

Subject Code: 2SC1010302	Subject Title: Environmental Aspects of Biotechnology
Course Type: Core Course	

Course Objective: The course will help the student to understand various problems associated with environment its causes, effects and remedies.

Teaching scheme (hours) per week		Credit			Theory Marks		Practical Marks		Total
Theory	Practical	Theory	Practical	Total	Uni. Assessment	Cont. Assessment	Uni. Assessment	Cont. Assessment	
3	-	3	-	3	70	30	-	-	100

Biotechnology Theory:

Unit	Content	Lectures	Weight (%)
1	- Pollution and contamination of natural components of environment: sources of pollutants. - Transport and fate of contamination in the environment. - An overview of selected compounds & their effect on environment: Petroleum hydrocarbons (Alkenes, Cycloalkanes, Aromatics, Polycyclic), chlorinated hydrocarbons, petroleum products Aromatics & Pesticides. - Biomagnification - Introduction to Air Pollution	15	33%
2	Bioremediation: types and overview of bioremediation of air, soil and water (soil & water contaminated with oil spills, heavy metals and detergents). - Biofertilizers: Role of symbiotic and asymbiotic nitrogen fixing bacteria in the enrichment of soil. Algal and fungal biofertilizers (VAM) - Bioplastics. - Bioleaching: Enrichment of ores by microorganisms (Gold & Copper). - MEOR (Microbially enhanced oil recovery).	15	33%
3	- Microbiological analysis of drinking water. - Role of indicator organisms, W.H.O. microbiological standards for drinking water. - Water purification: - Dwelling supply and Municipal Supply. - Physical, chemical & Biological properties of Water and Wastewater. - Primary & Secondary treatment, (Biological oxidation processes), Tertiary treatment process & Advanced processing. - Treatment of solid wastes (Anaerobic digestion and composting).	15	34%

Learning Outcome: Development of awareness of exploitation of microorganisms for various environmental & commercial aspects (bioleaching, bioremediation, biodegradation, biofertilizers, etc.). Enabling the students to understand and explore the use of microbes for the benefit of mankind. Acquiring of knowledge of “green and ecosafe” microbial processes and technologies based on renewable sources.

Reference book:

- Atlas, R.M. (1997) Principles of Microbiology. (2nd ed.). Win. C Brown Publishers. Dubuque.
- Atlas & Bartha. Microbial Ecology.
- Martine Alexander. Biodegradation and Bioremediation.
- Arciwala, S. J. Waste water treatment for pollution control. Tata McGraw-Hill Publications, New Delhi.
- APHA. Standard Methods for the Examination of Water and Wastewater 22nd Ed. (2012)
- Waste Water Engineering, Metcalf and Eddy, Tata McGraw hill
- Thakur, I S, Environmental Biotechnology, I K Publication.