

BACHELOR OF SCIENCE

6th SEMESTER

DISCIPLINE SPECIFIC ELECTIVES (DSEs)

BT620D2: BIO-TECHNOLOGY: ENVIRONMENTAL BIOTECHNOLOGY

CREDITS: THEORY – 4, PRACTICAL – 2(4+2)

OPTION-II

THEORY (4 CREDITS: 60 HOURS)

MAXIMUM MARKS: 60, MINIMUM MARKS: 24

Objective: The objective of this course is to familiarize the students with various problems concerning environment and their possible solutions employing the biotechnological approaches.

Unit–1 (15 HOURS)

Environment- basic concepts and issues; Pollution - types of pollutants, air, water and soil pollution; Global environmental problems – Green house effect, acid rain, ozone depletion, deforestation, desertification, salination, biodiversity loss.

Unit– 2(15 HOURS)

Water as a scarce natural resource; Sources and measurement of water pollution; Waste water treatment-physical, chemical and biological treatment processes; Microbiology of waste water treatments: Aerobic processes - activated sludge, oxidation ponds and ditches, trickling filter, towers, rotating discs and drums; Anaerobic processes - anaerobic digestion, anaerobic filters

Unit– 3(15 HOURS)

Solid waste and soil pollution management; Treatment and disposal of solid waste - Aerobic (composting and Vermiculture), Anaerobic treatment of solid waste and biogas generation.

Unit– 4(15 HOURS)

Bioremediation - principle and process; Bioremediation of contaminated soils, water and waste land, spilled hydrocarbons; Biodegradation of organic pollutants, pesticides and xenobiotics; Biopesticides; Biopollution; Macroplastics; Biomining

PRACTICALS (2 CREDITS: 60 HOURS)

MAXIMUM MARKS: 30, MINIMUM MARKS: 12

1. Collection, processing and storage of effluent samples
2. Determination of BOD/COD 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 samples.
5. Analysis of waste water/sludge for heavy metals.

BOOKS RECOMMENDED

1. Wastewater Engineering – Treatment, Disposal and Reuse, Tchobanoglous, G., Franklin, B. and Stensel, H. D- Tata McGraw Hill, New Delhi
2. Comprehensive Biotechnology, M.Moo-Young -Pergamon Press, Oxford
3. Environmental Chemistry De, A. K. - Wiley Eastern Ltd., New Delhi
4. Environmental Biotechnology, Kumar, A. -Daya publishing house.
5. Advances in industrial waste water treatment, Goel, P.K. - ABD Publishers.
6. Environmental risks and Hazards, Cutter, S. L. - Prentice Hall.
7. Biotechnology in Environmental Management, Pathade, G. R. and Goel, P.K - ABD Publications.

Expected Learning Outcomes:

1. Basic concept of Environmental pollution, its types, causes and treatment.
2. Understanding of global environmental issues and their mitigation.
3. Brief idea of bioremediation and biodegradation of organic pollutants.