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

2021-2022

DEPARTMENT OF ZOOLOGY

.K. GOVT. COLLEGE FOR WOMEN (AUTONOMOUS), NELLORE,
SPSR NELLORE DISTRICT- 522003
ZOOLOGY SYLLABUS FOR I SEMESTER 2021-22

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&classificationof 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:

Phylum: Porifera

2.1 General characters and classification up to classes with suitable examples
2.2 Skeleton in Sponges
2.3 Canal system in sponges

Phylum:Coelenterata

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:

Phylum: Platyhelminthes

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
3.5 *Life cycle and pathogenicity of Ascaris lumbricoides*

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.

Phylum :Echinodermata

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 2021-22

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 and function of Heart, structure and function 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, Structure and function of Heart, structure and function 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 2021-22

ZOOLOGY - PAPER - III

ourse Name : CellBiology,Gnetics,Molecular Biology & Evolution **Periods : 60**

ourse Code: **Credits : 04**

Unit–I Cell Biology

1.1 Definition, history, prokaryotic and eukaryotic cells, virus, viroids,mycoplasma

1.2 Electron microscopic structure of animal cell.

1.3 Plasma membrane –Models and transport functions of plasma membrane.

.4Structure and functions of Golgi complex, Endoplasmic Reticulum and Lysosomes

1.5 Structure and functions of Ribosomes, Mitochondria, Nucleus, Chromosomes

Unit–II Genetics - I

2. 1 Mendel's work on transmission of traits

2. 2 Gene Interaction – Incomplete Dominance, Codominance, Lethal Genes

2. 3 Polygenes (General Characteristics & examples); Multiple Alleles (General Characteristics and Blood group inheritance

2. 4 Sex determination (Chromosomal, Genic Balance, Hormonal, Environmental and Haplo-diploidy types of sexdetermination)

2. 5 Sex linked inheritance (X-linked, Y-linked & XY-linkedinheritance)

Unit–III Genetics - II

3.1 Mutations &Mutagenesis

3.2 Chromosomal Disorders (Autosomal and Allosomal)

3.3 Human Genetics – Karyotyping, Pedigree Analysis(basics)

3.4 Linkage &crossing over

UNITIV: Molecular Biology

4.1 Central Dogma of Molecular Biology

4.2 Basic concepts of-

a. DNA replication – Overview (Semi-conservative mechanism, Semi-discontinuous mode, Origin & Propagation of replication fork)

b. Transcription in prokaryotes – Initiation, Elongation and Termination, Post-transcriptional modifications(basics)

c. Translation – Initiation, Elongation and Termination

4.3 Gene Expression in prokaryotes (Lac Operon); Gene Expression ineukaryotes (BASICS)

Unit – V EVOLUTION

5.1 Origin of life

5.2 Theories of Evolution: Lamarckism, Darwinism, Germ Plasm Theory, Mutation Theory

5.3 Neo-Darwinism: Modern Synthetic Theory of Evolution, Hardy-Weinberg Equilibrium

5.4 Forces of Evolution: Isolating mechanisms, Genetic Drift, Natural Selection, Speciation

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ZOOLOGY SYLLABUS FOR III SEMESTER 2021-22

ZOOLOGY - PAPER - III

Course Name :ANIMAL PHYSIOLOGY, CELLULAR METABOLISM AND EMBRYOLOGY Periods : 60

Course Code: Credits : 04

UNITI **Animal Physiology -I**

1.1 Process of digestion and assimilation

1.2 Respiration - Pulmonary ventilation, transport of oxygen and CO_2

(Note: Need not study cellular respiration here)

1.3 Circulation - Structure and functioning of heart, Cardiac cycle

1.4 Excretion - Structure and functions of kidney urine formation, counter current Mechanism

JNIT II Animal Physiology -II

2.1 Nerve impulse transmission - Resting membrane potential, origin and propagation of action potentials along myelinated and non-myelinated nerve fibres

