Elective paper: Zoology

B.Sc. VI Semester (Zoology) Marks 70+30=100

Subject: Developmental Biology and Applied Zoology

Course Code- ZO (N)-350Credit: 3

Course objectives:

1. The general objective of the course is to understand and appreciate some of the events and processes which occur during animal growth and development, as the animal develops from an egg and a sperm into an adult organism.
2. To develop understanding how the process of differentiation leads to many different types of cells and tissues which function in an integrated way as each new organism develops.
3. To strengthen the knowledge in the field of applied zoology including animal pests in agriculture, horticulture, forests, fisheries science, veterinary, dairy, biomedical sciences and other allied fields.
4. To study the insect species causing damage to the crops in the field as well as under storage condition and the effective control measures against them.

Syllabus

Types of egg, Spermatogenesis and Oogenesis. Chemical and metabolic events during gamete formation. Approximation of gametes, Capacitation, Acrosome reaction, formation of fertilization membrane, egg activation, prevention of polyspermy. Patterns of cleavage , control of cleavage patterns, chemical changes during cleavage and significance of cleavage. Embryonic induction and concept of organizer. Formation of Fate maps and Foetal membrane in frog and chick. Significances of Fate and Foetal membrane.General principles of aquaculture: Induced Breeding, Composite fish culture, Lay out of fish farm and its management and by-products of fishing industry. Prawn culture and Pearl culture. Different kinds of silk producing insects. Host plants of silk insects. Grainage, rearing, breeding and diseases of silkworm. Reeling and fiber technology. Honey bee found in India and, different kinds of hives. Management of bee colonies, bee enemies and their control. Extraction and processing of honey. Role of Honey bees in pollination management of agro-horticultural crops. Different kinds of Lac producing insects. Host plants, life cycle and diseases of lac insects. Types of poultry breeds, poultry housing, farm and farm management. Grading, handling and marketing of eggs. Poultry diseases and their control. Economic Importance of mammals in agriculture, horticulture, dairy, leather, wool and fur industry. Store grains pests: Their systematic positions, habits, life cycle, nature of damage and control measures. Biological and Chemical control:Elementary knowledge of pesticides and integrated pest management. General charactersand Classification up to order level, morphology (including adaptations), life cycle, pathogenecity, diseases and control measures of parasitic animals.

UNIT SCHEDULE

Block I: Developmental Biology

Unit 1: Gametogenesis

Unit 2: Fertilization

Unit 3: Cleavage and Embryonic Induction

Unit 4: Blastulation and Gastrulation in Frog and Chick

Block II. Applied Zoology

Unit 5: Aquaculture

Unit 6: Sericulture

Unit 7: Apiculture

Unit 8: Lac Culture

Unit 9: Poultry

Unit 10: Economic importance of Mammals

Unit 11: Store grain pests

Unit 12: Pest Management

Unit 13: Parasitology

UNIT WISE CONTENT ZO (N)-350

Block I Developmental Biology:

Unit 1: Gametogenesis

Types of eggs, Spermatogenesis and Oogenesis. Chemical and metabolic events during gamete formation.

Unit 2: Fertilization

Approximation of gametes, Capacitation, Acrosome reaction, formation of fertilization membrane, egg activation, prevention of polyspermy.

Unit 3: Cleavage and embryonic induction

Patterns of cleavage , control of cleavage patterns, chemical changes during cleavage and significance of cleavage. Embryonic induction and concept of organizer.

Unit 4: Blastulation and Gastrulation in Frog and Chick

Fate maps, Foetal membranes: Their formation and significanc

Block II. Applied Zoology

Unit 5: Aquaculture

General principles of aquaculture: Induced Breeding, Composite fish culture, Lay out of fish farm and its management and by-products of fishing industry. Prawn culture and Pearl culture.

Unit 6: Sericulture

Different kinds of silk producing insects. Host plants of silk insects. Rearing and diseases of silkworm. Reeling and fiber technology.

Unit 7: Apiculture

Honey bees of India. Management of bee colonies, bee enemies and their control. Extraction and processing of honey. Role of Honey bees in pollination.

Unit 8: Lac Culture

Different kinds of Lac producing insects. Host plants, life cycle and diseases of lac insects.

Unit 9: Poultry

Types of poultry breeds, poultry housing, farm and farm management. Grading, handling and marketing of eggs. Poultry diseases and their control.

Unit 10: Economic importance of Mammals

Economic Importance of mammals in agriculture, horticulture, dairy, leather, wool and fur industry.

Unit 11: Store grain pests

Store grains pests: Pulse beetle (*Callosobruchus maculatus*), Rice weevil (*Sitophilus oryzae*), Wheat weevil (*Trogoderma granarium*), Rust red flour beetle (*Tribolium castaneum*) and Lesser grain borer (*Rhizopertha dominica*). Their systematic positions, habits, life cycle, nature of damage and control measures.

Unit 12: Pest Management

Biological and Chemical control:Elementary knowledge of pesticides and integrated pest management.

Unit 13: Parasitology: General charactersand Classification up to order level, morphology (including adaptations), life cycle, pathogenecity, disease caused and control measures of *Entamoeba,Trypanosoma, Leishmania, Giardia*, Ascaris, *Ancylostoma, Enterobius* , *Wuchereria* and *Schistosoma*.

B.Sc. VI Semester (Zoology) Marks = 50

Subject: Developmental Biology and Applied Zoology - Lab

Course Code- ZO (N) 350LCredit: 1

Course Objectives:

1. To study the histology through the permanent slide observation of different chordate grops.
2. To study the chordate anatomy through the dissection of fish, frog , rabbit or available mammal species.
3. To study the differential developmental stages of chick and frog by the whole mount slide observation
4. To understand the ecological process through the water sample analysis

Syllabus: Embryological slides of chick and frog showing the different developmental stages. Specimens, picture and slide study of economically important animalsParasites/Slides *Entamoeba, Trypanosoma, Leishmania, Giardia, Ascaris,Ancylostoma, Enterobius,Wuchereria* and *Schistosoma.*

UNIT SCHEDULE

Block III: Applied and Developmental Biology

Unit 1: Developmental biology (Permanent slides of chick & Frog embryology)
Unit 2: **Applied Zoology:** Specimens/ slides of Apis, Silk moth,
Unit:3: Specimens/ slides of Lac insect, Phytoparasitic nemotodes, major carps and store grain pests.
Unit 4. Specimens/ slides and Pictures of economically important varieties of poultry and cattle
Unit 5. Parasites/Slides *Entamoeba, Trypanosoma, Leishmania, Giardia, Ascaris,Ancylostoma, Enterobius,Wuchereria* and *Schistosoma.*

UNIT WISE CONTENT ZO (N) 350L

A complete record of laboratory work will be maintained by every student. The practical work will be consists of following:

Unit 1: Developmental biology

1. Study of the permanent slides of the chick embryos (whole mounts)
2. Study showing the embryology of frog.

Unit 2: Applied Zoology

Specimens/ slides of Apis, Silk moth, Lac insect,

Unit:3: Specimens/ slides of Lac insect, Phytoparasitic nemotodes, major carps and store grain pests.

Unit 4. Specimens/ slides and Pictures of economically important varieties of poultry and cattle

Unit 5. Parasites/Slides *Entamoeba, Trypanosoma, Leishmania, Giardia, Ascaris,Ancylostoma, Enterobius,Wuchereria* and *Schistosoma.*