

Course Code	Course Title	Teaching Load			Marks		Exam (hrs)		Credits
		L	T	P	Int.	Ext.	Int.	Ext.	
BP605T	Pharmaceutical Biotechnology	3	1	-	25	75	1	3	4

Scope: Biotechnology has a long promise to revolutionize the biological sciences and technology. Scientific application of biotechnology in the field of genetic engineering, medicine and fermentation technology makes the subject interesting. Biotechnology is leading to new biological revolutions in diagnosis, prevention and cure of diseases, new and cheaper pharmaceutical drugs. Biotechnology has already produced transgenic crops and animals and the future promises lot more. It is a research-based subject.

Objectives: Upon completion of the subject, student shall be able to

1. Understanding the importance of Immobilized enzymes in Pharmaceutical Industries.
2. Genetic engineering applications in relation to production of pharmaceuticals.
3. Importance of Monoclonal antibodies in Industries.
4. Appreciate the use of microorganisms in fermentation technology.

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.

Recommended Books (Latest edition)

1. B.R. Glick and J.J. Pasternak: Molecular Biotechnology: Principles and Applications of RecombinantDNA: ASM Press Washington D.C.
2. RA Goldshy et. al.,: Kuby Immunology.
3. J.W. Goding: Monoclonal Antibodies.
4. J.M. Walker and E.B. Gingold: Molecular Biology and Biotechnology by Royal Society of Chemistry.
5. Zaborsky: Immobilized Enzymes, CRC Press, Degrand, Ohio.
6. S.B. Primrose: Molecular Biotechnology. Blackwell Scientific Publication.
7. Stanbury F., P., Whitakar A., and Hall J., S., Principles of fermentation technology, Aditya books Ltd., New Delhi.