GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3133508
Semester – III
Subject Name: Environmental Management-I

Type of course: Professional Core Course
Prerequisite: A good fundamental backup of Environmental Management

Rationale: This subject is intended to make students aware about basics of Ecosystem and Environmental issues.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	20	30	20	150

Content:

Sr. No.	Content	Total Hrs
1	**Introduction to Ecosystems** :Meaning & Definition of Ecology, Scope & Importance, Evolution of Sustainable Development, Concepts of Ecosystem, Types of Ecosystem, Components of Ecosystem, Food Chain, Food Web, Bio-Geo Chemical Cycles, **Environmental Issues** :Meaning & Definition of Pollution, Environment and Pollutants, Causes and Effects of different types of Pollutants on Ecosystem, Greenhouse Effect, Global Warming and Climate Change, Ozone Depletion, Acid Rain.	8
2	**Biodiversity** Genetic, Species and Ecosystem Diversity, Biodiversity in India, Threats to Biodiversity, Conservation of Biodiversity, Biodiversity index **Sustainability:** Sustainability and its Background, Strategies of Sustainable Development, Concept of Green Business and Carbon Credit, Environmental Certifications.	9
3	**Land and Soil Pollution, Degradation and Management** Description of Lithosphere, Land Resources, Land Pollution, Sources and Health Consequences of Land Pollution, Land Degradation, Efforts to reduce land pollution, Soils	8

	and Soils Management. **Forest and Food** Types of forest, Importance of forests, Functions of forest, Deforestation, Causes of Deforestation and Environmental Effects of Deforestation, Food, Sources and Demand for food, Food Production and Environment, Food Supply and Demand scenario for India, Limits to Food production, Food Production and Environment.	
4	**Environmental Biotechnology** Introduction to Biotechnology , applications of biotechnology in industries and environmental engineering, Role of microorganism in water and waste water engineering, Culture Media and its types, Staining Techniques, Isolation Techniques of microorganisms. **Bioremediation** Introduction, Fundamental principles, In-situ bioremediation of soil and Groundwater, Ex-situ bioremediation of soil, Wastewater bioremediation, Innovative treatment technologies, Case studies.	**9**

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
15	**15**	**15**	**10**	**5**	**10**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1) Introduction to Microbiology by A.S. Rao
2) Ajith Sankar R. N Environmental Management, Oxford, University Press 2015
3) T V Ramachandra and Vijay Kullkarni Environmental Management TERI Press 2009
4) Microbiology by Pelczar and Ried
5) N K Uberoi Environmental Management Excel Books 2003
6) Environmental Microbiology by Ralph Mitchell

7) Handbook of Bioremediation Edited by Norris et al, Robert S. Kerr;
8) G.N. Pandey Environmental Management Vikas Publication 1997
9) V. K. Ahluwalia Environmental Studies: Basic Concepts TERI Press Second Edition
10) Bioremediation Principles: Ewies, Ergas, Chang and Schroeder
11) Basics of Environmental Studies by Prof. Dr. N.S.Varandani

Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	To examine the role of ecology and ecosystem.	22
CO-2	To describe the importance of land management	22
CO-3	To apply basic experiments related to Biotechnology and Bioremediation.	21
CO-4	To determine principle of Biodiversity and sustainable development.	14
CO-5	To explain the role of food management.	7
CO-6	To assess different types of environmental issues.	14

Practicals:

1. Preparation of culture media
2. Gram staining of microorganisms.
3. Isolation of microorganism-streak plate method
4. To calculate Biodiversity Index
5. To find the moisture content of soil.