

7th Semester	RBT7D003	Environmental Biotechnology	L-T-P 3-0-0	3 Credits
--------------------------------	-----------------	----------------------------------------	------------------------	------------------

Module-I:**(10 hours)**

1. Concept of biodiversity. Human issues. Socio-economic aspects. Environmental degradation. Global environmental issues: climate change, energy and environment and other issues (in discretion of the teacher) vis-à-vis Indian scenario. Role of engineers/technologists in environmental protection and management.
2. Natural Resources :Natural water resources. Hydrological cycle. Lakes, streams, marine water. Concept of ecological flow. Ground water. Fluid dynamics of surface and ground water. Dissolved matter in natural waters. Water quality.
3. Soil: its composition, physico-chemical properties, origin of soil, environmental classification of soil. Classification of land, land-use, land conservation. Mineral resources.

Module-II:**(10 hours)**

1. Determination of water quality parameters from different sources: TDS, pH, conductivity, sodium, potassium, iron, acidity, alkalinity, hardness, DO, chloride, sulphate. Arsenic content in groundwater. Determination of wastewater parameters: Suspended solids, dissolved solids, COD, BOD, TKN
2. Determination of air pollution parameters : SPM, RPM, NO₂ , SO₂ , settleable dust

Module-III:**(8 hours)**

1. Laboratory methods used to count the micro-organisms present in soil and understand the limitation of each method. Characterization of various micro-organisms that inhabit the soil.
2. Laboratory testing used for the detection members of Coliform bacteria in drinking and sewage water. Microbiological degradation of chemical pollutants.
3. Biosensors for Environmental Monitoring Basic concepts: Principles of detection, photometric, electrochemical, ion-channel switch, piezoelectric. Biosensor uses.

Module-IV:**(8 hours)**

1. In situ and soil phase bioremediation technologies. Biodegradation of air pollutants.
2. Solid waste generation, on-site handling, storage and processing, collection of solid wastes, transfer and transport, processing techniques, disposal.
3. Hazardous waste characteristics. Inventory of hazardous wastes. Risk assessment. Treatment and disposal of hazardous wastes (thermal destruction, containment). Radioactive hazardous wastes.

Books:

- [1] Microbial Ecology by Atlas and Bartha (Pearson Education)
- [2] Introduction to Environmental Impact Assessment by Glasson Taylor
- [3] Environmental Toxicology by Wright and Wellbourne (Cambridge University Press)
- [4] Standard Methods for the Examination of Water and Wastewater (American Public Health Association)