



MANIPAL UNIVERSITY JAIPUR

School of Basic Sciences

Department of Biosciences

Course Hand-out

Principles of Environmental Biotechnology | BT1307 | 4 Credits | 3 | 0 | 4

Session: 2018 – 2019 | Faculty: Dr. Rakesh Kumar Sharma | Class: III Semester

A. Introduction: This course is offered by Dept. of Biosciences as a core course in B. Sc. (Hons) Biotechnology Programme targeting students who wish to pursue their career in the research field of Environmental Biotechnology or higher studies in the field of Environmental Biotechnology. Key themes within this course include Biogeochemistry and Biodegradation, and Waste Management and Processing and Bioenergy.

B. Course Outcomes: At the end of the course, students will be able to

[BT1307.1] Define the importance of microbial diversity in environmental systems, processes and biotechnology

[BT1307.2] Understand and explain the importance of molecular approaches in environmental microbiology and biotechnology.

[BT1307.3] Demonstrate existing and emerging technologies that are important in the area of environmental biotechnology to develop employment skills.

[BT1307.4] Compare the principles and techniques underpinning the application of biosciences to the environment

[BT1307.5] Analyse case-studies representative of key areas of environmental Biotechnology and pollution

C. SYLLABUS

Concept of environmental pollution: Origin of pollution; Classification and nature of Environmental Pollutants; Major sources. Impacts of Environmental Pollution: local, regional and global impact of environmental pollution, role of biotechnology in pollution detection and control. Biosensors for the detection of pollutants. Immobilized cells/enzymes for the treatment of pollutants. Hazardous materials and their treatment: treatment of hazardous wastes; hazards caused by biomedical wastes; treatment strategies for biomedical wastes. Bioremediation: In situ and Ex situ bioremediation; constraints and priorities of bioremediation; use of microbes, plants, bio-surfactant and bioemulsifiers in biodegradation and biotransformation. Bio-sorption: biotechnology and heavy metal pollution. Hydrocarbon degradation. Environmental impacts on agriculture: Biodegradation of agricultural chemicals; Biofertilizers and biopesticide. Bioassessment of Environmental Quality.

D. TEXT BOOKS

1. Evans, E. and Furlong, J.C.. *Environmental Biotechnology: Theory and Application*, John Wiley Sons, New Delhi, 2003.
2. Bhattacharya, B.C. *Environmental Biotechnology*, Oxford University Press, New Delhi, 2007.

E. REFERENCE BOOKS

1. Jordening, H.J. and Winter, J.. *Environmental Biotechnology*, Wiley-VCH Verlag, New York, 2005.
2. Rittmann, B.E., and McCarty, M.. *Environmental Biotechnology*, McGraw-Hill, New Delhi, 2012.

