

## CORE COURSE SEMESTER - 1 ZOOLOGY ( HONS )

### ZOO. CC – I (Th) : DIVERSITY AND EVOLUTION OF NON-CHORDATA (PROTISTA TO PSEUDOCOELOMATES)

Time – 3hrs F.M.: 100 [60(End sem)+15(Int)+25(Pr)] Credit- 6 [ 4(TH) +2(PR) ]

#### Unit 1: Phylum Protozoa, Parazoa and Metazoa

General characteristics and classification up to classes; Life cycle, pathogenicity and prophylaxis of *Plasmodium vivax*, *Trypanosomagambiense* and *Entamoeba histolytica*; Locomotion and reproduction in Protozoa; Evolution of Parazoa and Metazoa.

#### Unit 2: Phylum Porifera and Ctenophora

General characteristics and classification up to classes; Canal system in sponges; General characteristics and evolutionary significance.

#### Unit 3: Phylum Cnidaria

General characteristics and classification up to classes; Metagenesis in *Obelia*; Polymorphism in Cnidaria; Corals and coral reefs.

#### Unit 4: Phylum Platyhelminthes

General characteristics and classification up to classes; Life cycle, pathogenicity and prophylaxis of *Fasciola hepatica* and *Taenia solium*; Parasitic adaptations.

#### Unit 5 :Phylum Nematelminthes

General characteristics and classification up to classes; Life cycle, pathogenicity and prophylaxis of *Ascaris lumbricoides* and *Wuchereria bancrofti*; Parasitic adaptations.

**Note:** Classification to be followed from “Barnes RD (1982) Invertebrate Zoology. 5<sup>th</sup> Edition.”

### ZOO.-CC-1( LAB )PRACTICALS

Marks 25

#### Phylum Protozoa

1. Morphology of *Paramecium*, Binary fission and Conjugation in *Paramecium*.
2. Life stages of *Plasmodium vivax*, *Trypanosomagambiense* and *Entamoeba histolytica* (Slides/ Micro- photographs).
3. Examination of pond water for protists.

#### Phylum Porifera

4. Study of *Sycon* (including T.S. and L.S.), *Hyalonema*, and *Euplectella*.
5. Temporary mounts of spicules, gemmules and spongin fibres.

#### Phylum Cnidaria

6. Study of *Obelia*, *Physalia*, *Millepora*, *Aurelia*, Ephyra larva, *Tubipora*, *Corallium*, *Alcyonium*, *Gorgonia* and *Metridium* (including T.S. and L.S.).

### **Phylum Ctenophora**

7. Any one specimen/slide.

### **Phylum Platyhelminthes**

8. Study of adult *Fasciola hepatica*, *Taeniasolium* and their life stages (Slides/ microphotographs).

### **Phylum Nematelminthes**

9. Study of adult *Ascarislumbricoides*, *Wuchereriabancrofti* and their life stages (Slides/ microphotographs).

**Note:** Classification to be followed from “Barnes RD (1982) Invertebrate Zoology. 5<sup>th</sup> Edition.”

### **SUGGESTED READINGS**

1. Arora MP (2006) Non-Chordata-I. 1<sup>st</sup> edition. Himalaya Publishing House, New Delhi.
2. Arora MP (2008) Non-Chordata-II. 1<sup>st</sup> edition. Himalaya Publishing House, New Delhi.
3. Barnes RD (1982) Invertebrate Zoology. 6<sup>th</sup> Edition. Holt Saunders International Edition.
4. Barnes RSK, Calow P, Olive PJW, Golding DW & Spicer JI (2002) The Invertebrates: A New Synthesis. 3<sup>rd</sup> Edition. Blackwell Science, USA.
5. Barrington EJW (1979) Invertebrate Structure and Functions. 2<sup>nd</sup> Edition. ELBS and Nelson.
6. Boradale LA and Potts EA (1961) Invertebrates: A Manual for the use of Students. Asia Publishing Home.
7. Jordan EL and Verma PS (1963) Invertebrate Zoology. Revised Edition. S. Chand, New Delhi.

## **CORE COURSE SEMESTER - 1 ZOOLOGY ( HONS )**

### **ZOO- CC- II (Th) - PERSPECTIVES IN ECOLOGY (CREDITS: THEORY-4, PRACTICALS-2)**

**Time – 3hrs F.M.: 100 [60(End sem)+15(Int)+25(Pr)] Credit- 6 [ 4(TH) +2(PR) ]**

#### **Unit 1: Introduction to Ecology**

Relevance of studying ecology; History of ecology; Autecology and synecology; Levels of organization; Laws of limiting factors; Detailed study of temperature and light as physical factors.

