MANGALORE UNIVERSITY

Department of Biosciences
MSc Biosciences

OPEN ELECTIVE COURSES

BSE 511 POLLUTION AND BIOREMEDIATION

39hrs

Course Outcomes:
After successful completion of the course, students will be able to:

- Gain a good knowledge in environmental pollution and bioremediation.
- Know air, water and land pollutants and their impacts.
- Realize the impacts of water pollution on aquatic biota and human health.
- Know what causes and how we are responsible for acid rain, photochemical smog, global warming, ozone depletion and haze.
- Understand the concept of bioremediation and how to use microorganisms, plants and enzymes to detoxify contaminants.
- Know how to do biological treatment of liquid wastes and solid wastes.

UNIT I (13 hours)

Environmental pollution: Types of pollution – Air, water, land, sound and radioactive pollution.
Water pollutants: Major sources- Domestic, municipal, industrial and agriculture; types and standards; Impact of water pollution on aquatic biota and human health.

UNIT II (13 hours)

Atmospheric Pollutants: Major sources, types and standards; Primary pollutants- Carbon monoxide, sulphur oxides, nitrogen oxides, particulate matter, hydrocarbons, asbestos and CFC's; Secondary pollutants; Impact of air pollutants on climate-Acid rain, photochemical smog, global warming, ozone depletion and haze.

UNIT III (13 hours)

Remediation: Types of remediation- Physical, chemical and biological; Bioremediation- *in- situ* and *ex-situ* bioremediation; Phytoremediation; Microbial remediation; Biological treatment of liquid wastes and solid wastes.

References:

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Secunderabad, India.

2. Eaton, A.D., Clesceri L.S. & Greenberg, A.E., 1995. Standard Methods for the Examination of Water and Wastewater, APHA, Washington.
3. Moriarty, F., 1975. Pollutants and animals; A factual perspective. George Allan & Unwin Ltd., London.
4. Schmitz, R.J, 1996. Introduction to water pollution biology. Asian Books Pvt. Ltd., New Delhi.
5. Trivedi, P.R. and Sudarshan, K., 1995. Global Environmental issues, Commonwealth Publications, New Delhi.
6. Vernberg *et al*., 1981. Biological monitoring of marine pollutants, Academic Press, New York.
7. George, A., 2000. The Ecology of sea shores, CRC Press.
8. Agrawal, K.C., 2002. Environmental Pollution: Causes, Effects and Controls.
9. Binoda C. Sabata, 1995. River Pollution in India.
10. Khetan S.K., 2000. Microbial Pest Control.
11. James, G.A., 1999. Ethical Perspective on Environmental issues in India.