

Semester I  
Core Course I

Hours: 6  
Credits: 5

## BIOLOGY OF INVERTEBRATES

### Unit-I

General characters and classification of Invertebrata upto orders with suitable examples.

**Protozoa** : Detailed study : Paramecium. General Topic : Nutrition in protozoa. Pathogenesis, prevention and control of Parasitic protozoans - *Entamoeba histolytica*, *Plasmodium vivax* .

### Unit II

**Porifera** : Detailed study – Sycon sponge. General Topic: Canal system in sponges.

Economic importance of Sponges.

**Coelenterata** : Detailed study: Obelia. General Topic: Corals and Coral reefs.

Polymorphism in Coelenterata

### Unit III

**Platyhelminthes** : Detailed study : *Fasciola hepatica* ( Liver fluke )

General Topic : Parasitic adaptations in Platyhelminthes.

**Aschelminthes** : Detailed study : *Ascaris lumbricoides*

General Topic : Nematode parasites of man- *Enterobius vermicularis*, *Ancylostoma deodinale*, *Wuchereria bancrofti* and *Dracunculus medinensis*.

### Unit IV

**Annelida** : Detailed study : Nereis. General Topic: Nephridium and coelomoducts in Annelids.

**Arthropoda** : Detailed Study : Marine Prawn- *Penaeus monodon* (Prawn).

General Topic : Mouth parts of insects - house fly, butterfly, honey bee and mosquito.

### Unit V

**Mollusca** : Detailed study : *Pila globosa*. General Topic : Economic importance of Molluscs.

**Echinodermata** : Detailed study : *Asterias rubens* (Star fish)

General Topic: Larval forms of Echinoderms.

### Text book

1. Ekambaranatha Ayyar and T.N. Ananatha Krishnan 1992. Manual of Zoology Vol-I (Invertebrata) Part-I & II Vishwanathan Pvt.Ltd.

### References

1. Jordon EL and Verma P.S. (1995), Invertebrate Zoology, S Chand and Co, Zoology Delhi.
2. Kotpal, R.L, S.K. Agarwal, R.P.R. Khetarpal 1989 Modern text Book of Zoology. Rastogi Publication.
3. N. Arumugam, Invertebrata, Saras Publication, Nagercoil.

**Semester I**

**Hours: 2**

**Core Practical II\***

**BIOLOGY OF INVERTEBRATES AND BIOPHYSICS AND CELL  
BIOLOGY**

**\*Running paper from semester I to semester II**

**Virtual Dissections: (*Virtual or draw and label the part*)**

**Invertebrata**

Cockroach: digestive system, nervous system, reproductive system male and female.

Earthworm: digestive system, nervous system - Identification of any two species of earthworms from fields.

Prawn/Cray fish- digestive system, nervous system.

Identification of mouth parts of Honey bee and House fly using slides.

**Spotters**

Protozoa: Elphidium, Vorticella, *Entamoeba histolytica*, *Plasmodium vivax*, Paramecium, Paramecium- binary fission and conjugation.

Porifera: Sycon sponge, gemmule, spicules

Coelenterata: Obelia, Physalia, Porpita, Aurelia, Sea anemone.

Platyhelminthes: Planaria, Liver fluke, Redia, Cercaria, *Taenia solium*

Aschelminthes: Ascaris- male and female.

Annelida: Neries, Heteroneries, Aphrodite, Chaetopterus, Arenicola, Earthworm, Leech

Arthropoda: Penaeus, Nauplius, Zoea, Cyclops, Balanus, Crab, Spirostreptus, Scolopendra, Termite, Honey bee, Scorpion, Limulus

Mollusca: Pila, Patella, Aplysia, Chiton, Dentalium, Sepia

Echinodermata: Star fish, Pedicellaria, Sea urchin, Antendon, Holothuria, Echinopluteus larva.

**Cell Biology**

***Slides***

Polytene chromosome.

Mitosis stages in onion root tips, Meiosis stages in pollen grains, Buccal smear.

Spotters: Epithelial – Simple, Squamous and Ciliated; Muscular - Striated, Non-striated and Cardiac; Connective tissues, bone and adipose tissue.

**Bio Physics**

Measurement of pH in samples. Demonstration of Paper Chromatography. Verification of Beer-Lamberts Law. Micrometric measurements.

Spotters: Compound Microscope, Micrometer, Camera Lucida. pH meter, Centrifuge, Calorimeter.

**SEMESTER - I**

**Hours: 4**

**ALLIED -I**

**ALLIED BOTANY – I**

**Credits: 4**

**Objectives:** To learn about the external and internal structure and economic importance of Thallophytes, Bryophytes, Pteridophytes and Gymnosperms and to learn about external morphology, description and classification of higher plants

**Unit – I**

Classification of Algae – Structure and reproduction of *Oscillatoria*, *Chlamydomonas*, *Ectocarpus* and *Polysiphonia*. Economic importance of algae.

**Unit – II**

Classification of Fungi – Structure and reproduction of *Albugo*, *Penicillium* and *Puccinia*. Economic importance of fungi. Causes, symptoms and control measures of Blast disease of Paddy, Tikka disease of Groundnut and Red rot disease of Sugarcane.

**Unit – III**

Structure and reproduction of *Polytrichum*, *Lycopodium* and *Cycas*.

**Unit – IV**

Bentham and Hooker's system of classification – Study of the families with their economic importance – Annonaceae, Rubiaceae, Rutaceae, Fabaceae and Caesalpiniaceae.

**Unit –V**

Study of the families with their economic importance – Cucurbitaceae, Apocynaceae, Solanaceae, Euphorbiaceae and Poaceae.

**Text Books**

1. Ganguly A.K. 1971, General Botany, Vol.I. The New Book Stall, Calcutta.
2. Rao. K.N. Krishnamurthy K.V. and Rao. G., 1979, Outlines of Botany, Viswanathan Private Ltd.
3. Dutta A.C., College Botany, Vol. I and II.

**SEMESTER I**

**Hours: 2**

**ALLIED PRACTICAL – II\* BOTANY PRACTICAL**

**\*Running paper from semester I to semester II**

Practical covering

Allied Paper I – Allied Botany I

**Semester : I**

**Hours : 2**

**SBE I**

**Credits: 4**

## **VERMICULTURE AND VERMICOMPOSTING**

### **Unit I**

Earthworms: Morphological and anatomical characteristics – reproduction - Biology of composting earth worms -*Eudrilus eugeniae* and *Lampito mauritii*.

### **Unit II**

Ecological Classification of earthworms – epigeics, endogeics, aneics, saprophages and geophages. Identification characteristics of earthworms.

### **Unit III**

Soil types and Decomposition : Soil - physical, chemical and biological features, soil organic matter- and decomposition. Humus formation.

### **Unit IV**

Organic waste sources – problems in traditional composting . Vermicomposting : types– small scale and large scale production and methods - pit method, heap method, windrow method and Indoor method. Factors affecting vermicomposting - pH, moisture, temperature, nutritional value of feed.

### **Unit V**

Advantages of vermicomposting / vermicompost. Applications of vermicomposting in agricultural and horticultural practices. Economic importance of vermiculture . NABARD, Nationalized Banks and KVIC supports for vermiculture.

