SANKALCHAND PATEL UNIVERSITY
।। अथातो ज्ञानजिज्ञासा ।।

FACULTY OF SCIENCE

M.Sc. (Biotechnology) (Semester-3)

In Effect from Academic Year 2017-18

Subject Code: 1SC2000303	**Subject Title: ENVIRONMENTAL MICROBIOLOGY**
COURSE TYPE: CORE COURSE	

Course Objective: Environmental Microbiology is a subject with great emphasis on environmental issues and risk assessment. Microorganisms and their use in environmental problem solving is at the core of this subject. Applications of microorganisms with different strategies of solving environmental issues will satisfy the thurst for curiosity of students

Teaching scheme (hours) per week		**Credit**			**Theory Marks**		**Practical Marks**		**Total**
Theory	**Practical**	**Theory**	**Practical**	**Total**	**Uni. Assessment**	**Cont. Assessment**	**Uni. Assessment**	**Cont. Assessment**	
4	**-**	**4**	**-**	**4**	**60**	**40**	**-**	**-**	**100**

Unit	**Content**	**Lectures**	**Weightage**
1	**Unit 1: Environmental problems and monitoring :** ✓ Environmental monitoring: environmental impacts and their assessments using bioindicators, biomarkers, biosensors and toxicity testing, rDNA technology ✓ Conservation strategies ✓ Environmental laws and policies in India	**15**	**25%**
2	**Unit 2: Biodegradation** ✓ Principles of biodegradation and mechanism of detoxification ✓ Biodegradation of detergent, pesticide, lignin, hydrocarbon and dyes	**15**	**25%**
3	**Unit 3: Bioremediation** ✓ Bioremediation principles ✓ Strategies and techniques of bioremediation: in situ and ex situ ✓ Bioremediation of metals ✓ Phytoremediation ✓ GMOs and their impact on bioremediations	**15**	**25%**
4	**Unit 4: Biodeterioration** ✓ Principles and mechanisms of biodeterioration ✓ Methodology to assess biodeterioration ✓ Prevention and control of biodeterioration ✓ Biodeterioration of selected materials	**15**	**25%**

Learning Outcome: Students will principally learn the core aspects of Biodeterioration, Bioremediation, Biodegradation & Environmental problems and their monitoring.

Reference Books:

1. Environmental engineering and management by S. K. Dhameja, Publ: Kataria & Sons
2. Microbial ecology by Bartha and Atlas, Pearson Edu
3. A text book of environmental chemistry & pollution control by S. S. Dara
4. Biotechnology by U. Satyanarayana
5. General Microbiology by Michael, M.M.John Stanier et al.
6. Experimental ecology by R.M. Atlas
7. Principles of Microbiology by RM. Atlas
8. Assessing Ecological Risks of Biotechnology by Lev R. Ginzburg
9. Environmental Biotechnology by B.C. Bhattacharyya and R. Banerjee
10. Environmental Science by S. C. Santra, Central, India
11. Environmental Microbiology – A Laboratory Manual by Pepper et. Al

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