - II

2. Physiology - I

2.1 Elementary study of process of digestion and absorption.

2.2 Respiration – Pulmonary ventilation, Transport of oxygen and carbon dioxide

2.3 Circulation - Structure and functioning of heart, Cardiac cycle

2.4 Excretion - Structure of nephron, urine formation, counter current mechanism

Unit - III

3. Physiology - II

3.1 Nerve impulse transmission - Resting membrane potential, origin and propagation of action potentials along myelinated neuron.

3.2 Muscle contraction - Types of Muscles, Ultra structure of muscle fibre, molecular and chemical basis of muscle contraction

3.3 Endocrine glands – Structure, secretions andthe functions (of hormones of pituitary, thyroid, parathyroid, adrenal glands and pancreas)

Unit - IV

4. Ecology - I

4.1 Structure and function of an Ecosystem – (Example: lake) food chains and food web, energy flow in ecosystem

4.2 Abiotic factors of anEcosystem - Temperature, light, water,

4.3 Nutrient cycles - Nitrogen, carbon cycle.

4.4 Ecology and Human welfare – Conservation of Water resources and its Management

Unit - V

5. Ecology - II

5.1 Habitat and ecological niche

5.2 Population Ecology (characteristics of Population, Growth Curves, Age Pyramids) Wildlife Conservation-concept of threatened species, necessity for wild life conservation and modes of wild life conservation

Zoogeography

5.3 Study of physical and faunal peculiarities of Zoogeographical regions (Oriental, Australian and Ethiopian regions.

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ZOOLOGY SYLLABUS FOR V SEMESTER 2020-21
ZOOLOGY - PAPER - V

Course Name: ANIMAL BIOTECHNOLOGY **Periods: 60**
Course Code: S05509 **Credits: 03**

Unit 1: Tools of Recombinant DNA technology –Steps of r-DNATechnology
Enzymes and Vectors
Restriction modification systems: Types I, II and III. Mode of action, nomenclature, applications of Type II restriction enzymes in genetic engineering
DNA modifying enzymes and their applications: DNA polymerases. Terminal deoxynucleotidyl transferase, kinases and phosphatases, and DNA ligases
Cloning Vectors: Plasmid vectors: pBR and pUC series, Bacteriophage lambda

Unit 2 Techniques of Recombinant DNA technology
Cloning: Use of linkers and adaptors
Gene delivery: Microinjection, electroporation, biolistic method (gene gun), liposome and viral-mediated delivery
Electrophoresis: Gel Electrophoresis-Principle, types, Agarose and SDS
PCR: Basics of PCR.and its applications
DNA Sequencing: Sanger's method of DNA sequencing
Hybridization techniques: Southern, Northern and Western blotting,
Genomic and cDNA libraries: Preparation and uses

UNIT 3 Animal Cell Technology
Cell culture media: Natural and Synthetic
Cell cultures: primary culture, secondary culture, continuous cell lines; Protocols for Primary Cell Culture; Cryopreservation of cultures.
Hybridoma Technology: Cell fusion, Production of Monoclonal antibodies (mAb), Applications of mAb
Stem cells: Types of stem cells, applications

Unit 4 Reproductive Technologies & Transgenic Animals
Manipulation of reproduction in animals: Artificial Insemination, *In vitro* fertilization, super ovulation, Embryo cloning
Transgenic Animals: Strategies of Gene transfer; Transgenic - sheep, fish; applications

Unit 5 Applied Biotechnology
Industry: Fermentation: Different types of Fermentation: Short notes on - Submerged & Solid state; batch, Fed batch & Continuous;
Agriculture: fisheries – Genetically modified fishes, polyploidy in fishes; DNA fingerprinting

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ZOOLOGY SYLLABUS FOR V SEMESTER 2020-21
ZOOLOGY - PAPER - VI

Course Name: Animal Husbandry and Economic Zoology **Periods: 60**
Course Code: S05609 **Credits: 03**

UNIT – I : **10 Hours**

1.1 General introduction to poultry farming.

1.2 Principles of poultry housing. Poultry houses. Systems of poultry farming.

1.3 Management of chicks, growers and layers, Broilers.

UNIT – II:

2.1 Poultry feed management – Principles of feeding.

2.2 Methods of feeding. Poultry diseases – viral, bacterial, fungal and parasitic (two each); symptoms, control and management.

2.3 Selection, care and handling of hatching eggs.Brooding and rearing. Sexing of chicks.

UNIT – III:

3.1 Breeds of Dairy Cattle and Buffaloes – Definition of breed; Classification of Indian Cattle breeds, exotic breeds and Indian buffalo breeds.

