GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm

SEMESTER: VI

Subject Name: Pharmaceutical Microbiology & Biotechnology – II
Subject Code: 2260002

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Theory

Sr No	Course Contents	Total Hrs
1	**Introduction to microbial genetics** Mutation and its importance (Frame shift mutation and point mutation) Different mutagenic agents(Chemical, Physical, biological) Test to identify Mutants	05
2	**Genetic recombination:** • Transformation conjugation, transduction • Protoplast fusion, gene cloning and their applications, monoclonal antibodies and its application	06
3	Study of various drug produces by biotechnology e.g. Humulin, Human growth hormone, streptokinase, activase, monoclonal antibodies etc	02
4	**Analytical Microbiology:** • Sterility testing of Pharmaceuticals • Microbiological Assay of Antibiotics, Vitamins and Amino acids	07
5	**Immunology and Immunological Preparation:** • Immunity, primary and secondary defense mechanism, interferon • Principles of immunology, antigen antibody reactions and application, • Preparations, Standardization and storage of vaccines & toxoids diphtheria, tetanus toxoid,cholera, pertussis, plaque, BCG, rabies, polio, measles, typhoid, brief introduction to new generation vaccines-hepatitis, AIDS, Malaria, brief study of sera. • Various diagnostic tests based on immunological principle (widal, ELISA, various blotting techniques, tuberculin test, schick test)	12
6	**Blood Products and Plasma Substitutes:** Collection, processing and storage of whole human blood, concentrated human RBCs, dried human plasma, human fibrinogen, human thrombin, human normal immunoglobulin, human fibrin, foam plasma substitutes, -ideal requirements, PVP, dextran etc. for control of blood pressure as per I.P.;	04
7	**Fermentation :**	09

	a. Historical development of antibiotics, b. methods used for their standardization, Screening of soil for organisms producing antibiotics, c. Fermenter, its design, control of different parameters, fermentation process. d. Media, Sterilization (fermenter, media, air, etc.) I e. Detailed production of I) selected antibiotics: penicillins, streptomycins, tetracyclines II) vitamin B 12, Riboflavin III) others: citric acid, alcohol. f. Isolation and recovery of fermentation products	

PRACTICAL – 22600P2

1.	Microbiological assay of antibiotics vitamins and Amino acids
2.	Sterility testing of various pharmaceutical preparations
3.	Preparation and Standardization of vaccines
4.	Preparation of mutant • Gradient plate method • Velvet replicate method
5.	Design of fermentor
6.	Study of shake flask technique
7.	Production of alcohol using Bakers yeast
8.	Extraction of citric acid from fermented mass
9.	Preparation of anticoagulant solutions, coagulant foam/sheet

References Books:

1. Textbook of microbiology by Tortora.
2. Pharmaceutical microbiology, sixth edn, edited by W. B. Hugo and A. D. Rusell Blackwell science
3. Crommelin, Daan J.A., Pharmaceutical Biotechnology : An Introduction for Pharmacists, and Pharmaceutical Scientists, 2nded. London : Routledge, 2002
4. Bergeys manual of systematic bacteriology, Williams and Wilkins- A Waverly company
5. El-Mansi, Mansi, Fermentation Microbiology and Biotechnology, New York : Taylor & Francis, 2003
6. Prescott and Dunn., Industrial Microbiology, 4th edition, CBS Publishers & Distributors, Delhi
7. Principles of fermentation tehchnology. Second edn. P. F. Stanbury, A. Whiteshaker and S. J. Hall Aditya Books Pvt Ltd. New Delhi.
8. Microbiology, Pelczar/Chan Kreig Tata McGraw Hill edn
9. Industrial microbiology L.E. Casida, Jr. New age international publishers
10. Fundamental principles of bacteriology. A. J. Sale, Tata McGraw Hill publishing company Ltd.
11. Remington Pharmaceutical Science, latest edn
12. I.P., B. P., USP
13. Stanbury F., P., Whitakar A., and Hall J., S., Principles of fermentation technology, 2nd edition, Aditya books Ltd., New Delhi