### ***Text Book***

1. Sultan Ahmed Ismail, 2005. The Earthworm Book, Second Revised Edition. Other India Press, Goa, India.

### ***References***

1. Manpuzhum manpuzhu vuramum by L.S. Renganathan, Manivasagar Publications, Chennai.
2. Vermiculture and organic Farming by T.V. Sathe, Daya Publications, 2004.

**Semester II**

**Hours: 6**

**Core Course III**

**Credits: 4**

## **BIOPHYSICS AND CELL BIOLOGY**

### **Unit I**

Scope of Biophysics: Colloids- description and properties -Tyndall effect, surface tension, Brownian movement, filtration, osmosis and dialysis. Microscopy - Principles and applications - light and electron microscope (SEM and TEM).

### **Unit II**

Instrumentation: Principles, description and applications - pH meter, colorimeter, centrifuge and Paper chromatography. Micrometry.

### **Unit III**

Plasma membrane- Ultrastructure, models –( unit membrane, fluid mosaic) and Functions. Endoplasmic Reticulum and Golgi complex - Ultra structure and functions.

### **Unit IV**

Mitochondria, Ribosomes, Lysosomes - Ultra structure and functions.

### **Unit V**

Ultra structure and functions of nucleus and Chromosomes. Structure and Biological importance of Giant chromosomes –Polytene and Lampbrush.

### ***Text Book***

1. Subramanian. M.A., 2005. Biophysics-principles and techniques-MJP publishers, Chennai.
2. Rastogi. S.C., 2004. Cell Biology, Second edition, New Age publishers, New Delhi.

### ***References***

1. De Roberties, E.D.P and E.M.F. De Roberties. 1988. Cell and Molecular Biology.8 th Edn. Hong Kong.
2. Tiraviaraj,2009. S. Biophysics. Saras Publications.Nagercoil.
3. Powar C.B. 1989. Essentials of Cytology Himalaya Publishing company.
4. Gupta, M.L. and M.L. Jangir (2002) Cell Biology Fundamentals and applications. Agrobios (India). Jodhpur.
5. Chatwal, G.R. (2005). Biophysics. First Edition, Himalaya publishing house, Mumbai.

**Semester II**  
**Core Practical II\***

**Hours: 4**  
**Credit: 4**

**BIOLOGY OF INVERTEBRATES AND BIOPHYSICS AND  
CELL BIOLOGY**

**\*Running paper from semester I to semester II**

**Virtual Dissections:** (*Virtual or draw and label the part*)

**Invertebrata**

Cockroach: Digestive system, nervous system, reproductive system male and female.

Earthworm: digestive system, nervous system - Identification of any two species of earthworms from fields.

Prawn/Cray fish- digestive system, nervous system.

Identification of mouth parts of Honey bee and House fly using slides.

**Spotters**

Protozoa: Elphidium, Vorticella, *Entamoeba histolytica*, *Plasmodium vivax*, Paramecium, Paramecium- binary fission and conjugation.

Porifera: Sycon sponge, gemmule, spicules

Coelenterata: Obelia, Physalia, Porpita, Aurelia, Sea anemone.

Platyhelminthes: Planaria, Liver fluke, Redia, Cercaria, *Taenia solium*

Aschelminthes: Ascaris- male and female.

Annelida: Neries, Heteroneries, Aphrodite, Chaetopterus, Arenicola, Earthworm, Leech

Arthropoda: Penaeus, Nauplius, Zoea, Cyclops, Balanus, Crab, Spirostreptus, Scolopendra, Termite, Honey bee, Scorpion, Limulus

Mollusca: Pila, Patella, Aplysia, Chiton, Dentalium, Sepia

Echinodermata: Star fish, Pedicellaria, Sea urchin, Antendon, Holothuria, Echinopluteus larva.

**Cell Biology**

**Slides**

Polytene chromosome.

Mitosis stages in onion root tips, Meiosis stages in pollen grains, Buccal smear.

Spotters: Epithelial – Simple, Squamous and Ciliated; Muscular - Striated, Non-striated and Cardiac; Connective tissues, bone and adipose tissue.

**Bio Physics**

Measurement of pH in samples. Demonstration of Paper Chromotography. Verification of Beer-Lamberts Law. Micrometric measurements.

Spotters: Compound Microscope, Micrometer, Camera Lucida. pH meter, Centrifuge, Calorimeter.

**SEMESTER II**

**Hours: 2**

**Credits: 3**

**ALLIED PRACTICAL – II\***

**\*Running paper from semester I to semester II**

Practical covering

Allied Paper II – Allied Botany II



**SEMESTER – II**

**Hours: 4**

**Credits: 4**

**ALLIED BOTANY – III**

**Objectives:** To learn about internal structure, morphogenesis, internal physiology of plants and Environment factors.

**Unit – I**

Structure and functions of Cell wall, Plasma membrane, Chloroplast, Mitochondria, Golgi bodies, Endoplasmic reticulum and Nucleus. Mendel's Laws – Monohybrid and Dihybrid Cross.

**Unit – II**

Structure, types and functions of Parenchyma, Collenchyma and Sclerenchyma. Structure of Xylem and Phloem components. Primary structure of Monocot stem and Dicot stem; Monocot root and Dicot root; Monocot leaf and Dicot leaf.

**Unit – III**

Structure of anther. Structure and types of Ovules – Structure of *Polygonum* type of embryosac. Types of endosperm. Double fertilization. Development of Dicot embryo.

**Unit – IV**

Absorption of water. Transpiration and factors influencing the transpiration. Photosynthesis- Light and Dark reactions – C<sub>3</sub> Cycle. Respiration – Glycolysis, Krebs's Cycle. Growth Hormones: Auxins, Gibberellins and Cytokinins.

**Unit –V**

Autecology – Synecology – Components of ecosystem – Pond ecosystem – Grassland ecosystem – Food Chain – Food Web – Ecological adaptations of Xerophytes – *Nerium*. Hydrophytes – *Eichhornia*.

**Text Books**

1. Ganguly A.K. 1971, General Botany, Vol.I. The New Book Stall, Calcutta.
2. Rao. K.N. Krishnamurthy K.V. and Rao. G., 1979, Outlines of Botany, Viswanathan Private Ltd.
3. Dutta A.C., College Botany, Vol. I and II.

**Semester III**  
**Core Course IV**

**Hours: 4**  
**Credits: 4**

## **BIOLOGY OF CHORDATES**

### **Unit I**

General characters of prochordates and chordates and classification up to orders with examples.

Prochordata : Detailed study – *Amphioxus lanceolatus*.

General topic: Retrogressive metamorphosis in *Ascidia*

### **Unit II**

Pisces: Detailed study – *Scoliodon* (Shark) ( excluding endoskeleton)

General Topic: Migration in Fishes.

Amphibia: Detailed study – *Rana hexadactyla* (Frog including endoskeleton)

General Topic: Parental care in Amphibians

### **Unit III**

Crocodiles, *Sphenodon* – Structure and Biological significance. Identification of Poisonous snakes, Poison apparatus, biting mechanism and venom.

General Topic : Snakes of south india.

### **Unit IV**

Aves: Detailed study – Pigeon- *Columba livia* (excluding endoskeleton)

General Topic: Flight adaptations in birds.

### **Unit V**

Mammals: Detailed study – Rabbit - *Oryctolagus cuniculus* (excluding endoskeleton)

General Topic: Adaptation of aquatic Mammals.