#### **Unit 2: Population**

Unitary and modular populations; Unique and group attributes of population: Density, natality, mortality, life tables, fecundity tables, survivorship curves, age ratio, sex ratio, dispersal and dispersion; Exponential and logistic growth, equation and patterns, r and K strategies, Population regulation - density-dependent and independent factors; Population interactions, Gause's Principle with laboratory and field examples; Lotka-Volterra equation for competition and Predation, functional and numerical responses.

#### **Unit 3: Community**

Community characteristics: dominance, diversity, species richness, abundance, stratification; Ecotone and edge effect; Ecosystem development (succession) with example and Theories pertaining to climax community.

#### **Unit 4: Ecosystem**

Types of ecosystem; Food chain, Detritus and grazing food chains, Linear and Y-shaped food chains; Food web; Energy flow through the ecosystem; Ecological pyramids and Ecological efficiencies; Nutrient and biogeochemical cycle, Nitrogen cycle and Sulphur cycle.

#### **Unit 5;Conservation of Biodiversity**

Types of biodiversity, its significance, loss of biodiversity; Conservation strategies (in situ and ex situ); Role of ZSI, WWF, IUCN; Wildlife (Protection) Act, 1972.

### **ZOO.-CC-II ( LAB ) PRACTICALS**

**Marks 25**

1. Study of life tables and plotting of survivorship curves of different types from the hypothetical/real data provided.
2. Determination of population density in a natural/hypothetical community by quadrat method and calculation of Shannon-Weiner diversity index for the same community.

3. Study of an aquatic ecosystem: fauna and flora Measurement of area, temperature, turbidity/penetration of light, determination of pH, and Dissolved Oxygen content (Winkler's method), Chemical Oxygen Demand and free CO<sub>2</sub>.
4. Report on a visit to National Park/Biodiversity Park/Wildlife sanctuary.

### **SUGGESTED READINGS**

1. Colinvaux PA (1993) *Ecology*. II Edition. John Wiley and Sons, Inc., USA.
2. Dash MC (1993) *Fundamentals of Ecology*. McGraw Hill Book Company, New Delhi.
3. Joshi N and Joshi PC (2012) *Ecology and Environment*. 1<sup>st</sup> Edition. Himalaya Publishing House, New Delhi.
4. Odum EP (2008) *Fundamentals of Ecology*. Indian Edition. Brooks/Cole.
5. Ricklefs, R.E., (2000). *Ecology*. 5<sup>th</sup> Edition. Chiron Press.
6. Robert Leo Smith *Ecology and field biology* Harper and Row.
7. Singh JS, Gupta SR and Singh SP (2014) *Ecology, Environmental Science and Conservation*. S. Chand, New Delhi.

## **CORE COURSE SEMESTER – II ZOOLOGY (HONS)**

### **ZOO. CC – III (Th) : DIVERSITY AND EVOLUTION OF NON-CHORDATA (COELOMATE NONCHORDATES)**

**Time – 3hrs F.M.: 100 [60(End sem)+15(Int)+25(Pr)] Credit- 6 [ 4(TH) +2(PR) ]**

#### **Unit 1: Phylum Annelida**

General characteristics and classification up to classes; Evolution of Coelom; Metamerism and Excretion in Annelida.

#### **Unit 2: Phylum Arthropoda**

General characteristics and classification up to classes; Vision in Arthropoda; Respiration in Arthropoda; Moulting in insects, Metamorphosis in insects; Social life in insects (bees and termites) and Larval forms in Crustacea.

#### **Unit 3: Phylum Onychophora**

General characteristics, evolutionary significance and affinities of *Peripatus*.

#### **Unit 4: Phylum Mollusca**

General characteristics and classification up to classes; Respiration in Mollusca; Torsion and detorsion in Gastropoda; Pearl formation in bivalves and Evolutionary significance of trochophore larva.

## Unit 5: Phylum Echinodermata

General characteristics and classification up to classes; Water-vascular system in Asterozoa; Larval forms in Echinodermata and Evolutionary significance (Affinities with Chordates).

