ENVIRONMENTAL TOXICOLOGY AND RISK MANGEMEN (IBT-825)

Credit Hrs 3(3-0)

Educational Objectives:

1. To acquaint the students with conservation and reclamation of environment through biotechnology.

Course Outcomes:

2. Upon successful completion of this course, students will be able to;

   a. Describe the different techniques used to monitor pollutants in the environment.

   b. How biotechnology could offer a solution when introduced to the problems of pollution.

   c. Describe the sewage treatment process and importance of wastewater treatment plants.

   d. Describe the concept of clean technology and its application.

   e. Describe the concept of bioremediation technology and different technologies involved to clean polluted sites.

   f. Describe the importance of biofuel and ways to replace hydrocarbon fuel.

   g. Describe the importance of microorganisms to leach out minerals from the environment.

   h. Describe the applications of rDNA in agrobiotechnology and use of the alternatives to the agrochemicals.

3. **Course contents:**

   a. Introduction to Environmental biotechnology,
   b. Fundamentals of Biological Intervention,
   c. Genetic manipulation strategies in environmental biotechnology,
   d. Pollution indicators,

e. Pollution control strategies,
f. Biology of Waste water and its treatment,
g. Sludge treatment,
h. Contaminated land and bioremediation,
i. Aerobes and Effluents,
j. Phytotechnology (Terrestrial Phyto-systems, Metal Phytoremediation, Rhizofilteration etc)
k. Hyper accumulation, Solid Waste treatments,
l. Concept of integrated Environmental biotechnology,
m. Detoxification of hazardous chemicals:
n. Biodegradation,
o. Biotransformation,
p. Products of environmental biotechnology.
q. Biodegradation of environmental pollutants by microorganisms,
r. Bacteriology of Drinking water,
s. Microscopic studies of water specimens collected from various locations,
t. Field survey of polluted areas,
u. Field study for pollution indicators (Plants, Microorganisms).

Recommended Books:

1. Christon Hurst, Ronald Crawford, Jay Garland, David Lipson, Aaron Mills and Linda Stetzenbach (2007) Manual of Environmental Microbiology. 3rd Ed. Blackwell Publishers
2. Christopher F. Faster and D. A John Wase, John Wase (2004) Environmental Biotechnology. John Willey & Sons.
3. Derek R. Lovley (2000) Environmental Microb-Metal Interactions. ASM Press.
4. Environmental Biotechnology by Bhattacharyya and Rintu Banerjee (Paperback - Mar 1, 2007) OUP India.
5. Environmental Biotechnology by Bruce E. Rittmann and Perry L. McCarty (Paperback - Jan 1, 2001). McGraw-Hill Publishing Co.

6. Environmental Biotechnology Theory and application, 2003. Gareth M Evans and Judith C. Furlong. Wiley Publishers.

7. Environmental Biotechnology, 2008. T, Srinivas New Age international Publishers.

8. Environmental Microbiology: Methods and Protocols (Methods in Biotechnology) by John F. T. Spencer and Alicia L. Ragout de Spencer (Hardcover - Jul 15, 2004) Humana Press; 1 edition.