### **Textbooks**

1. Ekambaranath Ayyar and T.N. Ananthakrishan, 1995. “A Manual of Zoology” Vol 2 (Part I and 2). S.Viswanathan, Chennai.

### **References :**

2. Jordan E.L and P.S.Verma, 2000 “Chordate Zoology” S. Chand, New Delhi.
3. Newman H.H.1939, the Phylum Chordata, Mc Millan, New York.

Core Practical V \*

**BIOLOGY OF CHORDATES, GENETICS AND MOLECULAR BIOLOGY**

**CHORDATA**

**\*Running paper from semester III to semester IV**

**Dissections:**

Virtual dissection through various computer simulations:

**Frog** - Arterial system, Venous system, Dorsal and Ventral view of brain.

**Fish** – Digestive system, Circulatory system.

**Rat** - Digestive system, Arterial system.

Identification of fish scales by using slides (Ctenoid, Placoid and Cycloid).

Study on different types of feet and beaks of birds (from museum specimen)

**Spotters:**

**Prochordates:** Amphioxus, Balanoglossus, Ascidian.

**Fishes:** Scoliodon, Narcine, Pristis, Echeinis, Hippocampus, Anabas, Arius, Channa, Clarius, Exocoetus, Protopterus, Anguilla.

**Amphibia:** Bufo, Hyla, Rhacoporus, Ambystoma, Axolotl larva, Ichthyophis.

**Reptilia:** Varanus, Calotes, Draco, Chameleon, Naja, Echis carinata, Russels Viper, Hydrophis, Chelone.

**Aves:** Pigeon, Bird feathers.

**Mammals:** Rabbit, Manis, Loris, Bat, Rat.

**Skeleton:** Frog Endoskeleton: Skull, Vertebral column, Fore-limb, Hind-limb.

Pigeon: Synsacrum and Skull.

**Dentition:** Rabbit, Dog, Man.

**GENETICS:**

Recording of Mendelian traits in man, Blood grouping of man, Pedigree (Chart).

Models: Monohybrid and Dihybrid crosses.

Karyotypes of normal male and female. Klinefelter's syndrome, Turner's syndrome and Down's syndrome.

Drosophila- Male and female identification, Genetic importance, Mutants (Wing, body colour, eye colour).

**MOLECULAR BIOLOGY:**

Models for DNA, RNA, tRNA Structure and DNA replication.

**SEMESTER III  
ME I**

**Hours: 4  
Credits: 5**

## **AQUACULTURE**

### **Unit I**

History and Importance of aquaculture; Water quality: physical and chemical characteristic features of freshwater, brackish water and sea water. Culture systems- traditional, semi- intensive and intensive.

### **Unit II**

Fish farm- site selection- construction and preparation of fish ponds, breeding pond, hatchery unit, nursery pond, stocking pond- raising ponds. Feeds for cultivable species- natural, supplementary and live feed- Artemia. Appliances used in culture fisheries.

### **Unit III**

Types of culture- monoculture- poly culture; culture of Indian Major carps – induced breeding in Indian major carps- hypophysation

### **Unit IV**

Shrimp farming: life cycle of marine prawn *Penaeus monodon*. Culture methods for marine prawn. Hatchery techniques- feed types and management. Prawn diseases and treatment. Ornamental fish culture.

### **Unit V**

Preservation and processing of fish and prawn- fishery byproducts. MPEDA, Agencies involved in marketing of aquaculture products.

### **Text Books:**

1. Santhanam,R. 1987. Fishery Science, Daya Publishing House.

### **References:**

1. Jhingeran, V.G. 1982. Fish and Fisheries of India. Hindustan Publishing corporation of India.
2. Pillai T.V.R. 1988. Aquaculture Principle and Practices. Fishing news books.
4. Santhanam,R. 1992. A manual of fresh water aquaculture Oxford I.B.H.
5. Shanmugam, K.1982. Fishery Biology and Aquaculture. Leo Pathipagam.

**SEMESTER: III**

**Hours: 2**

**SBE II**

**Credits: 4**

## **APICULTURE**

### **Unit-I**

Scope of Apiculture-Honey bee species-Characteristics-Combs types-Biology of *Apis indica* -Social organization of honey bee- division of labour; communication in bees-Nuptial flight- wagle dance-pheromones.

### **Unit-II**

Apiculture: Modern method of bee keeping-Newton`s beehive -Description-Accessories used in apiculture. Characteristics of bees suitable for bee keeping; Location of Apiary; Bee pasturage, Procedure of bee keeping: Acquiring beehive-Queen and its management-swarm control .

### **Unit-III**

Care and Management of beehive -Extraction of honey. Properties-Composition and uses of honey .By-products of Bee keeping - Bee wax -bee venom- propolis- royal jelly.

### **Unit-IV**

Diseases of honey bees :Thai Sac Brood Virus, Black Queen Virus, *Apis irridescent* virus, American Foul Brood ,Para Foul Brood , Chalk Brood disease, Stone Brood disease Nosemosis, Septicaemia. Enemies of honey bees: Wax moths-Ants-Wasps-Birds-Rattle snake. Advantages of bee pollination in crops

### **Unit-V**

Small scale and Self employment of bee keeping- Funding agencies-Economics of Apiculture-Marketing of honey and by-products.

### **Textbooks:**

1. Theeni valarpu-Thigarajan – TeeJay publications, Thanjavur
2. Cherian,R. and K.R Ramanathan,1992-Bee keeping in India

### **References:**

1. Sharma,P. and Singh L. 1987-Hand book of bee Keeping, Controller Printing and Stationery, Chandigarh.
2. Rare,S.1998-Introduction to bee keeping ,Vikas publishing house.
3. Mishra,R.C.,1985- Honey and their management in India, ICAR.
4. Nagaraja, N and, D. Rajagopal, 2009.Honey bee diseases ,Parasites, Pest, Predators and their Management. MJP publishers, Chennai, Tamil Nadu, India.

**SEMESTER IV**

**Hours: 6**

**Core Course VI**

**Credits: 4**

## **GENETICS AND MOLECULAR BIOLOGY**

### **UNIT I**

Mendelian Inheritance – Monohybrid and dihybrid crosses; Interactions of genes - Complementary, Supplementary and lethal genes. Linkage and crossing over.

### **UNIT II**

Determination of sex – Chromosomal, environmental and hormonal mechanisms. Geneic balance theory – Sex linked, Sex limited and sex influenced; gynandromorphy. Human genetics – inborn errors of metabolism - Phenylalanine metabolism- Alkaptonuria and phenylketonuria.

### **UNIT III**

Human Karyotype – Chromosomal aberrations in number – Aneuploidy, Euploidy and Polyploidy (Klinefelter's, Turner's and Down's syndromes; Chromosomal aberrations in structure – addition, deletion, inversion and duplication.

### **UNIT IV**

DNA as the genetic material - Griffith's Experiment, Hershey and Chase experiment. DNA-structure, replication and repair mechanism. RNA structure, types. Genetic code - transcription, translation and post translational modifications.

### **UNIT V**

Regulation of gene action – regulation in prokaryotes – Lac operon concept. Population genetics: Multiple alleles- blood groups in man- ABO, Rh and MN groups - Hardy Weinberg equilibrium.

