



MANGALORE UNIVERSITY
DEPARTMENT OF BIOSCIENCES

M.Sc. ENVIRONMENTAL SCIENCE

ESH 551 ENVIRONMENTAL BIOTECHONOLOGY

52 hrs.

Course Outcomes:

- CO1 Learn biodiversity conservation methods and bioremediation technique.
- CO2 Know natural products.
- CO3 Understand the technologies for the degradation of various environmental pollutants.
- CO4 Study molecular technologies for biodiversity assessment and monitoring.

UNIT I (13 Hours)

Bioremediation: Microbial bioremediation, *in situ* and *ex situ* bioremediation, phytoremediation; Ex-situ and in-situ conservation; Gene reserves and germplasm bank, cryopreservation, embryo transfer, Transgenic organism in the environment.

UNIT II (13 Hours)

Natural products: By-products from terrestrial and aquatic organisms, By-products from industrial, agriculture and domestic sources and their utilization. Microbial degradation of pesticide, detergent, plastic, hydrocarbons, textiles, leather and wood.

UNIT III (13 Hours)

Mariculture, biomolecules from marine organisms, biofilms, biofouling and its prevention. Microbial mining, microbial influenced corrosion and remedies, bioaccumulation, biomagnification, biogas production and utilization.

UNIT IV (13 Hours)

Key molecular technologies for biodiversity assessment and monitoring: DNA recombination, DNA sequencing, PCR techniques and DNA fingerprinting. Intellectual property rights, patenting, traditional knowledge and traditional knowledge digital library (TKDL), biopiracy, plant-related litigations, bioterrorism and biological warfare.

References:

1. Old, R.N. and Primrose, S.B. 1994. Principles of Gene Manipulation, Blackwell Scientific Publications.
2. Watson et al., 1992. Recombinant DNA, Scientific American Books.
3. Calendar, 1988. The Bacteriophage, Vol II, Plenum Press.
4. Young, M.M., 1985. Comprehensive Biotechnology, Vol. 2, 3 & 4, Pergamon Press.
5. Prave, P., Faust W, Sitting V. and Sukatesh, D.A. 1987. Fundamentals of Biotechnology, WCH, Weinheim.
6. Stanbury, P.F. and Whitaker, A. 1984. Principles of Fermentation Technology.
7. Lycett, G.W. and Grierson, D. 1990. Genetic Engineering of Crop Plants.
8. Chrispeels, M.J and Sadava, D. F. 1994. Plants, Genes and Agriculture.
9. Glover and Hames, B. D. 1995. DNA Cloning I & II IRL Press.
10. Gelfand and Sninsky, J.J. 1995. PCR Strategies, Academic Press