

Complementary course

First semester BSc Degree

1C 01 ZLG DIVERSITY OF LIFE I

PROTISTANS & NON CHORDATES

Lecture hours: 2 hours/week.No. of credits :2 Total Hours : 36

CO1.Familiar with the non-chordate world that surrounds us.

CO2.Able to identify the invertebrates and classify them up to the class level with the basis of systematics

CO3. Understand the basis of life processes in the non-chordates and recognize the economically important invertebrate fauna.

Unit I:Protista – General characters of Protista

Distinction between ‘Plant protists’ and ‘animal protists’.

Examples of animal protists –

Amoeba, Paramecium, Noctiluca, Trichonympha (Brief accounts)

Essay - Locomotion in protista. (5 hrs)

Unit II:Animal kingdom- Outlines of classification of Kingdom Animalia (1 hr)

a) Phylum Porifera – Salient features e.g., Ascon (1 hr)

b) Phylum Cnidaria – Salient features.

Class Hydrozoa – Salient features e.g., Physalia

Obelia – structural features and reproduction

Class Scyphozoa – Salient features e.g., Aurelia

Class Anthozoa – Salient features e.g., Adamsia

Coral forming cnidarians and their significance (4 hrs)

c) Phylum Platyhelminthes – Salient features

Class Turbellaria – Salient features e.g., Planaria

Class Trematoda – Salient features e.g., Schistosoma

Class Cestoda – Salient features – e.g., Taeniasolium (3 hrs)

d) Phylum Nematoda – Salient features

Mention free living & parasitic nematodes (of plants and animals) Pathogenic

nematodes- Ascaris, Wuchereria (2 hrs)

e) Phylum Annelida – Salient features.

Class Polychaeta – e.g., Nereis

Class Oligochaeta – e.g. Megascolex

Megascolex – Study of external features, digestive,circulatory and excretory organs

Mention vermiculture and its significance

86

Class Hirudinea – eg. Hirudinaria (4 hrs)

f) Phylum Arthropoda – Salient features

Type Study –Penaeus- External morphology, structure of appendages, Digestive, respiratory, excretory, and reproductive systems (Detailed study of larval stages not

expected)

Class Crustacea – Salient features – eg: Cancer

Class Myriapoda – Salient features of Scolopendra

Class Insecta - Salient features. Eg: Lepisma, Cockroach

Class Arachnida - Salient features e.g.: Heterometrus (scorpion)

Beneficial insects – Apisindica, Bombyx mori, Tachardialaca.

(Mention apiculture and sericulture) (10 hrs)

g) Phylum Mollusca – Salient features

Class Gastropoda – Salient features e.g.: Pila

Class Bivalvia – Salient features e.g.: Perna

Class Cephalopoda – Salient features e.g.: Sepia

Economic importance of mollusca. (3 hrs)

h) Phylum – Echinodermata – Salient features

Asterias – External features, locomotion and water vascular system.

Examples: Echinus, Holothuria (3 hrs)

ASSIGNMENT / SEMINAR TOPICS (Only for Internal Evaluation)

1. Plant protists (Euglena, Chlamydomonas, Volvox)

2. Reproduction in Hydra.

3. Life cycle of Taeniasolium

4. Insect mouthparts – Biting and Chewing type.

REFERENCES

D.T. Anderson : Invertebrate Zoology, 2nd edition. Oxford U'ty Press.

Ekambarnath Ayyer : Manual of Zoology- vol I; S V Publishers.

Kotpal. R L : Modern Text Book of Zoology; Rastogi Publishers.

Michael A. Sleight : Protozoa and other Protists; CBS Publishers, New Delhi.

Parker and Haswell : Text Book of Zoology Vol-1; Mac Millan.

Second Semester BSc. Degree
2C 02ZLG DIVERSITY OF LIFE – II
CHORDATE FORM AND FUNCTION

No of credits : 2 Lecture hours: 2 hours/week Total Hours : 36

Course outcomes

CO1: Understand the origin and evolutionary relationship in different subphyla of chordates.

CO2: Understand the diversity of chordates

CO3: Understand the unique characters of urochordates, cephalochordates and vertebrates

CO4: Recognize life functions of chordates

Unit I. Introduction-

Fundamental chordate characters. Classification into Subphylum Urochordata, Cephalochordata and Vertebrata. Mention Ascidia and Branchiostoma.

