

GUJARAT TECHNOLOGICAL UNIVERSITY

Pharm.D. 2nd year

Subject Name: Pharmaceutical Microbiology

Subject Code: 828802

Theory (3 Hours/ Week, Total: 90 Hours)

Teaching Scheme (Hours)				Evaluation Scheme (Marks)				Total Marks
Theory	Tutorial	Practical	Total	Theory		Practical		
				External	Internal	External	Internal	
3	1	3	7	70	30	70	30	200

Sr. No.	Course Contents	Hours	Module Weightage
1	Introduction to the science of microbiology. Major divisions of microbial world and Relationship among them.	5	6%
2	Different methods of classification of microbes and study of Bacteria, Fungi, virus, Rickettsiae, Spirochetes.	5	6%
3	Nutritional requirements, growth and cultivation of bacteria and virus. Study of different important media required for the growth of aerobic and anaerobic bacteria & fungi. Differential media, enriched media and selective media, maintenance of lab cultures.	10	11%
4	Different methods used in isolation and identification of bacteria with emphasis to different staining techniques and biochemical reactions. Counting of bacteria -Total and Viable counting techniques.	10	11%
5	Detailed study of different methods of sterilization including their merits and demerits. Sterilization methods for all pharmaceutical products. Detailed study of sterility testing of different pharmaceutical preparations. Brief information on Validation.	10	11%
6	Disinfectants- Study of disinfectants, antiseptics, fungicidal and virucidal agents factors affecting their activation and mechanism of action. Evaluation of bactericidal, bacteristatic, virucidal activities, evaluation of preservatives in pharmaceutical preparations.	12	13%
7	Immunology- Immunity, Definition, Classification, General principles of natural immunity, Phagocytosis, acquired immunity (active and passive). Antigens, chemical nature of antigens structure and formation of Antibodies, Antigen-Antibody reactions. Bacterial exotoxins and endotoxins. Significance of toxoids in active immunity, Immunization programme, and importance of booster dose.	14	16%
8	Diagnostic tests: Schick's Test, Elisa test, Western Blot test, Southern Blot PCR Widal, QBC, Mantoux Peripheral smear. Study of malarial parasite.	8	9%
9	Microbial culture sensitivity Testing: Interpretation of results Principles and methods of different microbiological assays,	8	9%

	microbiological assay of Penicillin, Streptomycin and vitamin B ₂ and B ₁₂ . Standardization of vaccines and sera.		
10	Study of infectious diseases: Typhoid, Tuberculosis, Malaria, Cholera, Hepatitis, Meningitis, Syphilis & Gonorrhoea and HIV.	8	9%

Course Materials:

Text books (Theory)

- Vanitha Kale and Kishor Bhusari — Applied Microbiology | Himalaya Publishing house Mumbai.
- Mary Louis Turgeon — Immunology and Serology in Laboratory Medicines | 2nd edition, 1996 Mosby- Year book inc St. Louis Missouri 63146.
- Harsh Mohan, — Text book of Pathology | 3rd edition, 1998, B-3 Ansari road Darya ganj N. Delhi.

Reference books (Theory)

- Prescot L.M., Jarley G.P Klein D.A — Microbiology | 2nd- edition Mc Graw Hill Company Inc
- Rawlins E.A. | Bentley's Text Book of Pharmaceutics | B ailliere Tindals 24-28 London 1988
- Forbisher — Fundamentals of Microbiology | Philidelphia W.B. Saunders.
- Prescott L.M. Jarley G.P., Klein.D.A. — Microbiology. | 2nd edition WMC Brown Publishers, Oxford. 1993
- War Roitt, Jonathan Brostoff, David male, — Immunology | 3rd edition 1996, Mosby-year book Europe Ltd, London.
- Pharmacopoeia of India, Govt of India, 1996.

Pharm.D. 2nd year Pharmaceutical Microbiology

Practical (3 Hours/ Week, Total: 90 Hours)

Sr. No.	Experiments
1	Study of apparatus used in experimental microbiology*.
2	Sterilisation of glass ware's. Preparation of media and sterilisation.*
3	Staining techniques – Simple staining ; Gram's staining ; Negative staining**
4	Study of motility characters*.
5	Enumeration of micro-organisms (Total and Viable)*
6	Study of the methods of isolation of pure culture.*
7	Bio chemical testing for the identification of micro*-organisms.
8	Cultural sensitivity testing for some micro-organisms.*
9	Sterility testing for powders and liquids.*
10	Determination of minimum inhibitory concentration.*

11	Microbiological assay of antibiotics by cup plate method.*
12	Microbiological assay of vitamins by Turbidometric method**
13	Determination of RWC.**
14	Diagnostic tests for some common diseases, widal, malarial parasite.**

* Indicate minor experiment & ** indicate major experiment

Assignments:

1. Visit to some pathological laboratories & study the activities and equipment/instruments used and reporting the same.
2. Visit to milk dairies (Pasteurization) and microbial laboratories (other sterilization methods) & study the activities and equipment/instruments used and reporting the same.
3. Library assignments
 - a. Report of recent microbial techniques developed in diagnosing some common diseases.
 - b. Latest advancement developed in identifying, cultivating & handling of microorganisms.

Format of the assignment:

1. Minimum & Maximum number of pages.
2. It shall be computer draft copy.
3. Reference(s) shall be included at the end.
4. Name and signature of the student.
5. Assignment can be a combined presentation at the end of the academic year.
6. Time allocated for presentation may be 8+2 Min.

Scheme of Practical Examination

	Internal/ Sessional	External
Synopsis	05	15
Major Experiment	10	25
Minor Experiment	03	15
Viva	02	15
Max. marks	20	70
Duration	3 hours	4 hours

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance)