SETH NARSINGDAS MOR COLLEGE OF ARTS & COMMERCE & SMT. G. D. SARAF SCIENCE COLLEGE, TUMSAR.

PROGRAMME OUTCOME DEPARTMENT OF ZOOLOGY

Course Outcomes

This course will provide students with an opportunity to gain information regarding animal classification and systematic, animal structure and function relationships, evolution between and within major animal groups, human evolution and animal reproduction and development.

Semester I

Paper I: Non-chordates (Protozoa to Hemichordata)

On completion of the course, students are able to:

1. Understand about the Non- chordate animals (Protozoa to Annelida).
2. To study the general characters and classification of non-chordate phyla.
3. To study the external as well as internal morphology of non- chordates.
4. To study the distinguishing characters of non chordates.
5. To study Parasitic Protozoans of Man.
6. To study the parasitic adaptations in helminthes
7. Understand the larval forms of the invertebrates.
8. Understand the process of coral reef formation.
9. To understand the vermiculture and its importance.
10. Understand the economical importance of all the phyla.

Paper II. Environmental Biology

On completion of the course, students are able to:

1. To understand about atmosphere, hydrosphere, lithosphere and biosphere.
2. To aware about Renewable and non- renewable energy sources.
3. Ecosystem, Food chain, food web and ecological pyramids and energy flow.
4. To understand the Importance, causes of loss and preservation of Biodiversity.
5. To know the sources, effects and control measures of Air, water and noise pollution.

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Semester II

Paper I. Non-chordates (Protozoa to Hemichordata)

On completion of the course, students are able to:

1. Understand about the Non- chordate animals (Arthopoda to Hemichordata).
2. Understand the evolutionary history of Non -chordate animals.
3. To study the external as well as internal morphology of non- chordates.
4. To study the distinguishing characters of non chordates.
5. Understand the colonial and social life in Insects.
6. To aware the students about parasites and insect vectors causing diseases in man.
7. Understand the process pearl formation.
8. To understand the vermiculture and its importance.

Paper II. Cell Biology

On completion of the course, students are able to:

1. Understand the various cell types and cell divisions.
2. Understand the structure cell, cell membrane and cell organelles.
3. Cellular ageing and cell death and Elementary idea of cancer and its causative agents.
4. Understand the Tools and Techniques in Molecular Biology.
5. Understand DNA finger printing.

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Semester III

Paper I. Chordates

On completion of the course, students are able to:

1. Understand the about Chordate animals (Protochordata to Amphibia).
2. Understand the Classification of various classes of phylum Chordata i.e. Urochordates, Cephalochordates, Cyclostomes, Pisces and Amphibians.
3. Understand the external and internal morphology of chordates.
4. Understand the General Topics like Migration and Accessory respiratory organs in fishes, Parental care and Neotony in Amphibia.
5. To study and understand the types scales and fins of fishes.
6. Gametogenesis, type of eggs, Fertilization of egg and Post fertilization development of fish.
7. Understand the Frog embryology, Fate map and Morphogenetic movements in gastrula.
8. Understand the development of respiratory organs and Aortic arches of frog.
9. Compulsory visit to any Ecosystem gives more knowledge to the students.

Paper II. Genetics

On completion of the course, students are able to:

1. Understand the Mendelian Principles, Darwinism and Neo-Neo-Darwinism, Interaction of genes, Quantitative and Extracellular genome (mitochondrial DNA, plasmids).
2. Understand the Cytoplasmic inheritance, Linkage and crossing over, Concepts of genes and Genetic disorders (Haemoglobin, Thalassemia and Sickle cell anemia) and Metabolic disorders (Phenylketonurea) in human beings.
3. Understand the Sex determination pattern in animals, Chromosomal aberrations, Gene mutations, mutagenic agents and Disorders related to chromosomal number (Turner syndrome, Klinefelter syndrome and Down syndrome).
4. Understand the Lethal genes, Hardy Weinberg equilibrium and its significance, Genetic counseling about hereditary diseases and DNA fingerprinting, amniocentesis and sperm banks.

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Semester IV

Paper I. Chordates

On completion of the course, students are able to:

1. Understand the about Chordate animals (Reptilia to Mammalia).
2. Understand the external and internal morphology of chordates.
3. Study and understand the various systems and adaptation in vertebrates.
4. Understand the comparative account of heart and aortic arches in vertebrates.
5. Understand the Races in Man.
6. Understand the Blastocyst and implantation in Mammals, Types of placenta and functions of placenta, Stem cells, Biological clock and Role of pheromones in reproductive behavior.
7. Compulsory visit to any Ecosystem gives more knowledge to the students.

Paper II. Molecular biology and Immunology

On completion of the course, students are able to:

1. Understand the structure of DNA, RNA, Prokaryotic and eukaryotic gene, and Recombination in Bacteria.
2. Understand the DNA replication, Genetic code, Protein synthesis and Gene regulation models (Lac operon and tryptophan operon).
3. Understand the Concepts of immunity, Antigen, Antibody and Antigen-antibody interaction.
4. Understand the Types of immune response, Complement system, Cytokine and Cytokine related diseases.
5. Understand the Autoimmunity and Autoimmune diseases and immunodeficiency and immunodeficiency diseases including AIDS.

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Semester V

Paper I. General Mammalian Physiology- I

On completion of the course, students are able to:

1. Understand the terms Physiology, the Enzymes**,** Structure and functions of digestive glands, Digestion and absorption of proteins, carbohydrates and lipids, Gastrointestinal hormones and Vitamins (Sources, deficiency and diseases).
2. To know about Respiratory Pigments, Mechanism of Respiration, Transport of O_2 and CO_2, Respiratory disorders and effects of smoking.
3. Composition and functions of blood, Blood clotting, blood groups and *Rh* factor, Cardiac cycle, E.C.G. and Blood pressure.
4. Types and structure of neurons, Conduction of nerve impulse, Ultrastructure of striated muscle, muscle contraction and Properties of muscles.
5. Structure of uriniferous tubule, Mechanism of urine formation, Normal and abnormal constituents of urine and Elementary idea of dialysis.
6. Structure and functions of endocrine glands- pituitary, thyroid, parathyroid, adrenal and pineal gland.
7. Oestrous and menstrual cycle, Male and female sex hormones, Causes of infertility in male and female, Contraceptives and *In-vitro* fertilization.

Paper II. Applied Zoology-I

(Aquaculture and Economic Entomology):

On completion of the course, students are able to:

1. Understand the about the different types of fish ponds, Bund and Induced breeding, types of fish farming, Fish products and byproducts and Fish preservation techniques.
2. To understand culturing techniques of Prawn and Pearl, Fabrication, setting up and maintenance of aquarium, breeding of aquarium fishes and Diseases of fishes.
3. To know about Life cycle, damage and control of crop and animal pests.
4. To introduce the term apiculture to the students.
5. To aware the students and provides the economical importance of Apiculture.
6. Understand the Bee keeping equipments and apiary management.
7. To study and understand the various species of Bees.
8. Understand the Various concepts in Lac Cultivation.
9. Observation of Lac Producing insects and their life cycle.
10. Understand the various techniques of isolation of seed lac from raw lac.
11. To know the Economical importance of lac.
12. Compulsory visit to the Goatary and Lac Cultivation Industry gives more knowledge to the students.
13. This is a job oriented subject.

Semester VI

Paper I. General Mammalian Physiology- II

On completion of the course, students are able to:

1. Understand the Types and structure of neurons, Conduction of nerve impulse, Ultrastructure of striated muscle, muscle contraction and Properties of muscles.

2. Structure of uriniferous tubule, Mechanism of urine formation, Normal and abnormal constituents of urine and Elementary idea of dialysis.

3. Structure and functions of endocrine glands- pituitary, thyroid, parathyroid, adrenal and pineal gland.

4. Oestrous and menstrual cycle, Male and female sex hormones, Causes of infertility in male and female, Contraceptives and *In-vitro* fertilization.

Paper II. Applied Zoology –II

(Biotechniques, Microtechnique, Biotechnology, Bioinformatics and Biostatistics)

On completion of the course, students are able to:

1. Understand the Concepts of sterilization, Separation of biomolecules by Centrifugation, Electrophoresis and Principles of colorimeter and spectrophotometers.

2. Preparation of permanent slides by following the process of Fixation, dehydration, clearing, embedding, Double staining by Haematoxylin and Eosin and Histochemical staining techniques for carbohydrates, proteins and lipids.

3. Understand the Scope and Significance of Biotechnology, Basic concepts in recombinant DNA technology, Gene isolation method, DNA manipulating enzymes (Nucleases, ligases, polymerases), cloning vectors and Application of biotechnology in Insulin and vaccine production.

4. Bioinformatics: Importance and role in life sciences, Bioinformatics databases types, Biostatistics: Tabulation of data, presentation of data, sampling errors, mean, mode, median, probability, standard error and standard deviation.