

BACHELOR WITH BIOTECHNOLOGY AS MINOR
6TH SEMESTER

BTG 622N: Environmental Biotechnology

CREDITS: THEORY – 3, PRACTICAL – 1

- **Course Learning Objective:** The objective of this course is to bring into the light the various problems concerning environment and their possible solutions employing the biotechnological approaches
- **Expected Learning Outcomes:** At the end of the course students should be able to;
 - differentiate between different types of pollutions and the respective causes.
 - to treat waste water and solid waste and turn it into environmental friendly end products.
 - employ biotechnological approaches for neutralizing different toxic substances.

Unit - 1 (15 HOURS)

Environment: importance and issues. Air, Water and soil pollution, causes and consequences, Air water and soil quality index, Global environmental issues: Global warming, acid rain, ozone depletion, desertification, bioaccumulation and biomagnification, global biodiversity loss.

Unit - 2 (15 HOURS)

Waste water treatment: preliminary, primary, secondary and disinfection. Activated sludge process, oxidation ponds, anaerobic digestion, anaerobic filters. Solid waste management: collection, segregation, disposal of solid waste, composting and vermicomposting, management of hazardous and biomedical waste.

Unit - 3 (15 HOURS)

Bioremediation: principle and types (ex-situ and in-situ bioremediation). Phytoremediation. Persistent organic pollutants. Biodegradation of pesticides, hydrocarbons, synthetic detergents and xenobiotics. Idea of bioplastics. Concept of biomining, bioaugmentation and biofiltration. Green fuels: bioethanol, biodiesel.

PRACTICALS (1 CREDITS: 15 hours)

1. Process of collection, segregation and storage of effluent samples.
2. Determination of chemical oxygen demand in waste water samples.
3. Determination of dissolved oxygen/ total dissolved solids in waste water samples.

4. Analysis of total hardness/temporary hardness of waste water sample.
5. Visit to solid/waste-water treatment plant.

BOOKS RECOMMENDED

1. Kumar, A., Environmental Biotechnology. Daya publishing house.
2. Bruce E. Rittmann, Perry L. McCarty, Environmental Biotechnology Principles and Applications, McGraw Hill.
3. Tchobanoglous, G., Franklin, B. and Stensel, H. D., Wastewater Engineering – Treatment, Disposal and Reuse, Tata McGraw Hill, New Delhi
4. De, A. K., Environmental Chemistry Wiley Eastern Ltd., New Delhi
5. Cutter, S. L., Environmental risks and Hazards. Prentice Hall.
6. Pathade, G. R. and Goel, P.K. (2003) Biotechnology in Environmental Management. ABD Publications.