B.Sc. Biotechnology: Semester-VI BST 605: Environmental Biotechnology	
Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	**Examination Scheme** Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Prerequisite: BST203 Microbiology, BST404 Genetics

Course Objectives:

After the completion of the subject the student will able to understand about the

1. To develop the basis knowledge of environment, ecology and ecolsystem.
2. To develop the basic knowledge of environmental pollution and serious effects on living organisms.
3. To develop the basic concept of the bioremediation and biorestoration.
4. To develop the basic information of the waste water treatments by conventional and advanced treatment technology.

Course Outcomes:

After completing the course, students will be able to:

CO1: Classify microbes according to energy source and carbon source and evaluate energy outcome of the energy metabolism according to electron acceptor and electron donor usage.

CO2: Apply Monods kinetics and basic chemostat theory to determine microbial growth rates, biomass yield, and substrate concentration and removal rate.

CO3: Carry out an experiment with nitrification in a continuous lab-scale bioreactor for ammonia removal.

CO4: Outline the principles of methods for quantification of organic carbon in wastewater and calculate the theoretical oxygen demand (ThOD) for simple organic compounds

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Detailed syllabus:

Unit-1 Introduction to Environment
Introduction to Environment: Concept of ecology and ecosystem, environmental pollution (Water, soil and air) noise and thermal pollution, their sources and effects. Environmental laws and policies. Bioremediation and Biorestoration: Reforestation through micropropagation, development of stress tolerant plants, use of mycorrhizae in reforestation, use of microbes for improving soil fertility, reforestation of soils contaminated with heavy metals.
Unit-2 Sewage and waste water treatments

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Sewage and waste water treatments anaerobic and aerobic treatment, conventional and advanced treatment technology, methanogenesis, methanogenic, acetogenic, and fermentative bacteria technical process and conditions, emerging biotechnological processes in waste-watertreatment.

Solid waste management: Landfills, composting, earthworm treatment, recycling and processing of organic residues. Biodegradation of xenobiotic compounds, organisms involved in degradation of chlorinated hydrocarbons, substituted simple aromatic compounds, polyaromatic hydrocarbons, pesticides, surfactants and microbial treatment of oil pollution.

Unit-3 Environmental Biotechnology

Environmental Biotechnology in Agriculture: Biofertilizers and microbial inoculants, biopesticide, bioinsecticides, bioherbicides Biofuel: Plant derived fuels, Energy crops, Biogas, Bioethanol, biohydrogen Environmental genetics: degradative plasmids, release of geneticallyengineered microbes in environment.

Text and Reference Books:

1. Environmental Biotechnology by Alan Scragg (1999); Longman.

2. An Introduction to Environmental Biotechnology by Milton Wainwright (1999): Kluwer Press.

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