3.2 Systems of inbreeding and crossbreeding.

3.3 Housing of dairy animals – Selection of site for dairy farm; systems of housing – loose, housing system.Conventional dairy barn.

UNIT- IV:

4.1 Cleaning and sanitation of dairy farm. Weaning of calf. Castration and dehorning. Deworming and Vaccination programme. Records to be maintained in a dairy farm.

4.2 Care and management of dairy animals in general

UNIT - V:

5.1 Introduction to Apiculture – Types of Honeybees, Different types of Bee Keeping Practices.

5.2 Life Cycle of Honey bee, Importance of Apiculture.

5.3 Introduction to Pearl Culture, Process of Pearl Formation in Oysters.

5.4 Artificial Pearl Production.

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ZOOLOGY SYLLABUS FOR VI SEMESTER 2020-21
ZOOLOGY ELECTIVE PAPER: VII-(A)

Course Name: IMMUNOLOGY **Periods: 60**
Course Code: S06709 **Credits: 03**

Unit - I

1.1 Overview of Immune system

1.1.1 Introduction to basic concepts in Immunology

1.1.2 Innate and adaptive immunity

1.2 Cells and organs of Immune system

1.2.1 Cells of immune system
(Lymphocytes, T lymphocyte, B lymphocyte, NK cell, K Cell, Macrophage, Dendritic cells, Eosinophil, Basophil, Neutrophil, APC and mast cell)

1.2.2 Organs of immune system-Primary and Secondary

Unit - II

2.1 Antigens

2.1.1 Basic properties of antigens

2.1.2 B and T cell epitopes, haptens and adjuvants

2.1.3 Factors influencing immunogenicity

Unit - III

3.1 Antibodies

3.1.1 Structure of antibody

3.1.2 Classes and functions of antibodies

3.1.3Monoclonal antibodies

Unit - IV

4.1 Immune system in health and disease

4.1.1 Classification and brief description of various types of hyper sensitivities

4.1.2 Introduction to concepts of autoimmunity and immunodeficiency

4.2 Vaccines

4.2.1 General introduction to vaccines

5.2.2 Types of vaccines

Unit-V

1.1 Immunological Techniques

1.1.1 Precipitation, Agglutination,ABO blood grouping,Rh blood typing,Widal test

1.1.2 Simple double Immunodiffusion, Immunoelectrophoresis, Rocket Immunoelectrophoresis, ELISA

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ZOOLOGY SYLLABUS FOR VI SEMESTER 2020-21
AQUACULTURE

CLUSTER ELECTIVE –VIII-B-1

Course Name: PRINCIPLES OF AQUACULTURE **Periods: 60**
Course Code: S06809 **Credits: 03**

Unit – I

1.1 Introduction / Basics of Aquaculture

1.1.1 Definition, Significance and History of Aquaculture
1.1.2 Present status of Aquaculture – Global and National scenario
1.1.3 Major cultivable species for aquaculture: freshwater, brackish water and marine.
1.1.4 Criteria for the selection of species for culture

Unit – II

2.1 Types of Aquaculture

2.1.1 Freshwater, Brackishwater and Marine
2.1.2 Concept of Monoculture, Polyculture,Composite culture, Monosex culture and Integrated fish farming, semi- intensive and intensive culture of shrimp.

2.2Culture systems

2.2.1 Ponds, Raceways, Cages, Pens, Rafts and water recirculating systems

Unit – III

3.1 Design and construction of aquafarms

3.1.1Criteria for the selection of site for freshwater and brackish water pond farms
3.1.2 Design and construction of fish and shrimp farms

3.2 Seed resources

3.2.1 Natural seed resources and Procurement of seed for stocking: Carp and shrimp

3.3 Nutrition and feeds

3.3.1 Nutritional requirements of a cultivable fish and shellfish

Unit – IV

4.1Management of carp culture ponds

4.1.1 Culture of Indian major carps: Pre-stocking management – Dewatering, drying, ploughing/desilting; Predators, weeds and algal blooms and their control, Liming and fertilization; Stocking management – Stocking density and stocking; Post-stocking management – Feeding, water quality, growth and health care; and Harvesting of ponds

Unit – V

5.1Culture of shrimp (*Litopenaeus vannamei*)
5.2 Culture of pearl oysters
5.3 Culture of seaweeds-species cultured, culture techniques, important by-products, prospects
5.4 Culture of ornamental fishes – Setting up and maintenance of aquarium; and breeding.

