Course code	Course Title	C	H	I	E	T
17P2BMC5	ENVIRONMENTAL BIOLOGY	6	6	25	75	100

Unit I Ecosystem Ecology 20 Hrs

Principles, sub-divisions, atmosphere, micro-climate, components, ecotone, edge effects, ecological niche, ecotypes, ecads, and ecosystem stability. Ecological factors - biotic - allelopathy; abiotic - light, fire, soil, temperature. Ecosystems - structure, function, producers, consumers and decomposers; Energy flow, food chains, food webs, ecological pyramids. Structure and function of ecosystems - aquatic – e.g., estuaries; terrestrial - grassland. Ecological succession – concept, causes, effects and climax. Biogeochemical cycles - C, N, O, P, S and H_2O.

Unit II Applied Ecology 20 Hrs

Environmental Pollution - causes, effects and control measures of air, water, land, noise and nuclear pollution. Global scenario of acid rain and smog, ozone depletion, urban sprawl, green house effect, climate change and global warming. Environmental impacts of major development projects - Tehri dam and Kudankulam nuclear power plant.

Environmental Xenobiotics – definition, direct, indirect and pharmaceutical sources, fate and effects. Bioremediation, biosparging and bioaugmentation. Applications, special features and limitations of bioremediation. Phytoremediation - definition, application and Techniques. Environmental policies and legislation in India.

Unit III Toxicology & disaster management 15 Hrs

Introduction, classification, occurrence, source and effects. Atmospheric toxins - carbon monoxide and sulphur oxides. Heavy metal toxicity - lead & chromium. Chemical toxicants - industrial and agricultural wastes, bioaccumulation and pollution indicators. Disaster management - flood, earthquake, tsunami, cyclone and landslides.

Unit IV Biodiversity 20 Hrs

Introduction, concept, definition, scope and constraints. Levels of biodiversity. Loss of biodiversity - factors and causes. Biodiversity of India and world. Hotspots. Mega diversity centres. Role of CITES and IUCN, Red Data Book and threatened categories. Conservation of Biodiversity- *in-situ* and *ex-situ*. Cryopreservation, Gene bank, Germplasm, Sacred groves, Biosphere Reserves, National parks and Sanctuaries. Organizations for conservation - CHIPKO, Green peace, WWF and UNEP. Role of remote sensing (RS) and geographic information system (GIS) in Ecology.

Unit V Phytogeography 15 Hrs

Definition, origin of earth - Pangaea, Eurasia, Gondwanaland. Wegner's theory of continental drift, role of plate tectonics. Plant distribution - continuous and discontinuous. Endemism, types, age and area hypothesis and causes of endemism. Vegetation types of India.

REFERENCES

1. Nwankiti, O. C, Geography of Man and his Environment, 1981, Nigel Smith Books. Ashtead, UK.
2. Odum, E.P., Fundamentals of Ecology, III Edition, 1991, Saunders & com.
3. Dash, M.C., Fundamentals of Ecology, 1993, Tata McGraw Hill, New Delhi.
4. Subrahmanyam, N.S. and Sambamurty, A.V.S.S, Ecology, 2000, Narosa Publishing House. New Delhi.
5. Agarwal, K.C., Fundamentals of Environmental Biology, 2001, Nidhi Publishers. Bikaner, India.
6. Krishnamurthy, K.V., An advanced text book on Biodiversity, 2003, Principles and Practice. Oxford and IBH publishing Co. Pvt. Ltd. New Delhi.
7. Kumar, U and Asija, M.J., Biodiversity Principle and Conservation, 2003, Saraswati Purohit for Student edition, Jodhpur.
8. Kaushik, A and Kaushik, C.P., Perspectives in Environmental Studies (4^{th} Ed.), 2004.
9. Asthana, D.K. and Asthana, M., A text book of Environmental studies, 2006, S. Chand & Co. Ltd. New Delhi.
10. Sharma, P.D., Ecology and Environment, 2009, Rastogi publications.
11. Rajagopalan, R, Basics of Environmental studies, 2009, Oxford University Press.
12. Pawan Kumar, B. and Mona Saad, A. Z.,Eco-toxicology & Eco-technology, 2013, Discovery Publishing house.
13. Hussain, M., Environment and Ecology: Biodiversity, Climate Change and Disaster Management for Civil Services Examination, 2015, Access publishing.

PRACTICALS

1. Morphological and anatomical features by typical xerophytes phylloclade - *Opuntia, c*ladode - *Casuarina*, succulent - *Bryophyllum* and hydrophytes - *Hydrilla.*

2. Vegetation study by quadrat method.

3. Vegetation study by line transect.

4. Estimation of dissolved O_2 in water samples by Winkler's method.
5. Comparison of chemical characteristics – moisture content, carbonate content, nitrate content, base deficiency and pH of the soil samples using rapid tests.
6. Estimation of CO_2 in water samples.
7. Biodiversity - Marking locations in India and world map – Hot spots, mega diversity centers.
8. Marking locations of endemic species, biosphere reserves, vegetation, climate, national parks and, wild life sanctuaries.
9. Visit to RS & GIS centers.
10. Field visit to natural ecosystem and identification of trophic levels, food webs and food chain, plant diversity-species & community.
11. Field visit to study the biotic components of pond ecosystem.