### **Text Books**

1. Singh BD. 2006. Fundamentals of Genetics. Kalyani Publishers. Lucknow
2. Verma P.S. and Agarval V.K. 2007. Cell Biology, genetics, molecular Biology, Evolution and Ecology. S,.. Chand and Company Ltd. New Delhi. Gupta.

### **References**

1. Gardner, E.J.1984. Principles of genetics. Eiley Eastern Ltd. New York.
2. Rastogi. V.B. 1990. A textbook of genetics. Kedar Nath Ram Nath, Meerut.
3. Mange, EJ and Mange A.P. 1997.Basic Human Genetics. Rastogi Publications, Meerut

**Semester IV**

**Hours: 4**

**Core Practical V \***

**Credits: 4**

**BIOLOGY OF CHORDATES, GENETICS AND MOLECULAR BIOLOGY**

**CHORDATA**

**\*Running paper from semester III to semester IV**

**Dissections:**

Virtual dissection through various computer simulations:

**Frog** - Arterial system, Venous system, Dorsal and Ventral view of brain.

**Fish** – Digestive system, Circulatory system.

**Rat** - Digestive system, Arterial system.

Identification of fish scales by using slides (Ctenoid, Placoid and Cycloid).

Study on different types of feet and beaks of birds (from museum specimen)

**Spotters:**

**Prochordates:** Amphioxus, Balanoglossus, Ascidian.

**Fishes:** Scoliodon, Narcine, Pristis, Echeinis, Hippocampus, Anabas, Arius, Channa, Clarius, Exocoetus, Protopterus, Anguilla.

**Amphibia:** Bufo, Hyla, Rhacoporus, Ambystoma, Axolotl larva, Ichthyophis.

**Reptilia:** Varanus, Calotes, Draco, Chameleon, Naja, Echis carinata, Russels Viper, Hydrophis, Chelone.

**Aves:** Pigeon, Bird feathers.

**Mammals:** Rabbit, Manis, Loris, Bat, Rat.

**Skeleton:** Frog Endoskeleton: Skull, Vertebral column, Fore-limb, Hind-limb.

Pigeon: Synsacrum and Skull.

**Dentition:** Rabbit, Dog, Man.

**GENETICS:**

Recording of Mendelian traits in man, Blood grouping of man, Pedigree (Chart).

Models: Monohybrid and Dihybrid crosses.

Karyotypes of normal male and female. Klinefelter's syndrome, Turner's syndrome and Down's syndrome.

Drosophila- Male and female identification, Genetic importance, Mutants (Wing, body colour, eye colour).

**MOLECULAR BIOLOGY:**

Models for DNA, RNA, tRNA Structure and DNA replication.

**Semester V**  
**Core Course VII**

**Hours: 6**  
**Credits: 5**

## **ANIMAL PHYSIOLOGY**

### **Unit I**

Nutrition: Physiology of digestion- ingestion, digestion absorption, assimilation and egestion. Circulation-haemopoiesis- blood corpuscles – blood function, blood volume and regulation: Structure and physiology of heart. ECG,cardiac cycle, blood pressure.

### **Unit II**

Respiration - Physiology of respiration - transport of gases (O<sub>2</sub> and CO<sub>2</sub>). Respiratory pigments- Haemoglobin – structure and function.

Excretion: Physiology of excretion – Kidney structure, urine formation, elimination; regulation of water, electrolyte and acid base balance.

### **Unit III**

Thermoregulation – Poikilotherms and Homeotherms. Comfort zone, body temperature – physical and chemical acclimatization – homeostasis.

Muscle physiology – Types of muscles - Ultra structure and contraction of smooth (skeletal) muscles.

### **Unit IV**

Neurophysiology: Anatomy of the brain and spinal cord- central and peripheral nervous system, Neurons, synapse, synaptic transmission, conduction of nerve impulse, action potential. Reflexes - types.

Receptors – Photoreceptors and phonoreceptors – Pheromones – definition.

### **Unit V**

Endocrinology: Pituitary, thyroid, adrenal, pancreas - structure and functions. Basic mechanism of hormone action and their regulation.

Reproductive physiology: Structure and physiology of testis and ovary. Neuro-endocrine regulation of reproduction.

**(All the systems are based on mammalian physiology)**

### **Textbooks**

1. Verma P.S. and V.K. Agarwal.1992. Animal Physiology. S. Chand and Co.

### **References**

1. Berry A.K. 1998. A textbook of animal physiology. Embay publications, Delhi.
2. Mariakuttikan and N. Arumugam, 2002 Animal Physiology, Saras publications, Nagarkoil.
3. Rastogi.S.L. 1997. Essential of Animal physiology. New Age International Publishers, New Delhi





**DEVELOPMENTAL BIOLOGY AND EVOLUTION**

**Unit-I**

Scope of Embryology, Gametogenesis – Spermatogenesis and Oogenesis in mammals. Sperm structure and types, Egg structure and types. Fertilization- Acrosomal reaction, cortical reaction, Physiological and Biochemical changes, significances- Parthenogenesis theories.

**Unit-II**

Cleavage- planes of cleavage, types and patterns of cleavage. Fate map, Blastulation and Gastrulation in frog. Organogenesis – Ectodermal derivatives – development of brain and eye in frog. Mesodermal derivatives –Development of Kidney in frog. Endodermal derivative– development of intestine in frog.

**Unit –III**

Extra Embryonic membranes in chick, Placentation in mammals-types and physiology of placenta. Embryonic induction, concept of organizer, Test tube baby.

**Evolution**

**Unit –IV**

Theories of evolution- Lamarckism, Neo-Lamarckism, Darwinism Neo- Darwinism, De Vries theory of mutation. Origin of life – Urey and Miller experiment - Oparin and Haldane experiment –Reddi’s experiment - Modern Synthetic Theory of Evolution - Evidences of evolution –Palaeontological, embryological and biochemical

**Unit-V**

Colouration and Mimicry, Speciation, Isolation.  
Evolution of man – Formation of fossils, Types of fossil, Dating of fossils - Cultural and future.

**Text Books**

1. Dr.(Tmt.) Bernis Anantharaj - Karuvial - Christolite Publications, Chennai,

**References**

1. Berrill, N.J., 1986, Developmental Biology, McGraw Hill, New Delhi.
2. Patten, B.M., 1956, Foundation of Embryology, McGraw Hill, New York.
3. Dobzhansky, T., et al., 1977, Evolution, W.H. Freeman and Co., San Francisco.
4. Stansfield, W.D., 1977, The Science of Evolution, Collier Macmillan, London.
5. Balinsky, B.I., 1981, An Introduction to Embryology, Holt saunders, New York.

**SEMESTER V**

**Hours: 6**

**Core Course IX**

**Credits: 4**

## **BIOSTATISTICS, COMPUTER APPLICATIONS AND BIOINFORMATICS**

### **Unit-I**

Data collection: Primary and secondary data – drafting a questionnaire. Methods of data collection- census and sampling methods. Processing data: classification, tabulation and construction of frequency distribution - organization. Diagrammatic presentation of data: bar diagram, pie diagram, frequency polygon, frequency curve, and histogram.

### **Unit -II**

Measures of central tendency: Mean, median, mode for simple, discrete and continuous data. Measures of dispersion: range, standard deviation, variance, standard error, coefficient of variation, simple correlation, regression.

