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.