**Note:** Classification to be followed from “Barnes, R.D. (1982). *Invertebrate Zoology*, 5<sup>th</sup> Edition, Holt Saunders International Edition.”

### ZOO. – CC-III ( LAB ) PRACTICAL

Marks 25

#### Phylum Annelida

1. Study of *Aphrodite*, *Nereis*, *Heteronereis*, *Sabella*, *Terebella*, *Serpula*, *Chaetopterus*, *Pheretima* and *Hirudinaria*.
2. T.S. through pharynx, gizzard, and typhlosolar intestine of earthworm.
3. T.S. through crop of leech.

#### Phylum Arthropoda

4. Study of *Limulus*, *Palamnaeus*, *Palaemon*, *Daphnia*, *Balanus*, *Sacculina*, *Cancer*, *Eupagurus*, *Scolopendra*, *Julus*, termite, louse, honeybee, silk moth, wasp and dragon fly.

#### Phylum Onychophora

5. Any one specimen/slide.

#### Phylum Mollusca

6. Study of *Chiton*, *Dentalium*, *Pila*, *Doris*, *Helix*, *Unio*, *Ostrea*, *Mytilus*, *Loligo*, *Sepia*, *Octopus* and *Nautilus* and *Cypraea* (cowrie).

#### Phylum Echinodermata

7. Study of echinoderm larvae.
8. Study of *Pentaceros*, *Asterias*, *Ophiura*, *Clypeaster*, *Echinus*, *Echinocardium*, *Cucumaria* and *Antedon*.

**Note:** Classification to be followed from “Barnes, R.D. (1982). *Invertebrate Zoology*, 5<sup>th</sup> Edition, Holt Saunders International Edition”.

### SUGGESTED READINGS

1. Arora MP (2006) Non-Chordata-I. 1<sup>st</sup> edition. Himalaya Publishing House, New Delhi.
2. Arora MP (2008) Non-Chordata-II. 1<sup>st</sup> edition. Himalaya Publishing House, New Delhi.
3. Barnes RD (1982) *Invertebrate Zoology*. 6<sup>th</sup> Edition. Holt Saunders International Edition.
4. Barnes RSK, Calow P, Olive PJW, Golding DW & Spicer JI (2002) *The Invertebrates: A New Synthesis*. 3<sup>rd</sup> Edition. Blackwell Science, USA.
5. Barrington EJW (1979) *Invertebrate Structure and Functions*. 2<sup>nd</sup> Edition. ELBS and Nelson.
6. Boradale LA and Potts EA (1961) *Invertebrates: A Manual for the use of Students*. Asia Publishing Home.
7. Jordan EL and Verma PS (1963) *Invertebrate Zoology*. Revised Edition. S. Chand, New Delhi.
8. Mohanty PK (2000) *Illustrated Dictionary of Biology*. Kalyani Publishers, Ludhiana.

**CORE COURSE SEMESTER – 1I ZOOLOGY ( HONS )**

**ZOO. CC – IV (Th) : PHYSIOLOGY: LIFE SUSTAINING SYSTEMS  
(CREDITS: THEORY-4, PRACTICALS-2)**

**Time – 3hrs F.M.: 100 [60(End sem)+15(Int)+25(Pr)] Credit- 6 [ 4(TH) +2(PR) ]**

**THEORY  
LECTURES: 60**

**Marks 75**

**Unit 1: Digestive System**

Structural organization, histology and functions of gastrointestinal tract and its associated glands; Mechanical and chemical digestion of food; Absorptions of carbohydrates, lipids, proteins, water, minerals and vitamins; Role of gastrointestinal hormones on the secretion and control of enzymes of gastrointestinal tract.

**Unit 2: Respiratory System**

Histology of trachea and lung; Mechanism of respiration, Pulmonary ventilation; Respiratory volume and capacity; Transport of oxygen in the blood; Oxygen- hemoglobin and myoglobin, dissociation curve and the factors influencing it; Carbon monoxide poisoning; Carbon dioxide transport in the blood; buffering action of blood and haemoglobin and Control of respiration.

**Unit 3: Excretory System**

Structure of kidney and its histological details; Renal blood supply; Mechanism of urine formation and its regulation and Regulation of acid-base balance.

**Unit 4: Blood**

Components of blood and their functions; Structure and functions of haemoglobin; Haemopoiesis; Haemostasis and Coagulation of blood and Disorders of blood.

