COMPLEMENTARY COURSE : ZOOLOGY –MODEL I

SEMESTER I. ZY1CMT01.

COMPLEMENTARY COURSE 1

NON CHORDATE DIVERSITY

36 hrs
Credits 2

Objectives:

1. To study the scientific classification of invertebrate fauna.
2. To learn the physiological and anatomical peculiarities of some invertebrate phyla through type study.
3. To learn the unity of life with rich diversity of organisms & evolutionary significance of certain invertebrate fauna
4. To stimulate the curiosity of students' in the biota living around them.

Module I **10 Hrs**

Introduction: Five kingdom classification

Kingdom Protista: Salient features (any five important salient features) of each phylum with one example each (detailed account of example is not necessary).

Phylum Rhizopoda (eg: Amoeba)
Phylum Actinopoda (eg: Actinophrys)
Phylum Dinoflagellata (eg: Noctiluca)
Phylum Parabasalia (eg: Trychonympha)
Phylum Metamonda (eg: Giardia)
Phylum Kinetoplasta (eg: Trypanosoma)
Phylum Euglenophyta (eg: Euglena)
Phylum Cryptophyta (eg: Cryptomonas)
Phylum Opalinata (eg: Opalina)
Phylum Bacillariophyta (eg: Diatoms)
Phylum Chlorophyta (eg: Volvox)
Phylum Choanoflagellata (eg: Proterospongia)
Phylum Ciliophora (eg: Paramecium)
Phylum Sporozoa (eg: Plasmodium)
Phylum Microsporidia (eg: Nosema)
Phylum Rhodophyta (eg: Red algae)

General Topic: Pathogenic Protists – Plasmodium, Entamoeba

Module II **3 Hrs**

Phylum Porifera: Salient features (eg: Leucosolenia)

Phylum Coelenterata: Salient features and classification upto class.

Class 1: Hydrozoa (eg: Physalia)

Class 2: Schyphozoa (eg: Aurelia)

Class 3: Anthozoa (eg: Adamsia)

General Topic: Corals and Coral reefs.

Module III **6 Hrs**

Phylum Platyhelminthes: Salient features and classification up to class.

Class 1: Turbelleria (eg: Planaria)

Class 2: Trematoda (eg: Fasciola)

Class 3: Cestoda (eg*: Taenia solium*)

Phylum Nematoda: Salient features and classification up to class.

Class 1: Phasmida (eg: Wuchereria*)*

Class 2: Aphasmida (eg: Trichinella*)*

Phylum Annelida: Salient features and classification up to class.

Class 1: Polychaeta (eg: Nereis)

Class 2: Oligochaeta (eg: Pheretima)

Class 3: Hirudinomorpha (eg: Hirudinaria)

Module IV **11 Hrs**

Phylum Arthropoda: Salient features. Type study – ***Fenneropenaeus*** (Penaeus) - habitat, morphology, appendages, sexual dimorphism, digestive system, respiratory system, circulatory system, excretory system, nervous system, sense organs, reproductive system, larval stages.

Classification up to class with one example each

Subphylum Trilobitomorpha

Class 1: Trilobita (Extinct) (eg: Dalmanites*)*

Subphylum: Chelicerata

Class 1: Merostoma (eg: Limulus)

Class 2: Arachnida (eg: Spider)

Class 3: Pycnogonida (eg: Nymphon)

Subphylum Mandibulata

Class 1: Crustacea (eg: Daphnia)

Class 2: Chilopoda (eg: Centipede)

Class 3: Symphyla (eg: Scutigerella)

Class 4: Diplopoda (eg: Millipede)

Class 5: Pauropoda (eg: Pauropus)

Class 6: Insecta (eg: Butterfly)

Module V **6 Hrs**

Phylum Mollusca: Salient features and classification up to class

Class 1: Aplacophora (eg: Neomenia)

Class 2: Monoplacophora (eg: Neopilina)

Class 3: Polyplacophora (eg: Chiton)

Class 4: Bivalvia (eg: Perna)

Class 5: Gastropoda (eg: Xancus)

Class 6: Cephalopoda (eg: Sepia)

Class 7: Scaphopoda (eg: Dentalium)

Phylum Echinodermata : Salient features and classification up to class.

Class 1: Asteroidea (eg: Astropecten)

Class 2: Ophiuroidea (eg: Ophiothrix)

Class 3: Echinoidea (eg: Echinus)

Class 4: Holothuroidea (eg: Holothuria)

Class 5: Crinoidea (eg: Antedon)

Phylum Hemichordata : Salient features (eg: Balanoglossus.)

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SEMESTER I

COMPLEMENTARY COURSE 1 - PRACTCAL

NON CHORDATE DIVERSITY **36 Hrs**

Credit 1

1. Scientific drawing - 5 specimens
2. Simple identification - 10 invertebrates, out of which 5 by their scientific names
3. T.S - Earthworm, T.S Fasciola
4. Dissection - Nervous system of Prawn
5. Dissection - Nervous system of Cockroach
6. Mounting - Prawn Appendages

SEMESTER II. ZY2CMTO2.