2.2 Muscle contraction - Ultra structure of muscle, molecular and chemical basis of muscle contraction

2.3 Endocrine glands - Structure, functions of hormones of pituitary, thyroid, parathyroid, adrenal glandsand pancreas

2.4 Hormonal control of reproduction in a mammal

JNITIII Cellular Metabolism – I(Biomolecules)

1. Carbohydrates - Classification of carbohydrates. Structure of glucose
2. Proteins - Classification of proteins. General properties of amino acids
3. Lipids - Classification of lipids
4. Enzymes: Classification and Mechanism of Action

UNITIV

Cellular Metabolism –II

Carbohydrate Metabolism - Glycolysis, Krebs cycle, Electron Transport Chain,

Glycogen metabolism, Gluconeogenesis

Lipid Metabolism – β-oxidation of palmitic acid

Protein metabolism - Transamination, Deamination and Urea Cycle

Unit–V

Embryology

5.1 Gametogenesis

5.2 Fertilization

5.3 Types of eggs

5.4 Types of cleavages, Types of placentae in mammals

5. 5 Development of Frog up to formation of primary germ layers

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ZOOLOGY SYLLABUS FOR IV SEMESTER 2021-22

ZOOLOGY - PAPER - V

Course Name : IMMUNOLOGY& BIOTECHNOLOGY Periods : 60

Course Code: Credit : 04

Unit–I Immunology – I (Overview of Immune system)

1.1 Introduction to basic concepts in Immunology

1.2 Innate and adaptive immunity, Vaccines and Immunization programme

1.3 Cells of immune system

1.4 Organs of immune system

Unit – II Immunology – II (Antigens, Antibodies, MHC and Hypersensitivity)

2.1 Antigens: Basic properties of antigens, B and T cell epitopes, Haptens and adjuvants; Factors influencing immunogenicity

2.2 Antibodies: Structure of antibody, Classes and functions of antibodies

2.3 Precipitation & agglutination , Single & double diffusion(Ouchertlony)

2.4 Immunoelectrophoresis & WIDAL TEST

2.5 Hypersensitivity – Classification and Types

Unit – III Techniques

1.2.1 Animal Cell, Tissue and Organ culture media: Natural and Synthetic media,

1.2.2 Cell cultures: Establishment of cell culture (primary culture, secondary culture, types of cell lines;); Established Cell lines (common examples such as MRC, HeLa, CHO, BHK, Vero); Organ culture; Cryopreservation of cultures

1.2.3 Stem cells: Types of stem cells and applications

1.2.4 Hybridoma Technology: Production & applications of Monoclonal antibodies (mAb)

Unit – IV Applications of Animal Biotechnology

3.1 Genetic Engineering: Basic concept, Vectors, Restriction Endonucleases and Recombinant DNA technology

3.2 Gene delivery: Microinjection, electroporation, biolistic method (gene gun), liposome and viral-mediated gene delivery

3.3 Transgenic Animals: Strategies of Gene transfer; Transgenic - sheep, - fish; aapplications

3.4 Manipulation of reproduction in animals: Artificial Insemination, *Invitro* fertilization, super ovulation, Embryo transfer, Embryo cloning

Unit - V

1.1. Electrophoresis Basics, PCR:Basics ofPCR.

4.2 DNA Sequencing: Sanger's method of DNA sequencing- traditional and automated sequencing (2hrs)

4.3 Hybridization techniques: Southern, Northern and Western blotting

4.4 DNA fingerprinting: Procedure andapplications

4.5 Applications in Industry and Agriculture: Fermentation: Different types of Fermentation- solid state & submerged Agriculture: Monoculture in fishes, polyploidy in fishes

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ZOOLOGY SYLLABUS FOR V SEMESTER 2021-22
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:

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

1.2 Life Cycle of Honey bee, Importance of Apiculture.

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

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ZOOLOGY SYLLABUS FOR VI SEMESTER 2021-22
ZOOLOGY ELECTIVE PAPER: VII-(A)

Course Name: IMMUNOLOGY
Course Code: S06709

Periods: 60
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

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ZOOLOGY SYLLABUS FOR VI SEMESTER 2021-22

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, Raftsand 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