## **COMPUTER APPLICATIONS**

### **Unit-III**

Introduction – generation, classification and applications of computers, Components of a computer: input devices, output devices; CPU, Memory - primary and secondary. Programming languages: An introduction to Basic programming – Writing simple programmes –To find mean of given number to find greatest of 3 numbers.

### **Unit IV**

BASIC software: MS-Word, MS –Office, MS-Excel, MS-Power point .Brief idea about operating systems and word processor. Computer and communication, Internet services and types of Search engines, world wide web, e-mail, e –commerce, e-book and e-journals .An introduction to medical transcription.

## **BIOINFORMATICS**

### **Unit-V**

Introduction, biological databases Primary- Primary nucleic acid. Databases- EMBL, DDBJ, Gen Bank. Protein – PIR, MIPS, SWISS - PROT, TrEMBL, NRL-3D .Composite-NRDB-OWL, MIPSX, SP+TrEMBL. Secondary databases, Prosite, Profiles, Print, Pfam, Blocks Identify.

### **Textbooks**

1. Ramakrishnan, P. 1995. Biostatistics . Saras Publications, KanyaKumari.
2. Ignacimuthu. S.J 2013. Basic Bioinformatics Narosa publishing House, New Delhi, India.

### **References**

1. Prasad, S. 2001. Elements of Biostatistics. Rastogi Publications, Meerut.
2. Veer Bala Rastogi. 2007. Fundamentals of Biostatistics .Ane Books India. Chennai.
3. Zar, J.H. 1984. Biostatistical analysis, Prentice Hall, New Jersey, USA.

**ANIMAL PHYSIOLOGY, BIOCHEMISTRY, DEVELOPMENTAL BIOLOGY AND EVOLUTION,  
BIO-STATISTICS, COMPUTER APPLICATIONS AND BIOINFORMATICS**

**Animal Physiology**

1. Human salivary amylase activity in relation to temperature and pH.
2. Identification of Nitrogenous waste products
3. Enumeration of RBCs/WBCs by haemocytometer

Spotters: Haemoglobinometer, Kymograph, Sphygmomanometer.

**Biochemistry**

1. Qualitative and quantitative tests for proteins,
2. Qualitative tests for carbohydrates and fats
3. Electrophoresis (demonstration)

Spotters: Models of Amino acids, Haemoglobin, ATP, Steroids

**Developmental biology**

Spotters: Blastoderm, Frog – sperm motility, Sperm, T.S. of Mammalian ovary.

Frog: Egg, cleavage, blastula, Yolk plug and tadpole stages

Chick: Egg, Developmental stages - 24 Hrs, 46Hrs and 72 Hrs.

Sheep: Placenta

**Evolution:**

Spotters: Protective coloration -Leaf insects, Stick insects, Chameleon, Hippocampus, Pepper moth. Mimicry: Monarch and Viceroy butterfly. Quantum evolution; Bat, Pteropus.

**Bio-statistics:**

1. Calculation of mean, median, mode, variance, SD and SE from Molluscan shell dimensions.
2. Diagram construction - Bar, Histogram, and Pie.
3. Calculation of correlation and regression – for fish length – weight measurements on shell dimensions.

**Computer applications**

1. Basic components of computers – Input (Mouse, keyboard, light pen, scanner etc.), Output (Printer, Monitor) devices.
2. Using windows OS – manipulating files – editing files, writing simple programmes in Basic.
3. Demonstration of the Internet and its uses.
4. File format of Genbank, EMBL and DDBJ.
5. File format of PIR, PDF and SWISSPROT.

**Semester V**  
**ME II**

**Hours: 5**  
**Credits : 5**

## **BIOCHEMISTRY**

### **Unit - I**

Definition and scope of Biochemistry, Classification, structure and Functions of Carbohydrates, Proteins, Lipids and Nucleic acids. Vitamins: water soluble and fat soluble vitamins, occurrence, function and deficiency diseases.

### **Unit- II**

Metabolism of Carbohydrate: Glycolysis, TCA cycle, HMP shunt pathway, Glycogenesis and glycogenolysis. Protein: General pathway of amino acid metabolism – deamination, transamination and decarboxylation. Urea cycle. Glycine and phenylalanine metabolism. Lipid : Beta-oxidation, biosynthesis of saturated fatty acids- Palmitic acid , Nucleic acids:- metabolism of purine and pyrimidine nucleotides. Ketogenesis

### **Unit- III**

Enzymes: Definition, nomenclature and classification of enzymes, properties. Structure and functions of coenzymes. Metallo enzymes and metal enzymes. Mechanism of enzyme action- active site, Lock and Key model, induced fit hypothesis. Mechanism of enzyme catalysis, enzyme-substrate complex formation, Allosteric enzymes.

### **Unit- IV**

Free energy and entropy changes in biological system, coupling of endergonic and exergonic processes. High energy phosphates and their role in redox reaction. Phosphagens-ATP as an energy molecule. Synthesis of ATP.

### **Unit- V**

Hormones- classification and types- General structure of Hormone- Organ specific hormones- Mechanism of hormonal action and regulation- Receptors of hormones- - G-protein.

### **Text books**

1. Biochemistry- Prof. Dulsy Fatima, Dr.P.Meyyan, Saras Publication,2004
2. Biochemistry-P.S.Verma,Chand & co,2004

### **References:**

- 1 Harper's review of Biochemistry- H.P. Harper et al., Lange Medical Publication 1981
2. Biochemistry – Stryer et al, W.H. Freeman Pubs, 2002, NY
3. Biochemistry 4t Ed. – Voet D & Voet J, VP & Publishers
4. Understanding enzymes – T. Palmer, Prentice Hall, Ellis Harwood, 1995.
- 5 Principles of Biochemistry- Lehninger A L,W.H.Freeman,2008.N Y

**ENVIRONMENTAL BIOLOGY AND TOXICOLOGY**

**Unit - I**

Environment: Atmosphere (air), Hydrosphere (water), Lithosphere (soil); Abiotic factors: Temperature and light - Effect of light and temperature on animals. Biotic factors - Animal association - Symbiosis, Commensalism, Mutualism, Antagonism, Antibiosis, Parasitism, Predators and Competition.

**Unit - II**

Community Ecology : Types of Communities; Characteristics of Community - Stratification - Community interdependence - Ecotone - Edge effect; Ecological Niche - Ecological succession. Population ecology : Population size and Density, Natality, Mortality, Age Structure, Biotic potential, Population Dynamics; Regulation of Population Size- Emigration, Immigration and Migration.

**Unit – III**

Habitat Ecology: Characteristic features, fauna and their adaptations in fresh water (Pond and river), Marine (pelagic, rocky, sandy, muddy shore), Estuaries, Man grooves of Tamil Nadu: characteristic features, flora and fauna and their adaptations.

**TOXICOLOGY**

**Unit - IV**

Scope and importance of Toxicology, Classification of Toxicants - Cardiotoxicants, Immunotoxicants, Hepatotoxicants and Food additives. Routes of entry of Toxicants, LC<sub>50</sub> and LD<sub>50</sub>. Dose response relationship - selection of exposure, Duration of exposure, Types of human exposure. Mode of action of Toxicants, Toxic effect, Toxicological methods - Acute, Sub acute and Chronic toxicity tests.

