BP605T. PHARMACEUTICAL BIOTECHNOLOGY (Theory)

45 Hours

Course content:

Unit-I **10 Hours**

Brief introduction to Biotechnology with reference to Pharmaceutical Sciences.
Enzyme Biotechnology- Methods of enzyme immobilization and applications.
Biosensors- Working and applications of biosensors in Pharmaceutical Industries.
Brief introduction to Protein Engineering.
Use of microbes in industry. Production of Enzymes- General consideration - Amylase, Catalase, Peroxidase, Lipase, Protease, Penicillinase.
Basic principles of genetic engineering.

Unit-II **10 Hours**

Study of cloning vectors, restriction endonucleases and DNA ligase.
Recombinant DNA technology. Application of genetic engineering in medicine.
Application of r DNA technology and genetic engineering in the production of:

i) Interferon
ii) Vaccines- hepatitis- B
iii) Hormones-Insulin.

Brief introduction to PCR.

Unit-III **10 Hours**

Types of immunity- humoral immunity, cellular immunity.
Structure of Immunoglobulins.
Structure and Function of MHC.
Hypersensitivity reactions, Immune stimulation and Immune suppressions.
General method of the preparation of bacterial infections, toxoids, viral vaccine, antitoxins, serum-immune blood derivatives and other products relative to immunity.
Storage conditions and stability of official vaccines.
Hybridoma technology- Production, Purification and Applications, Blood products and Plasma Substitutes.

Unit-IV **08 Hours**

Immuno-blotting techniques- ELISA, Western blotting, Southern blotting.
Genetic organization of Eukaryotes and Prokaryotes.
Microbial genetics including transformation, transduction, conjugation, plasmids and transposons.
Introduction to Microbial biotransformation and applications.
Mutation: Types of mutation/mutants.

Unit-V **07 Hours**

Fermentation methods and general requirements, study of media, equipments, sterilization methods, aeration process, stirring.

Large scale production fermenter design and its various controls.

Study of the production of - Penicillins, citric acid, Vitamin B12, Glutamic acid, Griseofulvin.

Blood Products: Collection, Processing and Storage of whole human blood, dried human plasma, plasma Substitutes.

Recommended Books (Latest edition):

- Molecular Biotechnology: Principles and Applications of Recombinant DNA by B.R. Glick and J.J. Pasternak, ASM Press Washington D.C.
- Kuby Immunology by R.A. Goldsby *et. al.*, W.H. Freeman and Company, NY.
- Biotechnology by U. Satyanarayan, Books and allied Pvt. Ltd., Kolkata.
- Industrial Microbiology by L.E. Casida Jr., New Age International Pub., New Delhi.
- Crueger's Biotechnology- A textbook of Industrial Microbiology by Crueger and Aneja, Medtech, New Delhi.
- Monoclonal Antibodies by J.W. Goding, Academic Press.
- Molecular Biology and Biotechnology by J.M. Walker and E.B. Gingold, Royal Society of Chemistry.
- Immobilized Enzymes by Zaborsky, CRC Press, Ohio.
- Molecular Biotechnology by S.B. Primrose, Blackwell Scientific Publication.
- Principles of Fermentation Technology by Stanbury F.P., Whitakar A., and Hall J.S., 2nd ed., Aditya books Ltd., New Delhi.
- Pharmaceutical Biotechnology: Concepts and Applications by G. Walsh, Wiley and Sons Pvt. Ltd., USA.
- Pharmaceutical Biotechnology: Biochemistry and Biotechnology by G. Walsh, Wiley and Sons Pvt. Ltd., USA.