



BRANCH	Subject Title	Subject Code
B.Sc. (ENVIRONMENTAL SCIENCE-MAJOR)	COMMUNITY AND ECOSYSTEM CONCEPT	ESM1

Course Learning outcomes (CLO),

1. Understand basic theoretical and empirical approaches to the study of natural systems.
2. Learn important ecological concepts and information.
3. Improve writing skills especially in synthesizing and interpreting complex concepts and data.
4. Demonstrate an understanding of basic concepts of ecology.
5. Understand the structure and function of ecosystems.
6. Demonstrate an understanding of the scientific method including field and laboratory methods (observation, sampling, recording data, analysis of data and reporting of data).

CONCEPT

Unit - 1

Basic Concept of Ecology

- Importance of ecology in Ancient India
- Ecology-definition, scope and basic principles of ecology and environment.
- Subdivision of ecology.
- Aut & Syn ecology.
- Levels of organization: population, community, ecosystem and biosphere.
- Ecological factors: Light and Solar radiations, temperature, precipitation wind (effect on plants and animals)
- Topographic factor- topography microclimate.
- Biotic factors - interspecific intraspecific interactions
- Plants indicator for ecological studies.

Unit - 2

Ecosystem

- Basic concepts
- Components of ecosystem.
- Trophic levels
- Food chain and food web.



- Ecological pyramids.
- Types of ecosystem- natural and artificial ecosystem.
- Characteristics of terrestrial, fresh water and marine ecosystems.
- General idea about Ecosystem Productivity.
- Energy flow in an ecosystem.
- Ecological pyramids, Productivity, Energy flow.

Unit - 3

Biogeochemical Cycles

Definition and Significance of biogeochemical cycles.

Important gaseous cycles.

- Carbon Cycle.
- Global Oxygen Cycle.
- Nitrogen Cycle.

Important sedimentary cycles

- Phosphorus Cycle.
- Sulphur Cycle.

Unit - 4

Succession

Concepts of succession,

Types of succession:

- Primary succession.
- Secondary succession
- Causes of succession
- Mechanism of succession
- Climax and stability.
- General idea about ECOLOGICAL adaptations.
 - Hydrophytes Morphological and adaptations in plants.
 - Xerophytes- Morphological and anatomical adaptations in plants.
 - Epiphytes-Morphological and anatomical adaptations in plants.



Unit - 5

Plant Community

- Basic concepts of plant community.
- Plant community structure.
- Growth forms.
- Life form.
- Analytical and synthetic characters of plant community (General Idea).
- Methods of plant community analysis.
- Ecades.
- Ecotone and edge effect.

Practical

Practicals

1. Measurement of light intensity by Lux meter in different environmental conditions.
2. Measurement of wind velocity by anemometer.
3. Measurement of humidity by dry and wet bulb thermometer.
4. Prepare a list of important plant indicators used for ecological study.
5. To determine the minimum size of quadrat for analytical ecological study.
6. To determine the frequency of plant species random quadrat sampling method and to frequency with Raunkiaer's frequency
7. To find out density of a species of pla community Higher with the help of quadrate sampling
8. To find out the Importance Value index
9. To find out the SDR (summed dominance ratio) of plant community.
10. Study of Hydrophytic adaption - Hydrilla- morphology and anatomy
11. Study of Xerophytic adaption-Casurina/Nerium.
12. Study Epiphytic adaption-Vanda root.
13. Study of Phytoplankton and Macrophytes from water bodies.



Semester 2

BRANCH	Subject Title	Subject Code
B.Sc. (ENVIRONMENTAL SCIENCE-MAJOR)	FUNDAMENTALS OF ENVIROMENTAL SCIENCE	

Course Learning outcomes (CLO)

1. Students will have a clear idea about the concept of environmental science.
2. Students will understand the Indian holistic concept of environment.
3. Students will understand correlation between evolution and environmental factors.
4. Students will learn the basics of hydrosphere and its properties
5. Students will learn the basics of atmosphere and its properties.
6. Students will learn the basics of lithosphere and its properties.
7. Students will have idea about natural and many induced environmental degradation.

Content

Unit - 1

Environmental science- Introduction:

1. Environmental Science: Introduction, role, necessity and scopes of environmental science.
2. Indian Holistic concept of environment in-- Vedas, Upanishads and Puranas - Ramayana, Mahabharata and Bhagvad Gita Education - Kautilya's Arthashastra - 5 element (Panchamahabhutas) concept of ancient India.
3. Relation of Evolution and Environment (brief idea)

Unit - 2

Biosphere and Hydrosphere:

1. Biosphere-brief Idea.
2. Properties of water (physical, chemical and biological)
3. Introduction and Idea of major types of water bodies (fresh and marine water bodies)
4. Hydrological cycle.
5. Factors influencing surface and ground water.

Unit - 3

Atmosphere

1. Structure and composition of atmosphere.
2. Major layers of atmosphere.



3. Earth's radiation/heat balance, energy budget.
4. Meteorological parameters-weather and climate.
5. Climatic factors - Temperature, light, pressure, precipitation, relative humidity and wind (general Idea).

Unit - 4

Lithosphere:

1. Fundamentals of geology, major endogenic and exogenic processes.
2. Structure and composition of rocks and its types with examples.
3. Weathering process of rock.
4. Soil profile
5. Soil composition- soil texture, soil air, soil water, soil organism, mineral matter, soil organic matter.
6. Pedogenesis
7. Factors effecting soil formation.

Unit - 5

Environmental degradation:

1. Natural causes of environmental degradation and its impact
 2. Consequences of man induced environmental degrad reference to-
 - Exploitation of natural resources
- Population explosion
- Industrialization and urbanization
 - Global climate change
 - Deforestation
 - Modernization of agriculture
 - Pollution

Practical

1. To study the soil profile (Demonstration).
2. Collection and preservation of different types of soil samples.
3. Identification of soil texture - clay, sand, loamy.
4. Identification of soil types - red soil, black soil.
5. Determination of soil and air temperature at different locations.
6. Determination of water holding capacity of soil
7. Determination of bulk density of soil.
8. Determination of soil organic carbon.
9. Identification of rocks (specimens) Dolerite, Shale, Sandstone, Limestone, Slate, Marble, Quartzite, Gneiss.
10. Field visit to weather station
11. Study of natural causes of environmental degradation (photographs and description)
12. Study of man induced cause of environmental degradation (photographs and description)