**Unit -V**

Environmental toxicology : Introduction and importance of toxicants in atmosphere; toxicants in hydrosphere - domestic, industrial, heavy metals. Bio-magnifications. Environmental monitoring - EIA, EIM.

**Textbooks**

1. Rastogi, V.B. and M.S.Jayaraj.1997. Animal ecology and distribution of animals. Kedarnath, Ramnath.
2. Verma P.S. and V.K.Agarwal.1996. Principles of ecology. S. Chand and Co., New Delhi.
3. Arumugam, N.1992. Concepts of ecology. Saras publications, Nagercoil

**References**

1. Claude, F., Christiane, F., Paul, M. and Jean, D.1998. Ecology Science and Practice. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
2. Sood, A. 1999. Toxicology. Sarup & Sons. Darya Ganj. New Delhi.
3. Dr. Kamalleshwar Pandey, Dr. J.P.Shukla, Dr. S.P. Trivedi. 2005. Fundamentals of Toxicology. New central Book Agency P(LTD). Kolkatta -700 009.

**IMMUNOLOGY**

**Unit I**

Types of immunity- Innate and acquired immunity, active and passive immunity; physical, biochemical and cellular factors in innate immunity. Lymphoid organs- primary lymphoid organs- thymus, bone marrow, Bursa of fabricius ; secondary lymphoid organs- spleen, lymph nodes , tonsils and Peyer's patches.

**Unit II**

Cells of immune system; origin of stem cells- cells of lymphoid lineage : lymphocytes- structure and functions of B- lymphocytes, Plasma cells; T- lymphocytes, NK cells and K cells. Cells of myeloid lineage; Study on monocytes and polymorphonuclear leucocytes, Neutrophils, Eosinophils and basophils. Circulation of lymphocytes in the body.

**Unit III**

Types of antigens, properties; definition of hapten, adjuvant. Antibodies: Basic structure of immunoglobulin, types of immunoglobulin, biological properties. Immune responses; Humoral and cell mediated immunity.

**Unit IV**

Major histocompatibility complex (MHC) - types of MHC molecules. MHC molecule in human – functions. Complement: classical and alternate pathways. Auto immune diseases- Pernicious anemia and Rheumatoid arthritis. Vaccination- Principle and types. Brief study on transplantation immunology.

**Unit V**

Basic idea on immunological techniques- precipitation- VDRL test; Immunodiffusion-immunoelectrophoresis; agglutination- ABO blood typing, Rh blood grouping. Widal test, ELISA and RIA.

**Textbook**

1. Fatima , D. and Arumugam N. 2001. Immunology , Saras Publication , Kanyakumari

**References:**

1. Shetty , N. 2006. Immunology, New Age International Private ltd., Publishers, New Delhi.
2. Shastri, N.V. 2005. Principles of Immunology, Himalaya Publishing House, New Delhi.
4. Rao, C.V. 2006. Immunology, Narosa Publishing house, New Delhi.
5. Kannan, I. 2007. Immunology, MJP publishers, Chennai.
6. Janis Kuby.1997.Immunology.W.H.Freeman & company, New York.
7. Ivan M. Roitt *et al.*, Essential Immunology. XII Edition, Wiley- Blackwell Publishers.UK.

## **MICROBIOLOGY**

### **Unit-I**

Scope of microbiology –microbial classification- bacteria- fungi – viruses. The morphology and fine structure and chemical composition of gram – positive and gram- negative bacterial Cell Wall.

### **Unit-II**

The culture of bacteria-Classification of bacteria based on their nutritional requirements. Types of culture media; isolation of pure culture-preparation of media; culture of aerobic and anaerobic bacteria. Bacterial growth curve; Preservation and Maintenance of pure culture.

### **Unit-III**

Fermentation-Types of fermenter - microbial production of Vinegar, Ethyl alcohol, Penicillin, Microbes in metal extraction, Pollution control - Super bug.

### **Unit –IV**

Microbial Spoilage of foods-meats, milk, egg-Methods of preservation of foods-Microbes in Agricultural pest control- antibiotic- antibacterial- antifungal-antiviral, chemotherapeutic agents.

### **Unit-V**

Microbial diseases of man-Bacterial disease - Diptheria, Pertusis, Tetanus, Tuberculosis, Typhoid ,Leprosy, Syphilis, Gonorrhoea, Viral disease, Polio myelitis, AIDS, Dengue, Chikungunya. Diagnosis and therapy.

### **Textbooks**

1. Ananthanarayanan,R. and Jayaraman Paniker ,C.K. 1990.Text book of Microbiology. Orients Longman.
2. Sharma,P.D.1998.Microbiology.Rastogi Publication,Meerut,India.

### **References**

- 1.Rao, A.S. 2001. Introduction to Microbiology.Prentice Hall of India Private Limited,New Delhi,India.
2. Powar and Daginnawala, General Microbiology, Vol. II, Himalaya Publishing house, Mumbai.
- 3.Dubey, R.C. and Maheswari,D.K.1999.Text Book of Microbiology.S.Chand and Company New Delhi,India.
- 4.Narayana,L.M.,Selvaraj,A.Mand N.Arumugam.1999.Microbiology ( General and applied). Saras Publication,Nagercoil,India.
- 5.Pelczar ,M.J.,Chan,E.C.S.,Krieg,N.R.1993.Microbiology(fifth edition) Tata McGraw-Hill Publishing Company Ltd., New Delhi,India.



**ENVIRONMENTAL BIOLOGY AND TOXICOLOGY, IMMUNOLOGY,  
MICROBIOLOGY, BIOTECHNOLOGY AND SERICULTURE**

**Environmental Biology**

1. Estimation of Dissolved oxygen.
2. Estimation of Salinity
3. Estimation of Calcium
4. Examination of intertidal fauna
- 5 Examination of marine plankton

**Spotters:**

Animal association, pH meter, Secchi disc, maximum and minimum thermometer, Anemometer, Barometer, Hygrometer.

**Toxicology**

1. Estimation of LC<sub>50</sub> (Demonstration in groups using different toxicants)
2. Estimation of toxicants (metals, organophosphorus) in industrial effluents.
3. Observation of pH and salinity variations in different soil samples.

**Immunology**

1. ABO Blood grouping and Rh factor typing.
2. Lymphoid organs of mouse- (spotters)
3. Double immunodiffusion

**Microbiology**

1. Demonstration of sterilization procedure for culture media and equipment.
2. Preparation of culture media for microbes, serial dilution techniques (in groups)
3. Distribution of microbes in water (demonstration and observations.)
4. Fixing and gram staining of bacteria
5. Hanging drop preparation of Lactobacillus.

**Spotters:** Autoclave and Petri-dish.

**Biotechnology**

Isolation of genomic DNA from human saliva.

Spotters: PCR, transilluminator, Electrophoresis unit, P<sup>BR322</sup> vector, Pharmaceutical products:  
Insulin

**Sericulture:**

1. Identification of different types of silkworms.
2. Morphology of egg larva, pupa and adult of different silkworm types.
3. Life history of different silkworm types

**Spotters:** Pest and Diseases of Mulberry silk worm and host plants

**Field Trip:** A visit to any silk

**SEMESTER VI**

**Hours: 5**

**ME III**

**Credits: 4**

**BIOTECHNOLOGY**

**Unit I**

Biotechnology – Scope. Overview of genetic engineering. Cloning vectors- plasmid, Cosmid, phagemids, other viral vectors. Specialized vectors: shuttle vectors, expression vectors. Construction and use of pBR 322, Transposons, Isolation of plasmids and DNA methods. Applications of Biotechnology.

