B.Sc. III Year **Semester – V**

BIM -E501
DSE-5 ENVIRONMENTAL MICROBIOLOGY

MM : 100
Time : 3 hrs
L Credit
4 4
Total Hours: 60

Sessional : 30
ESE : 70
Pass Marks : 40

Learning objectives:

- To understand how micro organisms adapt to different environments and their interaction with different habitats and also the spread of microorganisms from the environment.
- To know different techniques of detection of water, air and soil microorganisms.
- To acquire knowledge of treating sewage and industrial water through different means.

Learning outcomes:

At the end of course student will be able to

- Isolate and identify pathogenic microorganism from air, soil and water habitat
- Characterize the waste water and also explain the method that can be utilized in wastewater treatment.

UNIT - I

Microorganisms in different habitats: brief account of heterogeneous group of microorganisms, different habitats such as soil, water, air; factors affecting microbial population in nature.

(10 Lectures)

UNIT - II

Water microbiology: type of water (atmospheric, surface and stored), parameters of aquatic environment (temperature, light, pressure, pH, turbidity and organic constituents); Microflora of aquatic environmental (freshwater and marine microbiology;deep sea-vent, volcano and soda lake.

(15 Lectures)

UNIT - III

Microbiology of domestic and waste water: sewage/waste water (physical, chemical and microbiological analysis), BOD and COD;Waste water treatment (primary, secondary and tertiary treatment).

(10 Lectures)

UNIT – IV

Solid waste management: solid waste processing (landfills, composting and anaerobic sludge digestion), Effect of solid waste on public health;Microbial pathogens in municipal solid waste;Regulation for disposal of biohazardous materials.

(12 Lectures)

UNIT - V

Bioremediation and Biodegradation: concept of bioremediation, types of bioremediation, Microbial degradation of Xenobiotics;Bioindicators of pollution.

(13 Lectures)

Suggested Reading

1. N.S. SubbaRao, Soil Microbiology, Science Publisher, ISBN: 9781578080700
2. Dubey, R.C. *Advanced Biotechnology*. S. Chand & Co. P Ltd, New Delhi, p. 1161; ISBN: 81:219-4290-X
3. P.D. Sharma, Microbiology, Rastogi Publication ISBN:978-8171339358
4. Dubey R.C. and Maheshwari, D.K. *A Textbook of Microbiology*. 3rd ed., S. Chand & Co, Ram Nagar, New Delhi, p. 1034. ISBN 81-219-2620-3

DSE 5 SEMESTER V / BIM-E551 (LAB COURSE CC-05)

1. Demonstration of the bacterial flora of the skin.
2. Estimation of urine bacteria by pour-plate method.
3. Isolation of microorganisms from gastrointestinal tract.
4. Isolation of microorganisms from upper respiratory tract.
5. Determination of quality of milk by MBRT (methylene blue reductase test).
6. Demonstration of microbial production of curd.
7. Microbial production of Asav/wine.
8. Determination of biological oxygen demand (BOD) of water.
9. Determination of chemical oxygen demand (COD) of water.
10. Water analysis for total bacterial population by standard plate count.
11. Sterility testing of injectables.
12. Microbial limit tests.
13. Bacterial examination of water by multiple-tube fermentation test or multiple tube tests.