

SEMESTER - V

Elective – I Applied Microbiology

Ins. Hrs. : 45

Sub. Code : 16BOUE501

Max. Marks : CIA 25; ESE -75

Credits : 4

Objectives: To install necessary skills on fermentation process, isolation, identification and production of microbes used in industry. To understand culture and application of microbes in Agriculture.

UNIT – I

9 Hrs.

Fermentation - Introduction – Substrates for industrial fermentation- Kinds of fermentation – Batch, Fed-Batch and Continuous culture- Fermentation media – Sterilization - methods of sterilization – physical and chemical sterilization- *Advantages*.

UNIT – II

9 Hrs.

Soil & Air Microbiology – Soil microbes – Algae, Fungi and Bacteria. Role of micro organism in soil fertility –Rhizosphere and Rhizoplane micro organisms –Mycorrhiza- Ecto and Endo- Air microbiology – Role of Microorganism in air- *Phylloplane micro flora*.

UNIT – III

9 Hrs.

Microbiology of water - Microorganism in water - Purification- *Determination of sanitary quality*. Microbiology of sewage and treatment – Primary- Secondary- Tertiary- Oxidation Pond -Reuse of water - Composting methods –*Organic matter decomposition* - Vermicomposting.

UNIT – IV

9 Hrs.

Food Microbiology - Composition of milk - Pasteurization - Dairy products – Production of cheese and Lactic acid- Microbial flora of fresh food - Microbial examination of foods – Food poisoning- *Botulism*.

UNIT – V

9 Hrs.

Industrial Microbiology - Manufacture of Ethanol – Streptomycin - Vitamin B₁₂ - *Glutamic acids* – Citric acid.

Note : Bold and *Italics* denote Self Study Topics

PRACTICALS :

1. Simple staining for study of Bacterial morphology
2. Gram's staining
3. Negative staining of Bacteria
4. Preparation of agar streak and agar slant
5. Sterilization Techniques
6. Preparation of culture media for bacteria and fungi
7. Enumeration of bacterial colonies from soil by serial dilution method
8. Antibacterial activity
9. Microbial flora of fresh food
10. Methylene blue reduction test (MBRT) for Milk.
11. Eosin Methylene blue agar test for Coliforms.

TEXT BOOKS:

1. **Casida, JR. L.E.**, “ *Industrial Microbiology*”, New Age International (P) Ltd. Publishers, New Delhi, Revised Edition, 2000.
2. **Dubey, R.C.**, “*A text book of Microbiology*”, S.Chand & Company Ltd, New Delhi, Third Edition, 2004.
3. **Power, C.B.**, “*Microbiology Vol II*”, Himalaya Publishing House, Nagpur, Second Edition, 1977.

REFERENCE BOOKS :

1. **Gerald Reed, Prescott and Dunn's**, “*Industrial Microbiology*”, CBS Publishers & Distributors, New Delhi, Fourth Edition, 1987.
2. **Lechtman, M.D.**, “*Microbiology*”, Macmillan Publishing Co. London, 1976.
3. **Pelzar, M.J., Reid, R.D and Chan, E.C.S**, “*Microbiology*”, Tata Mc Graw Hill, 1983.
5. **Prescott, A. and Dunns**, “*Industrial Microbiology*”, AVS Publishing, Revised Edition, 1983.
6. **Purohit, S.S.**, “*Microbiology Fundamentals & Applications*”, Mrs. Saraswathi Purohit for Student Edition, India, Sixth Edition, 2005.
7. **Dubey, R.C. & Maheswari, D. K.**, “*Practical Microbiology*”, S.Chand & Company Ltd, New Delhi, First Edition, 2002.
8. **Bisen, P.S. & Kavita Verma**, “*Handbook of Microbiology*” CBS Publishers & Distributors, New Delhi, First Edition, 1994.