**Unit 5: Heart**

Structure of heart; Coronary circulation; Structure of conducting and working of myocardial fibers; Origin and conduction of cardiac impulses functions of AV node; Cardiac cycle; Cardiac output and its regulation-Frank-Starling Law of the heart; Nervous and chemical regulation of heart rate; Blood pressure and its regulation and Electrocardiogram.

**ZOO. – CC-IV ( LAB ) PRACTICAL**

**Marks 25**

1. Enumeration of red blood cells using haemocytometer.
2. Estimation of haemoglobin using Sahli's haemoglobinometer.

3. Preparation of haemin and haemochromogen crystals.
4. Recording of blood pressure using a Sphygmomanometer.
5. Examination of sections of mammalian oesophagus, stomach, duodenum, ileum, rectum liver, trachea, lung and kidney.

### **SUGGESTED READINGS**

1. Arey LB (1974) Human Histology. 4<sup>th</sup> Edition. W.B. Saunders, USA.
2. Chatterjee CC (2008) Human Physiology. Vol. I and II. Medical Allied Agency, Kolkata.
3. Guyton AC and Hall JE (2006) Textbook of Medical Physiology. 9<sup>th</sup> Edition. W.B. Saunders Company, Philadelphia.
4. Mohanty PK (2000) Illustrated Dictionary of Biology. Kalyani Publishers, Ludhiana.
5. Tortora GJ and Derrickson B (2012) Principles of Anatomy & Physiology. 13<sup>th</sup> Edition John Wiley and sons, USA.
6. Victor PE (2008) diFiore's Atlas of Histology with Functional Correlations. 12<sup>th</sup> Edition. Lippincott W. & Wilkins, USA.

## **GENERIC ELECTIVE COURSE SEMESTER – 1/III ZOOLOGY ( INTERDISCIPLINARY**

### **ZOO. GE – I (Th) : FOOD, NUTRITION AND HEALTH**

**Time – 3hrs F.M.: 100 [60(End sem)+15(Int)+25(Pr)] Credit- 6 [ 4(TH) +2(PR) ]**

#### **THEORY LECTURES: 60**

**Marks 75**

**Unit 1:** Food; Diet; Nutrient; Vitamins; Disorders due to deficiency of vitamins; Synthetic foods and drinks.

**Unit 2:** Functions of food; Components of food; Nutrients (Macro and micronutrients): their biochemical role and dietary sources; Food groups and the concept of a balanced diet; Causes of food spoilage; Food adulteration; Nutrition through the life cycle- Physiological considerations, nutrient needs and dietary pattern for various groups- adults, pregnant and nursing mothers, infants, preschool and school children, adolescents and elderly.

**Unit 3:** Nutritional Biochemistry Carbohydrates, Lipids, Proteins - Definition, Classification, Structure and properties Significance of acid value, iodine value and saponification value of lipids; Essential and Non-essential amino acids; Enzymes- Definition, Classification, Properties; Coenzymes Vitamins- Fat-soluble and Water-soluble vitamins; their Structure and properties Minerals- Iron, calcium, phosphorus, iodine, selenium and zinc and their properties.

**Unit 4:** Introduction to health- Definition and concept of health; Major nutritional deficiency Diseases: Protein Energy Malnutrition; Life style related diseases- hypertension, diabetes mellitus, and obesity- their causes and prevention through dietary or lifestyle modifications. Social health problems- smoking, alcoholism, drug dependence and Acquired Immuno Deficiency Syndrome (AIDS); Common ailments- cold, cough, fevers, diarrhoea, constipation: their causes and dietary treatment.

**Unit 5 ;** Food hygiene, Potable water- sources and methods of purification, Food and Waterborne Infections.

### **ZOO.- GE-1 LAB PRACTICALS**

**Marks 25**

1. To detect adulteration in a) Ghee b) Sugars c) Tea leaves and d) Turmeric.
2. To determine absorbed oil content in fried foods.
3. Estimation of lactose in milk.
4. Ascorbic acid estimation in food by titrimetry.
5. Estimation of calcium in foods by titrimetry.
6. Preparation of temporary mounts of various stored grain pests.
7. Project- Undertake computer aided diet analysis and nutrition counselling for different age groups. OR Identify nutrient rich sources of foods, their seasonal availability and price; study of Nutrition labelling on selected foods.

