

BP303T. PHARMACEUTICAL MICROBIOLOGY (Theory)

45 Hours

Course content:

Unit-I

10 Hours

Introduction, history of microbiology, its branches, scope and its importance.

Introduction to Prokaryotes and Eukaryotes.

Study of ultra-structure and morphological classification of bacteria, nutritional requirements, raw materials used for culture media and physical parameters for growth, growth curve, isolation and preservation methods for pure cultures, cultivation of anaerobes, quantitative measurement of bacterial growth (total & viable count).

Study of different types of phase contrast microscopy, dark field microscopy and electron microscopy.

Unit-II

10 Hours

Identification of bacteria using staining techniques (simple, Gram's & Acid-fast staining) and biochemical tests (IMViC).

Study of principle, procedure, merits, demerits and applications of physical, chemical gaseous, radiation and mechanical method of sterilization.

Evaluation of the efficiency of sterilization methods.

Equipments employed in large scale sterilization.

Sterility indicators.

Unit-III

10 Hours

Study of morphology, classification, reproduction/replication and cultivation of Fungi and Viruses.

Classification and mode of action of disinfectants.

Factors influencing disinfection, antiseptics and their evaluation.

For bacteriostatic and bactericidal actions.

Evaluation of bactericidal & Bacteriostatic.

Sterility testing of products (solids, liquids, ophthalmic and other sterile products) according to IP, BP and USP.

Unit-IV

08 Hours

Designing of aseptic area, laminar flow equipments; study of different sources of contamination in an aseptic area and methods of prevention, clean area classification.

Principles and methods of different microbiological assay.

Methods for standardization of antibiotics, vitamins and amino acids.

Assessment of a new antibiotic.

Unit-V**07Hours**

Types of spoilage, factors affecting the microbial spoilage of pharmaceutical products, sources and types of microbial contaminants, assessment of microbial contamination and spoilage.

Preservation of pharmaceutical products using antimicrobial agents, evaluation of microbial stability of formulations.

Growth of animal cells in culture, general procedure for cell culture, Primary, established and transformed cell cultures.

Application of cell cultures in pharmaceutical industry and research.

BP307P. PHARMACEUTICAL MICROBIOLOGY (Practical)

4 Hrs/week

1. Introduction and study of different equipment and processing, e.g., B.O.D. incubator, laminar flow, aseptic hood, autoclave, hot air sterilizer, deep freezer, refrigerator, microscopes used in experimental microbiology.
2. Sterilization of glassware, preparation and sterilization of media.
3. Sub culturing of bacteria and fungus. Nutrient stabs and slants preparations.
4. Staining methods- Simple, Grams staining and acid-fast staining (Demonstration with practical).
5. Isolation of pure culture of micro-organisms by multiple streak plate technique and other techniques.
6. Microbiological assay of antibiotics by cup plate method and other methods
7. Motility determination by Hanging drop method.
8. Sterility testing of pharmaceuticals.
9. Bacteriological analysis of water
10. Biochemical test.

Recommended Books (Latest edition)

- Pharmaceutical Microbiology by W.B. Hugo and A.D. Russel: Blackwell Scientific Publications, Oxford London.
- Industrial Microbiology by Prescott and Dunn., 4th edition, CBS Publishers & Distributors, Delhi.
- Microbiology by Pelczar and Chan Kreig, Tata McGraw Hill, New Delhi.
- Lippincott's Illustrated Reviews-Microbiology by Harvey, Champe and Fisher, Lippincott Williams and Wilkins, New Delhi.
- Principles and Practices of Contamination Control and Cleanrooms by C.K. Moorthy, Pharma Book Syndicate, Hyderabad.
- Pharmaceutical Microbiology by Malcolm Harris, Balliere Tindall and Cox., The Williams & Wilkins Co., NY.
- Fundamental Food Microbiology by Bibek Ray and Arun Bhunia, CRC Press, NY.
- Industrial Microbiology by Rose, Butterworths, USA.
- Fundamentals of Microbiology by Frobisher M., Hinsdill et al., 9th ed., Japan.
- Cooper and Gunn's Tutorial Pharmacy, CBS Publisher and Distribution.
- Microbial Technology by Pepler, Academic Press.
- I.P., B.P., U.S.P. - latest editions.
- Ananthnarayan and Paniker's Textbook of Microbiology, edited by C.K.J. Paniker, Orient-

Longman, Hyderabad.

- Fundamentals of Microbiology by Edward, Benjamin Cummings, USA.
- Pharmaceutical Microbiology by N.K. Jain, Vallabh Prakashan, Delhi.
- Bergey's Manual of Systematic Bacteriology, Williams and Wilkins, Philadelphia.
- Disinfection and Sterilization- Theory and Practice, General and Industrial Chemistry Series by Sykes G., E & F.N. Spon Ltd., London.
- General Microbiology by Stanier R.Y., Ingraham, J.L., Wheelis M.L., Painter P.R., Macmillan Press Limited, London.
- Microbiology: An Introduction by Tortora, G.J., Funke, B.R. and Case, C.L., Pearson India Education Services Pvt. Ltd., Noida.
- Pharmaceutical Dosage Forms: Parenteral Medications by Sandeep Nema, John D. Ludwig, Informa Healthcare.