VANITA VISHRAM WOMEN'S UNIVERSITY

SCHOOL OF SCIENCES AND TECHNOLOGY

DEPARTMENT OF BIOTECHNOLOGY

BACHELOR OF SCIENCE (B.SC.) HONOURS BIOTECHNOLOGY PROGRAMME

Under Learning Outcomes-based Curriculum Framework (LOCF) for Under Graduate (UG) Education

SEMESTER 1

Generic Elective Course (GEC)

Syllabus applicable to the students seeking admission in the following programme

B.Sc. Biotechnology under LOCF w.e.f. the Academic Year 2021-2022

SEMESTER 1
GENERIC ELECTIVE COURSE PAPER 1

ECOLOGY AND ENVIRONMENT MANAGEMENT

Course Objectives:

1. The main objective of this paper is to create an awareness about the environment and to manage environmental problems.
2. This course focuses on the ecosystem and its components, energy transfer in ecosystem, various types of environmental pollution, and conservation strategies with sustainable management.
3. To give knowledge of natural systems which make life possible on earth.
4. To realize the learners about that human are part of this system and depend on them.
5. To aware how human activity adversely affect the natural system and damage them.
6. To make learners aware of the environmental issues and their management.

Course Outcome:

By the end of the course,

1. The students will have a better appreciation for the environment and become responsible citizen.
2. They will be able to understand the factors leading to environmental problems, their reasons and their impact on the environment.
3. This knowledge can help to form strategies for conservation of natural system and sustainable management.
4. Sprouting of an understanding of sustainable development to meet the needs of the present, without compromising the ability of future generations to meet their own needs.
5. Development of a sense of responsibility and concern for the welfare of the environment and all organisms.

BT13010 - THEORY COURSE CONTENT
(4 Credits)

UNIT1	**Our Environment:** Geological consideration of Atmosphere, Hydrosphere, Lithosphere Scope of Ecology, Development & Evolution of Ecosystem, Principles & Concepts of Ecosystem, Structure of ecosystem (Strata of an ecosystem, Types of ecosystems including habitats, Cybernetics & Homeostasis), Biological control of chemical environment, Ecosystem under threat, Deforestation and forest management	10 lectures
UNIT2	**Ecosystem and Energy:** Energy transfer in an Ecosystem, Food chain, food web, Energy budget, Production & decomposition in a system, Ecological efficiencies, Trophic structure & energy pyramids, Ecological energetic, principles pertaining to limiting factors, Bio-geochemical cycles (N, C, P cycles)	20 lectures
UNIT3	**Environment and Pollution:** Pollution & environmental health related to Soil, Water, Air, Food, (Pesticides, Metals, Solvents, Radiations, Carcinogen, Poisons), Detection of Environmental pollutant and management, Indicators & detection systems, Bio-transformation, Plastic, Aromatics, Hazardous	20 lectures

	wastes, Bioremediation, Waste disposal, Environmental cleanup: Case studies	
UNIT4	**Environment and Energy management:** Renewable and non-renewable energy sources, Energy resources, Energy demand, Conservation and management of energy resource	10 lectures

BT13020 - LAB COURSE CONTENT
(2 Credits)

1. Study of all the biotic and abiotic components of any simple ecosystem- natural pond or terrestrial ecosystem or human modified ecosystem.
2. Determination of population density in a terrestrial community or hypothetical community by quad rate method.
3. Calculation of the Simpson's and Shannon- Weiner diversity index for the same community.
4. Principle of GPS (Global Positioning System).
5. Study of the life table and fecundity table, plotting of the three types of survivorship curves from the hypothetical data.
6. Study of the types of soil, their texture by sieve method and rapid tests for –pH, chlorides, nitrates, carbonates and organic carbon
7. Study any five endangered species- one from each class.
8. Study any five threatened species- one from each class.
9. Measure the dissolved oxygen of water sample.
10. Measure the TDS and TSS of given water sample.

SUGGESTED READING

1. Chapman, J.L., Reiss, M.J. 1999. Ecology: Principles and applications (2nd edition) CambridgeUniversity Press.
2. Divan Rosencraz, Environmental laws and policies in India, Oxford Publication.
3. Ghosh, S.K., Singh, R. 2003. Social forestry and forest management. Global Vision PublishingHouse
4. Joseph, B., Environmental studies, Tata Mc Graw Hill.
5. Michael Allabay, Basics of environmental science, Routledge Press.
6. Miller, G.T. 2002. Sustaining the earth, an integrated approach. (5thedition) Books/Cole,Thompson Learning, Inc.
7. Mohapatra Textbook of environmental biotechnology IK publication.
8. Rana SVS, Environmenta lpollution – health and toxicology, Narosa Publication.
9. Sinha, S. 2010. Handbook on Wildlife Law Enforsement in India. TRAFFIC, India.
10. Thakur I S, Environmental Biotechnology, I K Publication.