(4hrs)

Unit II. Subphylum Vertebrata.

Classification as given below with important diagnostic features and brief account of examples.

A) Superclass Pisces – diagnostic characters. Chondrichthyes and Osteichthyes. Scoliodon sorakowah – external morphology, structure and working of digestive, respiratory, circulatory, nervous and urino-genital systems.

Examples – Trygon, Mugil, Etroplus, Rastrelliger, Sardinella, Channa

Economic importance of fishes (10hrs)

88

B) Superclass Tetrapoda – Diagnostic features. Structure of typical pentadactyl limb.

i) Class: Amphibia; Orders Apoda, Urodela and Anura

Examples: Ichthyophis, Ambystoma, Bufo.

ii) Class Reptilia: Orders- Chelonia, Squamata and Crocodilia

Examples: Chelone, Chamaeleon, Typhlops, Hydrophis.

Poison apparatus and venom of snakes. Identification of poisonous snakes of Kerala.

iii) Class Aves: Ratite and Carinate groups. Flight adaptations in birds.

Examples: Struthio, Casarius, Pavo, Columba, Aptenodytes

iv) Class Mammalia: Order-Monotremata Example: Ornithorhynchus

Order: Marsupialia. Example Macropus

Order: Chiroptera- Example: Pteropus

Order: Primates: Examples: Macaca, Hylobates, Homo

Order: Carnivora: Examples Pantherasp.

Order: Artiodactyla: Example Axis

Order: Perissodactyla: Example Equus

Order: Proboscida: Example Elephas

Order: Cetacea: Example: Balaenoptera

Adaptations of aquatic mammals (whales and dolphins)

Brief account of dentition in mammals (18 hrs)

Unit III

Early chordate development. Structure of mammalian egg and sperm. Types of eggs based on quantity and distribution of yolk.

Types of cleavage. Brief accounts of blastulation, gastrulation and germ layer formation in vertebrates

Embryonic membranes and their functions (4hrs)

SEMINAR / ASSIGNMENT TOPICS

(Only for Internal evaluation)

1 Aquatic adaptations of fishes.

2 Structure of vertebrate eye and ear.

3 Structure of feather

4 Types of feathers

89

5 Endangered mammals of India

REFERENCES

Parker and Haswell : A Text Book of Zoology, Vol 2; Orient Longman.

Ekambarnath Ayyer : Manual of Zoology- Vol II; S V Publishers.

Jordan and Verma : Chordate Zoology; S.Chand & Co.

Kotpal R L : Vertebrate Zoology; Rastogi Publications.

Verma and Agarwal : Chordate Embryology; S.Chand.

THIRD Semester BSc. Degree

Course Code: 3CO3ZLG

Animal physiology

credits:2\`Lecturehours:3hours/weekTotal Hours 54

COURSE OUTCOMES

CO1. Understand the function of various systems at cellular and system levels

CO2. Understand the mechanisms that work to keep the body alive and functioning

CO3. Apply the knowledge to lead a healthy life

1. Nutrition & Digestion (8 Hrs)

1.1. Types of nutrition - Autotrophic, Heterotrophic, Holozoic, Saprozoic and Parasitic. Symbiotic digestion (pre and post gastric).Compound stomach in ruminants

1.2. Digestion and absorption of carbohydrates, proteins and lipids in man (role of enzymes and hormones).

2. Gas exchange and internal transport (8 Hrs)

2.1. Respiratory organs in different groups of animal kingdom. Integument, Gills, Tracheal system,Lungs (only a brief account).

