

# Syllabus

## Module 01

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.

## Module 02

10 Hours

- Study of cloning vectors, restriction endonucleases and DNA ligase.
- Recombinant DNA technology. Application of genetic engineering in medicine.
- Application of rDNA technology and genetic engineering in the production of: i)
- Interferon ii) Vaccines- hepatitis- B iii) Hormones-Insulin.
- Brief introduction to PCR.

## Module 03

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 vaccines, 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.

## Module 04

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.

### **Module 05**

**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.