6th Semester

Branch	Subject Title	Subject Code
B.Sc. (Zoology-Major)	**Ecology, Biodiversity and Evolution**	**ZOM1-161**

Course Objective - In the course students are able to Design an experiment and use statistics to test whether there is a significant difference between two treatment groups. Explain how biological variation is produced and maintained. Explain the mechanisms that lead to evolution within a population and the formation of new species. The Course Ecology, Biodiversity, Evolution is an introduction to the foundational concepts in ecology biodiversity and evolution. It provides a comprehensive study of the interrelationships between living organisms and their environment emphasizing the role of these principles in shaping the diversity of life. The course also explores the evolutionary processes that have led to the development of distinct life forms.

Course Learning Outcomes - After the completion of the course the student will be able to:

1. Have comprehensive understanding of the basic terms, principles, rules, values & concept of ecological science.
2. Identify the different types of Ecosystem and relationship between the organisms and their environment.
3. Identify the significance of Biodiversity with emphasis on various groups of animals.
4. Get clear understanding on the major issues of Biodiversity.
5. Get knowledge of the theories of origin and development of early life on earth.
6. Identify how the Evolution takes place from single cell to man.

Content

Unit -1

1. Concept of Ecology

1.1 Introduction and History of Ecology.
1.2 Component of Ecosystem.
1.3 Classification of Ecosystem.
1.4 Function of Ecosystem-Productivity of ecosystem.
Energy flow of the ecosystem - food chain, food web, ecological pyramid and trophic level. Ecological footprint and Carbon footprint.
1.2 Bio-Geochemical cycle - Carbon, Oxygen, Nitrogen, Phosphorus cycle**.**

Unit -2

1. Population Concept

1.1 Basic concept and characteristics of population.
1.2 Factors affecting population.
1.3 Population interaction - Mutualism, Predation,Competition.
1.4 Species interaction - Herbivory, Carnivory, Symbiosis

2. Community Concept

2.1 Characteristics of community.
2.2 Stratification in terrestrial' and aquatic habitat**.**

3. Ecological Succession

3.1 Types of succession.

Unit – 3

1. Habitat Ecology

1.1 Concept of Habitat and Ecological Niche.
1.2 Fresh water habitat and its conservation.
1.3 Marine water habitat and its conservation.
1.4 Estuarine habitat and its conservation.
1.5 Terrestrial habitat and its conservation.

2. General idea of Ecological and Biological indicators.

3. Ecological division of India

Unit - 4

1. Biodiversity

1.1 Meaning, values and ethics of Biodiversity.
1.2 Importance of biodiversity.
1.3 Types of biodiversity - genetic, species and ecological biodiversity.
1.4 Causes of depletion of biodiversity.
1.5 Hotspots of biodiversity in India.
1.6 Conservation of biodiversity.
In Situ-protected areas.
Ex Situ - Germplasm bank, Gene bank, Seed bank, Zoo and Botanical garden.
1.7 Biodiversity Protection Act-2002.
2. Role of People for conservation of biodiversity.
3. Emerging trends in conservation of biodiversity.
4. Medicinal Plants of Forest and its Uses.
- Mahua, Harad, Baheda, Amla, Oak.

Unit - 5

1. Evolution

1.1 Definition and History of evolution.
1.2 Origin of life - Theories of evolution.
- Lamarckism
-Darwinism
-Neo-darwinism
1.3 Modern synthetic theory of evolution.
1.4 Evidence of organic evolution - anatomical, palaeontological, embryological.
2. Micro, Macro and Mega evolution.
3. Evolution of man.
4. Elementary idea of Geological timescale.
5. Adaptation - Definition and types of adaptation.
6. Mimicry - Definition and kinds of mimicry.

Practical's

I. Identification and study of fresh water fauna and its economic importance - Paramoecium, Spongilla, Leech, Prawn, Unio, Crab, Frog, Catla.
II. Identification & Study of marine water fauna and its economic importance – Euplectella, Neries, King Crab, Pinctada, Asterias, Balanoglossus, Sea Horse, Scoliodon.
III. Identification & Study of terrestrial fauna and its economic importance - Earthworm, Millipede, Peripatus, Scorpion, Naja, Tortoise, Echidna, Kangaroo.
IV. Study of ecological experiments:
a. To determine the population of some species of organism by Quadrat sampling method.
b. To measure the population of a locality by mark and Recapture method.
c. To estimate the biomass of particular area.
V. To identify, study and prepare slide/preservation of micro and macro-organisms from any water body.
VI. Study of pond ecosystem. - Visit to a nearby pond/lake.
VII. Identify, comment and use of important forest medicinal plants - Mahua, Harad, Baheda, Amla, Oak.
VIII. Identify and comment on specimen related to adaptation and mimicry - Scoliodon, Pigeon, Phrynosoma, Chameleon, Draco, Stick Insect, Leaf Insect.
IX. Evolutionary experiment:
a. Connecting link- Peripatus, Archaeopteryx, Platypus.
b. Homology and Homologous organs –
- Homology in four limbs structure of vertebrates.
- Serial homology - Crustacean appendages.

c. Analogy - Wings of Bird and Bat.