2.2. Respiratory pigments in animals – Haemoglobin,Haemerythrin, Haemocyanin and Clorocruorin.

2.3. Transport of gases

2.4. Types of heart(Neurogenic and myogenic)

2.5. Pacemaker and specialised conducting fibres

3. Excretory system (8 Hrs)

3.1. A brief account of excretory organs in animals.Contractile vacuoles, Protonephridia,Nephridia, Malpighian tubules, Antennary glands, Kidneys (Mention Pronephros,Mesonephros and Metanephros)

3.2. Ammonotelism, Uricotelism and Ureotelism.Urea Cycle

3.3. Mechanism of urine formation in man

4. Nervous system (8 Hrs)

4.1. Types of neurons. Glial cells

4.2. Organization of nervous system in vertebrates: central and autonomous system

4.3. Mechanism of nerve impulse transmission

5.Locomotion (8 Hrs)

90

5.1 Striated(Ultrastructure expected) and non striated muscle

5.2 Mechanism of muscle contraction

6. Receptors and Sense organs (2 Hrs)

6.1. Photo receptor – rods and cones

6.2. Rheo receptor – Lateral line sense organ

6.3. Olfacto receptor – Jacobson's organ

6.4. Auditory receptor – Organ of corti

6.5. Thermo receptor – Ampullae of Lorenzini

7. Endocrine System (4 Hrs)

Hormones released by major endocrine glands and their functions: Hypothalamus, Pituitary,

Thyroid, Parathyroid, Thymus, Pancreas and Adrenal glands.

8. Reproduction (8 Hrs)

8.1. Types of asexual reproduction: fission, regeneration and parthenogenesis

8.2. Menstrual cycle

8.3. Hormones released by gonads and placenta and their functions

REFERENCE BOOKS: ANIMAL PHYSIOLOGY

1. Guyton, A.C. (2015). Text Book of Medical Physiology, W.B. Saunders co.

2. Hoar, W.S.(1983). General and Comparative Physiology, Prentice Hall.

3. Prosser, C.L.(1978). Comparative Animal Physiology. W.B. Saundersco.

4. Schmidt Nielsen, K. (1994). Animal Physiology: Adaptation and Environment. Cambridge University Press

Fourth Semester BSc Degree

4C04ZLG

MEDICAL ZOOLOGY

credits:2 Lecture hours:3 hours/week Total Hours 54

Course outcomes

CO 1:

Understanding of the various causative organisms and factors and also how and what preventive measures can be adopted against these.

Unit I. Diseases – Mention communicable diseases, noncommunicable diseases; hereditary and nutritional diseases, metabolic diseases, allergic diseases, zoonotic diseases, occupational diseases, sexually transmitted diseases, diseases transmitted through blood transfusion, gerontological diseases and autoimmune diseases. (03hrs)

Unit II. Parasitic Diseases: Brief life cycle (stressing infective stage and mode of infection), pathogenicity and prophylaxis of the following pathogenic Protists: *Entamoeba histolytica*, *Plasmodium vivax*. Helminthiasis: Brief life history, mode of infection, pathogenicity

91

and prophylaxis of the following parasites: *Schistosoma haematobium*, *Ancylostoma duodenale*, *Ascaris lumbricoides* and *Wuchereria bancrofti*. Disease causing arthropods:

Clinical manifestations, treatment and prophylaxis of – *Sarcoptes scabii*, *Demodex folliculorum*. (15hrs)

Unit III. Viral, Bacterial and fungal diseases. Very brief accounts of causative organism, symptoms, lab diagnosis and prophylaxis of Rabies, Chickenpox, Hepatitis, AIDS, Tetanus, Cholera, Typhoid, Mycosis, (05hrs)

Unit IV. Inherited Diseases. Genetic basis of inherited diseases. Normal human karyotype; numerical and structural aberrations of chromosomes. Aneuploidy, deletion (terminal and interstitial), inversion (peri and para centric), translocations (balanced, unbalanced and Robertsonian) Clinical features and causes of Trisomy 21 (mention maternal age effect), Turner's syndrome, Klinefelter's Syndrome, and Cri du chat syndrome. Clinical symptoms, cause and mode of inheritance of Neurofibromatosis, Myotonic muscular dystrophy (Autosomal dominant); Albinism, Phenylketonuria, Alkaptonuria, Sickle cell anaemia (autosomal recessive); Haemophilia, Colour blindness (X linked) Mention Alzheimer's disease as an example of multifactorial trait.

(15hrs)

Unit V. Life style related diseases. Mention the role of environmental factors in

Hypertension,

cardiovascular diseases, Diabetes mellitus and Obesity. Mention the role of heredity as a predisposing factor. (05hrs)

Unit VI. Immunity and diseases. Immune response: Primary, Secondary, Humoral, and Cell mediated. Autoimmune diseases: Type 1 Diabetes Mellitus, Myasthenia Gravis.