**Unit II**

Enzymes used in genetic engineering: Restriction endonuclease, ligases, SI nucleases, DNA polymerases, ribonucleases, reverse transcriptase, deoxyribonuclease- Klenow fragment, linkers, adaptors and homopolymers cutting and joining.

**Unit III**

Medical and farm biotechnology – production, methodology and applications of Hybridoma and Monoclonal antibodies. DNA finger printing, Gene therapy- In-vivo, Ex-vivo. Biopharmaceutical products, application of biotechnology in medicine.

**Unit IV**

Industrial biotechnology: Enzyme production, Isolation and purification of enzyme, immobilization of enzymes. Fermentation: Fermenter structure, types and process of fermentation. Ethanol production. Production of Antibiotics – penicillin. Single cell protein (SCP)

**Unit V**

Environmental biotechnology- Biofertilizer, nitrogen fixation, biopesticides, Bioremediation, pollution control.

**Text book:**

1. Dubey, R.C. 2007. A Text Book of Biotechnology. S. Chand and Company Ltd, New Delhi.

**References :**

1. Ignacimuthu, S.J. 2002. Basic Biotechnology. Tata Mc Graw-Hill Publishing Company, Ltd., New Delhi.
2. Kumerasan, V. 2001. Biotechnology, saras publication, kanyakumari.
3. Arora, P.M. 2003. Biotechnology I edition. Himalays Publishing House, Mumbai.
4. Gupta, P.K.2004. Biotechnology and genomics (1st Edition) Rastogi Publication, Meerut.

**Semester: VI**

**Hours: 2**

**SBE III**

**Credits: 4**

## **SERICULTURE**

### **Unit- I**

History and Economic importance of sericulture. *Bombyx mori* – biology, life cycle, sex determination of larva, pupa and adult – Races of silk worm – uni, bi and multivoltine. Types of silkworms – Mulberry silk worm, Tasar silk worm, Muga silk worm and Eri silk worm – Types and uses of silk – The Central Silk Board (CSB) – Organizational set up of CSB –.

### **Unit-II**

Moriculture – Optimum temperature for mulberry growth – Methods of propagation: seedling and vegetative propagation – cutting, grafting, and layering – Irrigation, manuring, pruning and harvesting

### **Unit - III**

Rearing facilities: rearing house – Rearing appliances - appliances used for feeding, bed cleaning, disinfection and maintaining optimum conditions – Rearing methods – Chawki rearing of young age worms – paraffin paper rearing – box rearing – new net method

### **Unit - IV**

Cocoons and cocoon marketing – Identification of defective cocoons – Silk reeling – stifling-flossing – deflossing – re-reeling

### **Unit - V**

By products of silk worm – Diseases of silk worm and their control measures - Bacterial disease – Flacherie, Viral disease – Infectious Grasserie, Fungal disease – Muscardine.

### **Textbooks**

1. Ganga, G. and Sulochana Chetty, J. An Introduction to Sericulture (2<sup>nd</sup> Edition), Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi
2. Tomar, B. S. and Singh, N (2007). A Text Book of Applied Zoology. Emkay Publications, New Delhi

### **References**

1. Ullal, S. R. and Narasimhanna, M. N. (1979). Hand Book of Practical Sericulture, Central Silk Board, Bombay..
3. Taxima, Y. 1972. Hand Book of Silkworm Rearing, Fuji Publication, Tokyo.

**Offering Department : Zoology**

**Receiving Department: Botany and Chemistry**

**Semester: I**

**Hours: 4**

**Allied I**

**Credits: 4**

## **BIOLOGY OF INVERTEBRATES AND CHORDATES**

### **Unit I**

General characteristics and outline classification of Invertebrata

Phylum: Protozoa- Type study -Paramecium.

Phylum: Platyhelminthes-Type study - *Fasciola hepatica*.

### **Unit II**

Phylum: Annelida - Type study- Earthworm.

Phylum: Arthropoda- Type study- Marine Prawn (*Penaeus monodon*).

### **Unit III**

Phylum: Echinodermata- Type study- *Asterias rubens*.

General Characters and outline classification of Chordata .

### **Unit IV**

Class: Pisces : Type study- *Scolidon sorrokowah* (Shark). (except Endoskeleton).

Class: Amphibia : Type study - *Rana hexadactyla* (Frog). (except Endoskeleton).

### **Unit V**

Class: Aves - Type study - *Columba livia* (Pigeon). (except Endoskeleton).

Class: Mammalia - Type study -*Oryctolagus cuniculus* (Rabbit). (except Endoskeleton).

### ***Text book.***

1. Manual of Zoology (Invertebrata), Ekambaranatha Ayyar and T.N. Ananatha Krishnan (1992) Part-I & II Vishwanathan Pvt.Ltd.

2. **Manual of Zoology ( Vertebrata), Ekambaranatha Ayyar and T.N. Ananatha Krishnan (1992) Part-I & II Vishwanathan Pvt.Ltd.**

### ***References***

1. Jordon EL and Verma P.S. (1995), Invertebrate Zoology, S Chand and Co, Zoology Delhi.

2. Kotpal, R.L, S.K. Agarwal, R.P.R. Khetarpal 1989 Modern text Book of Zoology Rastogi Publication.

3.N. Arumugam, Invertebrata, Saras Publication, Nagercoil.

**Offering Department : Zoology**

**Receiving Department: Botany and Chemistry**

**SEMESTER: I**

**Hours: 2**

**Allied Practical II\***

**\*Running paper from semester I to semester II  
BIOLOGY OF INVERTEBRATES & CHORDATES AND ECONOMIC  
ZOOLOGY**

**Dissection:**

Cockroach: Digestive system and Nervous system/Demo/CD/ Virtual.

**Spotters:**

Honey bee – mouth parts - Slides. Identification of Cycloid, Placoid and Ctenoid Scales - slides.

Earth worm –Body setae slide.

**Spotters**

**Specimens:** Paramecium, Euglena, Liver fluke, Tapeworm, Neries, Earthworm, Leech, Crab-Scolopendra, Honey bee, Scorpion, Star fish, Sea cucumber, Shark, Frog, Chameleon, Pigeon and Rabbit.

**Products**

Honey bee, Cod Liver oil, Pearl, silk.

**Economic Importance:**

**Harmful animals:** *Entamoeba*, *Plasmodium*, Housefly, Mosquito, Termite queen, *Oryctes rhinoceros*.

**Beneficial animals:** *Bombyx mori*, Cocoon, Pearl oyster, *Penaeus monodon* and *Macrobranchium malcomsonii*.

**Offering Department : Zoology**

**Receiving Department: Botany and Chemistry**

**SEMESTER: II**

**Hours: 2**

**Allied Practical II\***

**Credits: 3**

**\*Running paper from semester I to semester II**  
**BIOLOGY OF INVERTEBRATES & CHORDATES AND ECONOMIC**  
**ZOOLOGY**

**Dissection:**

Cockroach: Digestive system and Nervous system/Demo/CD/ Virtual.

**Spotters:**

Honey bee – mouth parts - Slides. Identification of Cycloid, Placoid and Ctenoid Scales - slides.

