Chitkara College of Pharmacy
Chitkara University, Rajpura, Punjab
Chandigarh–Patiala National Highway, Punjab – 140 401, India

Institute/School Name	Chitkara College of Pharmacy		
Department Name	Pharmacy		
Programme Name	B. Pharmacy		
Course Name	Pharmaceutical Microbiology	**Session**	July-Dec 25
Course Code	BP-303T	**Semester/Batch**	3rd /2024
L-T (Per Week)	3-1	**Course Credits**	4
Pre-requisite	Basic Knowledge of Plant cell, animal cell and basic sterilization techniques	**NHEQF Level**	5.5
Course Coordinator	Dr. Diksha Sharma/ Dr. Prakram Singh Chauhan		
SDG	3, 4		

Objectives of the Course:

- This Subject imparts basic knowledge and detailed description of the wide range of ecological habitats of microorganisms in nature.
- Identify methods used in the identification of organisms involved in diseases and disease treatment and prevention.
- The student shall understand the role microorganisms play in medicine, biotechnology and other industries, like wine and baking, that are important to human well-being.
- Upon completion of the course student shall be able to learn and understand the structure of prokaryotic and eukaryotic microorganisms, human infectious diseases, pure culture techniques, methods of staining, biochemical identification of microorganisms and sterilization methods.

Course Outcomes (COs)

Students should be able to:

	COs	**Program Outcomes (PO)**	**NHEQF Level Descriptor**	**No. of Lectures**
CO01	Students will be able to acquire, articulate, retain and apply specialized language and knowledge relevant to microbiology.	PO01, PO03	Q1	11
CO02	Acquire and demonstrate competency in laboratory safety and in routine and specialized microbiological laboratory skills applicable to microbiological research or clinical methods, including accurately reporting observations and analysis.	PO01, PO02	Q2	18
CO03	Communicate scientific concepts, experimental results and analytical arguments clearly and concisely, both verbally and in writing.	PO01, PO02	Q3	14
CO04	Students will demonstrate isolation of and identification of microbes.	PO01, PO04	Q2	9
CO05	To design microbiology laboratory considering all the aspects of safety	PO01, PO06	Q2	14
CO06	Acquire knowledge about validating the microbiological equipment and reporting the observations	PO01	Q1	7
Total Contact Hours				**73**

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	Type of Assessment's
CO01	3		3									Summative/Formative
CO02	3	3										Summative/Formative
CO03	2	2										Summative/Formative
CO04	2			2								Summative/Formative
CO05	3					3						Summative/Formative
CO06	3											Summative/Formative

3=High, 2=Medium, 1=Low

Recommended Books:

B01: N.K. Jain: Pharmaceutical Microbiology, Second Edition, Vallabh Prakashan, Delhi
B02: Prescott and Dunn., Industrial Microbiology, 4th edition, CBS Publishers and Distributors, Delhi.
B03: N.K. Jain: Pharmaceutical Microbiology, Third Edition, Vallabh Prakashan, Delhi
B04: Pelczar, Chan Kreig, Microbiology, Tata McGraw Hill edn.
B05: Ashutosh Kar. New Age International, 2008 - Pharmaceutical microbiology

Other readings and relevant websites:

Serial No	Link of Journals, Magazines, websites and Research Papers
1.	www.pubmed.com
2.	www.sciencedirect.com
3.	www.googlescholar.com
4.	https://parisjc.libguides.com/c.php?g=761522&p=5460578
5.	https://open.oregonstate.education/generalmicrobiology/