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ZOOLOGY SYLLABUS FOR VI SEMESTER 2020-21

AQUACULTURE

CLUSTER ELECTIVE –VIII-B-2

Course Name: AQUACULTURE MANAGEMENT **Periods: 60**
Course Code: S06809 **Credits: 03**

Unit – I

1.1Breeding and Hatchery Management

1.1.1 Bundh Breeding and Induced breeding of carp by Hypophysation; and use of synthetic hormones

1.1.2Types of fish hatcheries; Hatchery management of Indian major carp Catlacatla

1.1.3 Breeding and Hatchery management of *Penaeus monodon*/ *Litopenaeusvannamei*

Unit – II

2.1 Water quality Management

2.1.1Water quality and soil characteristics suitable for fish and shrimp culture

2.1.2 Identification of oxygen depletion problems and control mechanisms in culture ponds

2.1.3 Aeration: Principles of aeration and Emergency aeration

2.1.4 Liming materials, Organic manures and Inorganic fertilizers commonly used and their implications in fish ponds

Unit – III

3.1 Feed Management

3.1.1Live Foods and their role in shrimp larval nutrition.

3.1.2 Supplementary feeds: Principal foods in artificial diets; Types of feeds; Feed additives and Preservatives; role of probiotics.

3.1.3 Feed formulation and manufacturing; Feed storage

3.1.4 Feeding strategies: Feeding devices, feeding schedules and ration size; Feed evaluation- feed conversion efficiencies and ratios

Unit – IV

4.1 Disease Management

4.1.1 Principles of disease diagnosis and health management;

4.1.2 Prophylaxis, Hygiene and Therapy of fish diseases

4.1.3 Etiology, Symptoms, prophylaxis and therapy of common fish diseases (any two) in fish ponds

4.1.4 Etiology, Symptoms, prophylaxis and therapy of common shrimp diseases (any two) in shrimp ponds

Unit – V

5.1 Economics and Marketing

5.1.1 Principles of aquaculture economics – Capital costs, variable costs, cost-benefit analysis

5.1.2Fish marketing methods in India; Basic concepts in demand and price analysis

5.2 Fisheries Extension

5.1.3 Fisheries Training and Education in India; Role of extension in community development.

REFERENCE BOOKS

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ZOOLOGY SYLLABUS FOR VI SEMESTER 2020-21

AQUACULTURE

CLUSTER ELECTIVE –VIII-B-3

Course Name: POST HARVEST TECHNOLOGY
Course Code: S06809

Periods: 60
Credits: 03

Unit – I

1.1 Handling and Principles of fish Preservation

1.1.1 Handling of fresh fish, storage and transport of fresh fish, post mortem changes (rigor Mortis and spoilage), spoilage in marine fish and freshwater fish.

1.1.2 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.

Unit – II

2.1 Methods of fish Preservation

2.1.1 Traditional methods - sun drying, salt curing, pickling and smoking.

2.1.2 Advanced methods – chilling or icing, refrigerated sea water, freezing, canning, Irradiation and Accelerated Freeze drying (AFD).

Unit – III

3.1 Processing and preservation of fish and fish by-products

3.1.1Fish products – fish minced meat, fish meal, fish oil, fish liquid (ensilage), fish Protein concentrate, fish chowder, fish cake, fish sauce, fish salads, fish powder, pet Food from trash fish, fish manure.

3.1.2 Fish by-products – fish glue, ising glass, chitosan, pearl essence, shark fins, fish Leather and fish maws.

3.2Seaweed Products

3.2.1Preparation of agar, align and carrageen. Use of seaweeds as food for human consumption, in disease treatment and preparation of therapeutic drugs.

Unit – IV

4. Sanitation and Quality control

4.2.1 Sanitation in processing plants - Environmental hygiene and Personal hygiene in processing plants.

4.2.2 Quality Control of fish and fishery products – pre-processing control, control during processing and control after processing. Steps in processing of shrimp

Unit – V

5.1 Quality Assurance, Management and Certification in processing of shrimp

5.1.1Seafood Quality Assurance and Systems: Good Manufacturing Practices (GMPs); Good Laboratory Practices (GLPs); Standard Operating Procedures (SOPs); Concept of Hazard Analysis and Critical Control Points (HACCP) in seafood safety.

5.1.2 National and International standards – ISO 9000: 2000 Series of Quality Assurance System, Codex alimentarius

REFERENCE BOOKS

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