BSS 505 ECOTOXICOLOGY

39hrs

Course Outcomes:

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

CO 1. Know the principle of bioassays for assessment of toxicity.
CO 2. Understand how the biotransformation and detoxification of xenobiotics occurs
CO 3. Gain the knowledge how to do the toxic risk and environmental impact assessments.
CO 4. Understand various atmospheric toxicants and consequences of air pollution, acid rain, photochemical smog, global warming, ozone depletion and haze.
CO 5. Gain in-depth knowledge of the adverse effects of alcohol, tobacco, food additives, petroleum and petroleum products
CO 6. Understand the impact ofpesticides and metal toxicity
CO 7. Know antidote therapiesfor pesticide poisoning.

Unit I (13 hours)

Introduction, definition and various facets of ecotoxicology; Kinds of toxicity; time & dose-response relationships; factors influencing the toxicity;Bioassay- toxicity testing; Role of US-FDA.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 CFCs; Secondary pollutants; Impact of air pollutants on climate-Acid rain, photochemical smog, global warming, ozone depletion andhaze.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. Poisoning - antidote.

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., (2000). Modelling in Ecotoxicology. Elsevier, Amsterdam.
7. Lewin, S.A. et al., (1989). Ecotoxicology: Problems and approaches. Springer - Verlag, Tokyo, NewYork.

8. Moriarty, F. (1975). Pollutants and animals: A factual perspective. George Allan &Unwin Ltd., London
9. Omkar, (1995). Concepts of Toxicology. Chand & Co., Jallandhar.
10. Schmitz, R.J. (1996). Introduction to water pollution biology.Asian Books Pvt. Ltd., New Delhi.
11. Trivedi, P.R. and Sudarshan, K. (1995). Global environmental issues. Commonwealth Publications, New Delhi.
12. Vernberg et al. (1981). Biological monitoring of marine pollutants. Academic Press, New York