B.Sc. III Year **Semester – V**

BIM -S502
SEC-3 MICROBIOLOGICAL ANALYSIS OF AIR AND WATER

MM : 100
Time : 3 hrs
L Credit
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Sessional : 30
ESE : 70
Pass Marks : 40

Total Hours: 60

Learning objectives:

- To understand how microorganisms adapt to different environments and their interaction with different habitat and also the spread of microorganism from the environment.
- To know different techniques of detection of microorganism from air,soil, and aquatic environment.
- To acquire knowledge of treating polluted water.

Learning outcomes:

At the end of course student will be able to

- Perform and demonstrate different methods used to determine the quality of water and air.
- Purify the household water through physical, chemical and biological method.

UNIT - I

Aeromicrobiology: Bioaerosols, Air borne microorganisms (bacteria, viruses, fungi) and their impact on human health and environment, significance in food and pharma industries and operation theatres, allergens. **(16 Lectures)**

UNIT - II

Air Sample Collection and Analysis: Bioaerosol sampling, air samplers, methods of analysis, CFU, culture media for bacteria and fungi, Identification characteristics. **(14 Lectures)**

UNIT - III

Control Measures: Fate of bioaerosols, inactivation mechanisms – UV light, HEPA filters, desiccation, Incineration. **(08 Lectures)**

UNIT - IV

Microbiological Analysis of Water: Sample Collection, Treatment and safety of drinking (potable) water, methods to detect potability of water samples: (a) standard qualitative procedure: presumptive/MPN tests, confirmed and completed tests for faecal coliforms (b) Membrane filter technique and (c) Presence/absence tests. **(16 Lectures)**

UNIT - V

Control Measures: Precipitation, chemical disinfection, filtration, high temperature, UV light. **(06 Lectures)**

Suggested Reading

1. N.S. SubbhaRao, 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

17.4.21

DSE 1/SEC 3 SEMESTER V BIM-E551(LAB COURSE)

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 microorganism 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 injectibles.
12. Microbial limit tests.
13. Bacterial examination of water by multiple-tube fermentation test or multiple tube tests.

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