Mention graft rejection. Reasons for autoimmune responses. (05hrs)

Unit VII. Cancer. Types of cancer. Characteristics

of cancer cells. Carcinogens. Oncogenes and Antioncogenes. (03hrs)

Unit VIII. Diagnostic Tools and Techniques. Brief account of EEG, ECG, Ultra Sonography, Amniocentesis, Chorionic Villus Biopsy. (03hrs)

PRACTICAL 4C05ZLG(P)

Lecture hours: 2 hours/week in each semester (I to IV),No. of credits: 4

TAXONOMY. Study of the following specimens in the laboratory by making simple sketches and preparing notes stating the scientific names, classification, morphological and adaptive features, biological significance, economic importance etc.

Protista (2) , Porifera (1) Cnidaria (3) Helminthes (3) Annelida (3) Arthropoda (6)
Mollusca (3) Echinodermata (3) Pisces (4) Amphibia (3) Reptilia (3) Aves (1) Mammalia (1).

Study of the any four specimens of parasites with simple outlines sketches and notes of importance. (Hosts, pathogenicity, infective stage, mode of infection, prophylaxis)
Identification of any four genetic diseases from photographs. Relevant notes to be recorded.

Instead of drawings, photocopies of pictures may be pasted in the record.

- Trisomy 21 - Turner's syndrome
- Albinism - Neurofibromatosis
- Sickle Cell Anaemia (using photograph/ drawings of RBC)

MOUNTING. The record should carry neat, labelled diagrams.

- Earthworm - body setae (in situ).
- Prawn - appendages.
- Honey - bee mouthparts.
- Honey bee pollen baskets
- Shark - placoid scales. Cycloid Scales
- Lepidoptera Wing Scale

93

EXPERIMENTS

1. Preparation of blood smear to identify formed elements (Major)
2. Differential count of WBC (Major)
3. Urine analysis for glucose, albumin and ketone bodies (Major)
4. Determination of blood group (Minor)
5. Measurement of blood pressure using sphygmomanometer (Minor)
6. Measurement of human pulse rate (Minor)
7. Estimation of Hb using haemoglobinometer (Sahli's haemoglobinometer)(Minor)

B. Sc. DEGREE PROGRAMME (Theory)

ZOOLOGY

Generic Elective Course

APICULTURE

CODE : 5 D 02 ZLG

Credit:2; Hours:2/week; Total Hours:36

Course outcomes

CO 1 :Develop self-employment capabilities.

CO 2 : Acquires scientific knowledge of profitable farming.

UNIT I (8 Hrs)

Definition, Scope, Classification of bees, Rock bee, Indian bee, Little bee and Dammer bee- their identification and habits, choice of species in Apiculture. Bee colony-Distinctive features (social organization), Identification and Functions of queen, drones and workers, Structure and functions of Legs, mouth parts and sting of worker bee. Development of Honey bee-egg, larva and pupa. Food of the bee- honey and pollen-royal jelly. Artificial feeding. Behaviour of bees-dances.

UNIT II (8 Hrs)

Principles of apiculture, Arranging an apiary, position-space-direction,acquiring bees-care of newly captured colonies-handling the bees. The bee comb and its architecture-Different kinds of cells. Different types of Modern hives (Newton, Langstroth) – Architecture. Appliances used in Apiaries.

UNIT III (8 Hrs)

Swarming-Prevention and control.Uniting stocks-Different methods Queen rearing. Requeening. Feeding methods. Apiary management. Inter-relationships of plants and bees.

UNIT IV (8 Hrs)

Honey bee products. Honey- Collection and Extraction, Preservation and storage –Physical properties,Chemical composition,nutritive value, medicinal values-honey as daliy food. Bee wax- Production , method of extraction-characteristics and uses. Bee venom-method of collection - composition of venom- its uses.

UNIT V (4 Hrs)

Enemies of bees- Mites, Greater wax moth, lesser wax moth, ants, wasps, beetles, birds and their management. Diseases of bees-adult and brood diseases- Bacterial, Fungal, Viral & Protozoan; Prevention and Control measures.