Earth worm –Body setae slide.

**Spotters**

**Specimens:** Paramecium, Euglena, Liver fluke, Tapeworm, Neries, Earthworm, Leech, Crab-Scolopendra, Honey bee, Scorpion, Star fish, Sea cucumber, Shark, Frog, Chameleon, Pigeon and Rabbit.

**Products**

Honey bee, Cod Liver oil, Pearl, silk.

**Economic Importance:**

**Harmful animals:** *Entamoeba*, *Plasmodium*, Housefly, Mosquito, Termite queen, *Oryctes rhinoceros*.

**Beneficial animals:** *Bombyx mori*, Cocoon, Pearl oyster, *Penaeus monodon* and *Macrobranchium malcomsonii*.

**Offering Department : Zoology**

**Receiving Department: Botany and Chemistry**

**Semester II  
Allied III**

**Hours: 4  
Credits: 4**

### **ECONOMIC ZOOLOGY**

#### **Unit I**

Aquaculture: Scope, site selection, pond construction and management of freshwater fish farming. Edible South Indian Fishes: Fresh water fishes – *Catla catla*, *Labeo rohita*, *Mirigala*, *Tilapia* and *Channa striata*. Marine water fishes – *Mugil cephalus*, *Lates calcarifer*, *Sardinella longiceps*, *Rastrelliger kanagaruta* and *Scolidon sorrokowah* (Shark). Fish by-products.

#### **Unit II**

Aquarium fishes – marine (any two), fresh water (any two). Economic importance of aquarium fishes. Culture practice for Marine prawn (*Penaeus monodon*)

#### **Unit III**

Mulberry culture, Biology and life history of *Bombyx mori*, rearing techniques, harvesting, bacterial diseases (Septicemia and Bacterial intoxication) and viral diseases (Grasserie and Flacherie) of silk worm and economic importance.

#### **Unit IV**

Vermiculture: Scope, Culture of *Eisenia foetida*, *Perionyx excavatus*, methods of vermicomposting, advantage of vermicomposting, marketing of vermicompost and economics.

#### **Unit V**

Parasitic protozoan diseases: Amoebiasis, Malaria, Leishmaniasis, African sleeping sickness. House holds pests: Mosquitoes, Cockroaches, House flies. Agricultural pests: Life cycle and control measures of *Scirpophaga incertulas* (paddy stem borer), *Amsacta albistriga* (red hairy caterpillar), *Oryctes rhinoceros* (rhinoceros beetle), Cotton, *Pectinophora gossypiella*.

#### **Text Books**

- 1 Vasantharaj David, 2001. Elements of Economic Entomology, Popular Book Depot., Chennai-6000015.
- 2 Economic Zoology. Dr Shukla Upadhyay, Rastogi Publication, Meerut.
- 3 A Hand book on Economic Zoology. Dr Jawaid Ahsan and Dr. Subhas Prasad Sinha, S.Chand Company Ltd, New Delhi.

#### **References**

1. Sultan Ahamed Ismail, 2005. The Earthworm Book, II Ed., Mother India Press, Goa.
2. Aquaculture. Dr. N. Arumugam, Saras Publication.
3. Ganga, S and Sulochana Chetty J. An Introduction to Sericulture (II Ed.,) Oxford and IBH Pub., Co. Pvt. Ltd., New Delhi.

**Offering Department : Zoology**

**Receiving Department: Botany and Chemistry**

**SEMESTER: II**

**Hours: 2**

**Allied Practical II\***

**Credits: 3**

**\*Running paper from semester III to semester IV  
BIOLOGY OF INVERTEBRATES & CHORDATES AND ECONOMIC  
ZOOLOGY**

**Dissection:**

Cockroach: Digestive system and Nervous system/Demo/CD/ Virtual.

**Spotters:**

Honey bee – mouth parts - Slides. Identification of Cycloid, Placoid and Ctenoid Scales - slides.

Earth worm –Body setae slide.

**Spotters**

**Specimens:** Paramecium, Euglena, Liver fluke, Tapeworm, Neries, Earthworm, Leech, Crab-Scolopendra, Honey bee, Scorpion, Star fish, Sea cucumber, Shark, Frog, Chameleon, Pigeon and Rabbit.

**Products**

Honey bee, Cod Liver oil, Pearl, silk.

**Economic Importance:**

**Harmful animals:** *Entamoeba*, *Plasmodium*, Housefly, Mosquito, Termite queen, *Oryctes rhinoceros*.

**Beneficial animals:** *Bombyx mori*, Cocoon, Pearl oyster, *Penaeus monodon* and *Macrobranchium malcomsonii*.



**Offering Department : Zoology**

**Receiving Department: Computer Science**

**SEMESTER IV**

**Hours: 2**

**NME I**

**Credits: 2**

### **HUMAN NUTRITION**

#### **Unit-I**

Introduction and scope . Carbohydrates, proteins and lipids- classification – sources.

#### **Unit – II**

Vitamins and minerals – sources and functions – deficiency diseases

#### **Unit III**

Calorific values of food – energy units – BMR – energy requirements of man , woman, infants and children.

#### **Unite-IV**

Nutritional value of food : Cereals, fruits ,milk egg, meat, fish.

Balanced diet.

#### **Unit-V**

Nutritional requirements : pregnant and lactating mother. Faulty food habits: obesity , diabetes and cardiac problems.

#### **Textbooks**

1. Swaminathan , M., 1989. Handbook of food and nutrition, Bapcco, Bangalore.
2. Gopalan, C., B.S.Ramasastri and S.C.Balasubramanian, 1971, Nutritive value of Indian foods. NIN, Hyderabad.

#### **References**

1. Ghosh, S.1981. The feeding care of Infants and yours children. UNICEF, New Delhi.
2. Mudambi,S.R. 1995. Fundamentals of food and Nutrition. New age International, New Delhi.
3. Ambika Shanmugam.1995.Fundamentals of Biochemistry for medical students. Karthik offset Printers. Chennai

**Offering Department : Zoology**

**Receiving Department: English**

**Semester V**

**Hours: 2**

**NME II**

**Credits: 2**

## **PUBLIC HEALTH AND HYGIENE**

### **Unit 1**

Nutrition and Health: Classification of food; Sources and functions of carbohydrate, protein, fat, vitamins and minerals. Vitamin deficiencies.

### **Unit II**

Environment and health: Hazards of water and air pollutions, global warming and its effects. Impact of solid waste disposal.

### **Unit III**

Diseases, prevention & control: Communicable diseases: viral (Small box, Polio and AIDS) and bacterial diseases (Plague and Tuberculosis).

Non-communicable diseases: Heart diseases, hypertension, diabetes, obesity, cancer.

### **Unit IV**

Mental health: Prevention of mental illness; adolescent problems and counseling. Maternal and child health: congenital malformations, genetic counseling and school health service.

### **Unit V**

Health education: Practice of health education, health care programme in India, basic criteria for first aid, First aid in emergency.

### **Textbooks**

1. Park and Park, 1995. Text book of preventive and social medicine, Banarsidas Bhanot Publishers, Jabalpur Zoo.
2. Sorna Raj and Kumaresan. Public health and Hygiene, Saras Publication, Kanyakumari.

### **References**

1. Verma. S, 1998. Medical Zoology, Rastogi publications, New Delhi.