### **SUGGESTED BOOKS**

1. Bamji MS, Rao NP and Reddy V (2009) Text Book of Human Nutrition. Oxford & IBH Publishing Co. Pvt Ltd.
2. Jain P et al. (2007) Poshanvaswasthyakemooolsiddhant (Hindi). 1<sup>st</sup> Ed. AcademicPratibha.
3. Lakra P and Singh MD (2008) Textbook of Nutrition and Health. 1<sup>st</sup> Edition. Academic Excellence.
4. Manay MS, Shadaksharaswamy (1998) Food-Facts and Principles. New Age International (P) Ltd.
5. Mohanty PK (2000) Illustrated Dictionary of Biology. Kalyani Publishers, Ludhiana.
6. Mudambi SR and Rajagopal MV (2007) Fundamentals of Foods, Nutrition and Diet Therapy. 5<sup>th</sup> Edition. New Age International Publishers.
7. Srilakshmi B (2002) Nutrition Science. New Age International (P) Ltd.
8. Srilakshmi B (2007) Food Science. 4<sup>th</sup> Edition. New Age International (P) Ltd.
9. Swaminathan M (1986) Handbook of Foods and Nutrition. 5<sup>th</sup> Edition. BAPPCO.
10. Wardlaw GM, Hampl JS (2007) Perspectives in Nutrition. 7<sup>th</sup> Edition. McGraw Hill.

**ZOOL.-DSC- I OF SEM-I IS SAME AS CC-I OF SEM-I**



**GENERIC ELECTIVE COURSE SEMESTER – II / IV ZOOLOGY ( INTERDISCIPLINARY )**

**ZOO. GE – II (Th) : HUMAN PHYSIOLOGY**

**Time – 3hrs F.M.: 100 [60(End sem)+15(Int)+25(Pr)] Credit- 6 [ 4(TH) +2(PR) ]**

**Unit 1: Digestion and absorption of Food**

Structure and function of digestive gland ; Digestion and absorption of carbohydrates, Fats and Proteins ; Nervous and hormonal control of digestion (in brief ).

**Unit 1i : Functioning of excitable tissue ( Nerve and Muscle )**

Structure of neuron, Propagation of nerve impulse ( myelinated and non-myelinated nerve fibre ) ; Structure of skeletal muscle, mechanism of muscle contraction ( sliding filament theory ), Neuromuscular junction.

**Unit 1II : Respiratory Physiology**

Ventilation ,External and internal respiration. Transport of Oxygen and Carbon dioxide in blood, factors affecting transport of gases.

**Unit 1V : Renal and cardio vascular Physiology**

Functional anatomy of Kidney, mechanism and regulation of urine formation. Structure of heart, coordination of heart beat, Cardiac cycle, ECG.

**Unit V : Endocrine and Reproductive Physiology**

Structure and function of endocrine glad ( Pituitary thyroid, parathyroid, pancreas, adrenal, ovaries and testes ), Brief account of spermatogenesis and oogenesis, menstrual cycle .

**ZOO.- GE-1i - LAB PRACTICALS**

**Marks 25**

- 1.Preparation of temporary mounts : neurons and Blood film.
- 2.Preparation of haemin and haemochromogen crystals.
3. Estimation of haemoglobin, using Sahi's haemoglobinometer.
4. Examination of permanent histological sections of mammalian oesophagus, stomach, duodenum, rectum, lung, Kidney, Thyroid, Pancreas, adrenal, testes, ovary.

**Suggested Readings**

- 1.Totra G.J. Derickson, B.H. ( 2009 ). Principles of Anatomy and Physiology, XII Ed John Wiley and Sons. Inc.
2. Winmair, E.P. Raff. H. And Strand, K. T. ( 2008 ) Vander"s Human Physiology, XI Ed. Mc Graw Hill.
3. Gayton, A.C. Hill. J.E. (2011), Textbook of medical physiology. Xii Ed. Harcourt Asia Pvt. Ltd. / W.B. Saunders Company.
4. Marieb, E. (1998). Human Anatomy and Physiology. Iv Ed. Addison- Wesley.
5. Kesar. S. And Vashisht, N. (2007). Experimental Physiology, heritage Publishers.
6. Prakash, G. (2012). Lab Manual on Blood analysis and medical diagnostics, S.Chand and company

Ltd. **Zoo.-DSC- II OF SEM-II IS SAME AS CC-II OF SEM-I**