Lecture Plan

Lec no.	Topic	Book no, Ch no, page no.	TLM	ALM	Web References	Audio - video
1-2	Introduction of microbiology, History of Microbiology	**B01**, CH 1, Page no 1-7	Lecture and discussion, Active Learning	Group Discussion		
2-3	History of Microbiology, Branches scope and introduction of microbiology	**B02**, CH 1, Page no 1-16	Lecture, Active Learning	Group Discussion		
4-6	Ultra structure of bacteria and morphological classification of bacteria	**B01**, CH 4, Page no 47-55	Lecture, Active Learning	Group Discussion		
6-7	Nutritional requirement for bacterial growth and raw material used for culture media preparation	**B01**, CH-4, Page no 55-58, 33-36	Lecture, Active Learning	Group Discussion		

8-9	Physical parameters used for bacterial growth and Bacterial growth curve	**B01**, CH-4, Page No. 58-61	Lecture, Active Learning	Group Discussion		
10-11	Isolation and Preservation method for pure culture, Cultivation of Anaerobes	**B03**, CH 4, Page no 72-74	Lecture, Active Learning	Group Discussion		
12-15	Quantitative measurement of bacterial growth	**B03**, CH 4, Page no 74-76	Lecture, Active Learning	Group Discussion		
	Microscopy: Dark field, Phase contrast and Electron microscopy	**B01**- CH-3, Page no-26-30	Lecture, Active Learning	Group Discussion		
16-18	Staining Techniques: Simple, Gram's, Acid Fast and IMViC tests	**B01,** CH-3, Page **No.**-30-32	Discussion, Inductive Teaching and learning	Group Discussion, Statement-Opinion-Summary		
19-20	Sterilization techniques: physical, chemical, radiation and mechanical	**B01**, CH-8, Page No.-95-113	Discussion, Inductive Teaching and learning	Statement-Opinion-Summary		
21-24	Evaluation of efficiency of sterilization, Equipment's employed for sterilization, Sterility Indicators	**B02**, CH-7, Page No.-154-161	Discussion, Inductive Teaching and learning	Group Discussion		
25-26	Classification and mode of action of disinfectants	**B01**, CH-9, Page No. 114-126	Lecture, Active Learning	Group Discussion		
26-27	Factors influencing disinfection, antiseptics and their evaluation.	**B01**, CH-9, Page No.126-129	Lecture, Active Learning	Group Discussion		
28-33	Evaluation of Bactericidal and bacteriostatic, Sterility testing of products (solid, liquid, ophthalmic)	**B01**, CH-9, Page No. 122-126	Lecture, Active Learning	Group Discussion		
34-41	Morphology, Classification, reproduction, cultivation of fungi and virus	**B01**, CH-5,6, Page No.;52-82	Discussion, Inductive Teaching and learning	Group Discussion		
42	Designing of Aseptic area,	**B03**, CH-10, Page No.-171-177	Lecture, Active Learning	Group Discussion		
43	Laminar Air flow introduction and its equipment.	**B03**, CH-10, Page No.- 185-187	Lecture, Active Learning	Group Discussion		

44-45	Different sources of contamination, methods of prevention of aseptic area through contamination, Clean Air Classification	**B03**, CH-10, Page No. – 177-184	Lecture, Active Learning	Group Discussion		
46-54	Principles and methods of different microbiological assays: Antibiotics, vitamins, amino acids	**B03**, CH-17, Page No.-401-412	Lecture, Inductive teaching and learning	Group Discussion		
55	Assessment of a new antibiotic	**B03**, CH-17, Page No.-398-400	Lecture, Active Learning	Group Discussion		
56-60	Types of spoilage, factors, sources of contaminants	**B03**, CH-21, Page No:439-450	Lecture, Active Learning	Group Discussion, Statement-Opinion-Summary		
61	Preservation of pharmaceutical products, evaluation of microbial stability	**B03**, CH-21, Page No:451-453	Lecture, Active Learning	Group Discussion		
62-73	Growth of animal cells, procedure for cell cultures, application of cell cultures in pharmaceutical industry and research.	**B03**, CH-3, Page No. 54-62.	Lecture, discussion, Active Learning	Group Discussion, Statement-Opinion		

Teacher in-charge Assistant Dean Dean