LJ UNIVERSITY

LJ INSTITUTE OF PHARMACY

SEMESTER: V

Subject Name: Pharmaceutical Biotechnology
Subject Code: BP502TT

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.

Objectives: Upon completion of the course the 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

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	0	4	75	25	0	0

Sr. No.	Course Contents	Hours
1	**Introduction:** 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. **Protein Engineering:** Brief introduction to Protein Engineering. **Use of microbes in industry**: Production of Enzymes- General consideration -Amylase, Catalase, Peroxidase, Lipase, Protease, Penicillinase. **Genetic Engineering:** Basic principles of genetic engineering.	10
2	**Cloning vectors:** Study of cloning vectors, restriction endonucleases and DNA ligase. **Recombinant DNA technology**: Application of genetic engineering in medicine. **Application of r DNA technology**: Application of r DNA technology and genetic engineering in the production of:i) Interferon ii) Vaccines- hepatitis- B iii) Hormones- Insulin. **PCR**: Brief introduction to PCR	10
3	**Types of immunity**: Humoral immunity, cellular immunity **Structure of Immunoglobulins** **Structure and Function of MHC** Hypersensitivity reactions, Immune stimulation and Immune suppressions. **Vaccines:** 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	10

	Hybridoma technology: Production, Purification and Applications	
4	**Immuno blotting techniques**: ELISA, Western blotting, Southern blotting. **Genetic organization of Eukaryotes and Prokaryotes** **Microbial genetics:** Microbial genetics including transformation, transduction, conjugation, plasmids and transposons. **Introduction to Microbial biotransformation and applications.** **Mutation:** Types of mutation/mutants.	08
5	**Fermentation:** 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 Substituties	07
Total Hours		45

Recommended Books:

1. B.R. Glick and J.J. Pasternak: Molecular Biotechnology: Principles and Applications of Recombinant DNA: 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, Degraland, Ohio.
6. S.B. Primrose: Molecular Biotechnology (Second Edition) Blackwell Scientific Publication.
7. Stanbury F., P., Whitakar A., and Hall J., S., Principles of fermentation technology, 2nd edition, Aditya books Ltd., New Delhi