COMPLEMENTARY COURSE 2

CHORDATE DIVERSITY

36 Hrs
Credits 2

Objectives

1. To make the student observe the diversity in chordates and their systematic position.
2. To make the a student ware of the economic importance of some chordates.

3. To learn the physiological and anatomical peculiarities of some vertebrate species through type study.
4. To stimulate the students' curiosity in vertebrates living associated with them.

Module I **4 Hrs**

Phylum Chordata: Fundamental characters and outline classification upto class.

Sub phylum Urochordata: General characters,

Classification:

Class 1: Larvacea (eg: Oikopleura)

Class 2: Ascidiacea (eg: Ascidia) , Retrogressive metamorphosis.

Class 3: Thaliacea (eg: Salpa)

Sub phylum Cephalochordata: Salient features (eg: Branchiostoma)

Module II **6 Hrs**

Sub phylum Vertebrata: Salient features

Division Agnatha : salient features and classification

Class 1: Cyclostoma (eg: Petromyzon)

Class 2: Class Ostracodermi (eg: Cephalapsis)

Division Gnathostomata: Salient features

Super class Pisces

Super class Tetrapoda.

Super class Pisces: Salient features and classification

Class 1: Chondrichthyes (eg: N

arcine)

Class 2:Osteichthyes (eg: Latimeria)

General Topic: Accessory respiratory organs in fishes.

odule III **14 Hrs**

Super class Tetrapoda: Salient features

Class 1: Amphibia : Salient features. **Type study:** ***Euphlyctis hexadactyla*** - Habitat, morphology, sexual dimorphism, coelom and viscera, skeletal system, digestive system, respiratory system, circulatory system, excretory system, nervous system, sense organs, reproductive system, development..

Classification up to order:

Order 1: Urodela (eg: Amblystoma)

Order 2: Anura (eg: Bufo)

Order 3: Apoda (eg: Icthyophis)

Module IV **6 Hrs**

Class Reptilia: Salient features and classification up to subclass

Sub class 1: Anapsida (eg: Chelone)

Sub class 2: Diapsida (eg: Chamaeleon)

Sub class 3: Parapsida (eg: Icthyosaurus)

General Topics: Poisonous and non poisonous snakes of Kerala.

Class Aves: Salient features and classification up to subclass

Sub class Archeornithes (eg: Archaeopteryx)

Sub class Neornithes (eg: Struthio)

General Topics: Flight adaptation of birds

Module V **6 Hrs**

Class Mammalia: Salient features and classification up to subclass

Sub class 1: Protheria (eg: Echidna)

Sub class 2: Metatheria (eg*:* Macropus)

Sub class 3: Eutheria (eg: Elephas*)*

General Topic: General adaptation of aquatic mammals with example.

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SEMESTER II

COMPLEMENTARY COURSE 2- PRACTCAL

CHORDATE DIVERSITY

36 Hrs
Credit I

1. Simple identification of 10 chordates, out of which 5 by their scientific names
2. Osteology - Vertebrae and girdles of Frog
3. Snake identification - 3 poisonous and 3 non poisonous snakes with key
4. Mounting of placoid scales of shark
5. Dissections: Frog: Photographs/Diagrams/ models may be used for the study.
   1. Frog - Viscera
   2. Frog - Digestive System
   3. Frog - Arterial System
   4. Frog - Brain

SEMESTER III. ZY3CMT03.

COMPLEMENTARY COURSE -3

PHYSIOLOGY AND IMMUNOLOGY

54 hrs
Credits 3

Objectives

1 To appreciate the correlation between structure and function of organisms
2 To make the student aware of the health related problems, their origin and treatment.
3 To understand how efficiently our immune system work in our body.
4 To acquire knowledge about preventing common diseases rather than curing.

Module I **14 Hrs**

Nutrition: Types of nutrition – autotrophy, heterotrophy. Nutritional requirements – carbohydrates, proteins, lipids, minerals (Ca, Fe, I), vitamins (sources and deficiency disorders), nutritional disorders

Respiration: Transport of respiratory gases in blood - transport of oxygen, transport of carbon dioxide, chloride shift. Respiratory disturbances – Hypoxia, Hypercapnia, Asphyxia, physiological effect of smoking, carbon monoxide poisoning.

Circulation: Composition and functions of blood. Plasma and formed elements - WBC, RBC and platelets, Mechanism of blood coagulation – clotting factors, intrinsic and extrinsic pathways, anticoagulants. ECG, Blood pressure, Arteriosclerosis, Heamophilia, cerebral and pulmonary thrombosis.

Module II **14 hrs**

Excretion: Structure of a nephron. Urine formation – glomerular filteration, tubular reabsorption, tubular secretion. Urine concentration – counter current mechanism. Composition of urine – normal and abnormal constituents. Hormonal regulation of kidney function. Kidney stone, dialysis.

