

# **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 assessment; 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:**

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- 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.
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- 9. Moriarty, F., 1975. Pollutants and animals: A factual perspective. George Allan & Unwin Ltd., London.
- 10. Omkar, 1995. Concepts of Toxicology. Chand & Co., Jallandar.
- 11. 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. Commonwealth Publications, New Delhi.
- 13. Vernberg et al., 1981. Biological monitoring of marine pollutants. Academic Press, New York.