MANGALORE UNIVERSITY

DEPARTMENT OF BIOSCIENCE

BSS 505 ECOTOXICOLOGY **39hrs**

Course Outcomes:

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

- Gain a sound knowledge in the field of ecotoxicology both basics and advanced with application point of view.
- Know various terminologies used in toxicology in general and ecotoxicology in particular.
- Know how to perform bioassays for assessment of toxicity.
- Understand how the biotransformation and detoxification of xenobiotics occurs at different levels.
- Gain the knowledge how to do the toxic risk and environmental impact assessments.
- Know about the atmospheric toxicants and their impact on climate.
- Enhance the knowledge of consequences of air pollution, including acid rain, photochemical smog, global warming, ozone depletion and haze.
- Know about how alcohol, tobacco, food additives, petroleum and petroleum products induce adverse effects.
- Understand how to scientifically use and the impact of reckless usage of pesticides.
- Know how to give antipodal therapy during pesticide poisoning.
- Get a detailed knowledge of toxicities of various metals.

Unit I (13 hours)

Introduction, definition and various facets of ecotoxicology; Kinds of toxicity; time & dose response relationships; factors influencing the toxicity; Bioassay.
Metabolism of toxic substances: biomagnification, biotransformation and detoxification; Effects of environmental toxicants- sub cellular, cellular, individual, population and ecosystem levels. Toxic risk assessment: Methods, monitoring, importance and surveillance of risk assessmen; Environmental Impact Assessment.

Unit II (13 hours)

Atmospheric toxicants: 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.
Toxicity of Alcohol, tobacco & its products, food additives, petroleum & petroleum products.

Unit III (13 hours)

Pesticides: Definition, classification, usage and exposure; Insecticides: Organochlorines - (DDT, cyclohexane, aldrin and endosulfan; Poisoning and treatment; Organophosphates and carbamates-Examples, sources, effects and treatment; herbicides, fungicides, rodenticides, endocrine disrupters. PCBs and Dioxins.

Metal toxicity - History, sources, emissions, effect of mercury, cadmium, arsenic and lead on metabolism and environment.

References:

1. Boudou, A. 1997. Aquatic toxicology. Vol. I and II.
2. Diwakar Rao, P.L. 1990. Pollution control Hand book, Utility Publications Ltd., Secunderabad. India.
3. Eaton, A. D., Clesceri, L.S. & Greenberg, A.E. 1995. Standard Methods for the Examination of Water and Wastewater. APHA, Washington.
4. Gupi P.K. and Salunke, D.K. 1985. Modern Toxicology. Vol.I, II and III. Metropolitan Publications, Delhi.
5. Hommadi, A.H. 1990. Environmental and Industrial safety. Indian Bibliographics Bureau, Delhi.
6. Jorgensen, S.E., Modelling in Ecotoxicology. Elsevier, Amsterdam.
7. Lewin, S.A. et al., 1988. Ecotoxicology : Problems and approaches. Springer - Verlag, Tokyo, New York.
8. Lewin, S.A. et al., 1989. Ecotoxicology: Problems and approaches. Springer - Verlag, Tokyo, New York.
9. Moriarty, F., 1975. Pollutants and animals : A factual perspective. George Allan & Unwin Ltd., London.
1. Omkar, 1995. Concepts of Toxicology. Chand & Co., Jallandar.
2. Schmitz, R.J. 1996. Introduction to water pollution biology. Asian Books Pvt. Ltd., New Delhi.
12. Trivedi, P.R. and Sudarshan, K. 1995. Global environmental issues. Commenwealth Publications, New Delhi.
13. Vernberg et al., 1981. Biological monitoring of marine pollutants. Academic Press, New York.