Neuro physiology: Structure of a neuron. Myelinated and non myelinated nerve fibre, nerve impulse production (resting membrane potential, action potential), Impulse propagation, All or none law, saltatory conduction, synaptic transmission. Neurotransmitters (acetyl choline, adrenalin, dopamine), brain waves, EEG. Neural disorders - Parkinson's disease, Alzheimer's disease.

Muscle physiology: Types of muscles: striated, non striated and cardiac. Ultra structure of striated muscle, Mechanism of muscle contraction, cori cycle and muscle relaxation. Muscle fatigue, oxygen debt, Rigor mortis.

Module III **8 hrs**

Endocrinology: Introduction to Endocrine system. Mechanism of hormone action, Endocrine glands - hypothalamus, pituitary gland, pineal gland, thyroid gland, parathyroid gland, endocrine pancreas, adrenal gland, thymus gland, testis and ovary. Physiological role of hormones, Hormonal disorders.

Module IV **12 Hrs**

Immunology: Introduction to immunology, types of immunity – innate, acquired, passive, active, mechanism of innate immunity (barriers, inflammation, phagocytosis). Types of antigens. Basic structure of immunoglobulins, Classes of immunoglobulins and functions. Antigen antibody reactions, Precipitation test, agglutination test, WIDAL, VDRL, HIV test (ELISA),

Module V **6 Hrs**

Immune response system: (Brief accounts of the followings)

Primary and secondary lymphoid organs, Cells of Immune system - T&B lymphocytes, natural killer cells, macrophages, plasma cells , memory cells, Monoclonal antibodies, Hybridoma technology.

Immune disorders: Hypersensitivity, Auto immunity (rheumatoid arthritis) & Immunodeficiency (AIDS), Vaccines - BCG, DPT, Polio vaccine.

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SEMESTER III

COMPLEMENTARY COURSE - 3 PRACTCAL

PHYSIOLOGY AND IMMUNOLOGY

36Hrs

Credit 1

1. Preparation of Human Blood smear & identification of leucocytes
2. Qualitative analysis of Reducing Sugar, Protein and Lipid
3. Action of Salivary amylase on Starch (Demonstration Only)
4. Estimation of Haemoglobin (Demonstration only)
5. Identification of human blood groups, A, AB, B and O, Rh factor
6. Instruments (Principle & uses)- Sphygmomanometer , Stethoscope

SEMESTER IV. ZY4CMT04.

COMPLEMENTARY COURSE - 4

APPLIED ZOOLOGY

54 hrs
Credits 3

Objectives

1. To acquire basic knowledge and skills in applied branches of zoology.
2. To understand the technology for utilising ecofriendly organisms around them for beneficial purpose.
3. To equip the students for self employment opportunities with scientific knowledge to perform profitably & confidently.

Module I **24 Hrs**

Aquaculture: Advantages of aquaculture, Traditional methods of aquaculture, Biotic and abiotic factors in water, Pond culture – construction and maintenance. Types of aquaculture, composite fish culture, integrated fish culture, induced breeding of carp & prawn, Importance of algae in aquaculture. Aquarium management - Setting up of an aquarium, biological filter and aeration. Common cultivable fishes of Kerala. Fish diseases, Prawn culture, mussel culture, pearl culture, Fish processing and preservation.

Module II **12 Hrs**

Sericulture: Four species of silkworms, life history of silkworm, silk worm rearing techniques, Mounting of silkworm - Chandrika, defective cocoons, harvesting and stifling of coccons. Silkworm diseases and pest, preventive and control measures.

Module III **6 Hrs**

Vermiculture: Species of earthworms, ecological classification of earthworms, life cycle and reproduction of earthworm. Physical & chemical effects of earthworms on soil, Vermicomposting – site selection, preparation of pit, maintenance, monitoring and harvesting of vermicompost.

Module IV **12Hrs**

Apiculture: Species of honey bees, organization of honey bee colony. Bee keeping methods and equipments. Apiary management and maintenance. Bee pasturage, byproducts of honey bees and their uses. Diseases, pests of honey bees and control measures.

References:

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SEMESTER IV

COMPLEMENTARY COURSE - 4 PRACTCAL

APPLIED ZOOLOGY

2 Hrs/week

36 Hrs

Credit 1

1. General identification, economic importance, morphology, scientific names and common names of the following
   a. Economic importance and morphology of culturable fishes (Catla, Rohu, Grass carp, Common carp, Silver carp, Etroplus, Tilapia)
   b. Two species of earthworms used in Vermiculture
   c. Two species of honey bees
   d. Silkworm. Cocoon/Adult
2. Castes of honey bees
3. Bee keeping equipments - Bee hive, Smoker, honey extractor
4. Identification and uses - Bee wax, Honey, Silk, Vermicompost
5. Chandrika / Natrika used in sericulture