INSTITUTE	**FACULTY OF SCIENCE**
PROGRAM	**MASTER OF SCIENCE (MICROBIOLOGY)**
SEMESTER	**3**
COURSE TITLE	**PHARMACEUTICAL MICROBIOLOGY**
COURSE CODE	**02MB0507**
COURSE CREDITS	**4**

Objective:

1 Introduce students to the synthesis, classification, and mode of action of antibiotics and antimicrobial agents, along with regulatory guidelines for pharmaceutical production and safety.

Course Outcomes: After completion of this course, student will be able to:

1 Comprehend the principles of antibiotic classification and gain knowledge of both synthetic and natural antimicrobial drugs.

2 Examine the mechanisms of action of antibiotics and evaluate microbial resistance to antimicrobial therapies.

3 Implement microbial contamination control measures, preservative strategies, and disinfectant validation techniques to ensure product safety and stability.

4 Interpret regulatory guidelines for quality assurance and control of microbial contaminants in pharmaceuticals, ensuring compliance with FDA, WHO, and Indian Pharmacopeia standards.

Pre-requisite of course:NA

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
4	0	0	50	30	20	0	0

Contents : Unit	Topics	Contact Hours
1	**Antibiotics and Synthetic antimicrobial agents** Antibiotics- ß-lactam, aminoglycosides, tetracyclines, macrolides Antifungal antibiotics - Griseofulvin Antiviral drugs: Amantidines; Nucleoside analogues, Interferons, Peptide antibiotics Synthetic antibiotics - Sulphonamides; Chloramphenicol; Quinolone.	15
2	**Mechanism of Action of Antibiotics** Inhibition of cell wall synthesis, Nucleic acid and Protein synthesis. Mode of Action of chemical antimicrobial agents. Study of resistance of microbes to antimicrobial agents.	15

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Contents : Unit	Topics	Contact Hours
3	**Microbial contamination and control** Microbiological Contamination: Product recalls; microbial limit standards. Preservation of microbial product: Type of Preservatives. The test methods for evaluation of formulations such as Preservative Efficacy Testing and Stability of Drugs & Stability Testing. Microbiological control: Risk Assessment, Disinfectants: Factors in Choice and Use of Disinfectants. Qualification of Disinfectants Test Methods and Validation of disinfectants.	15
4	**Regulatory Aspects of Pharmaceuticals** Quality assurance and Quality control of microbial contaminants in pharmaceutical industries with respect to FDA and WHO (GMP and GLP). Their maintenance and requirement criteria as per Indian Pharmacopeia.	15
Total Hours		**60**

Textbook :

1 Essential Microbiology for pharmacy and pharmaceutical science, Geoffrey Hanlon and Norman Hodges, Wiley Blackwell, 2013

2 Pharmaceutical Biotechnology, S. P. Vyas & V. K. Dixit., CBS Publishers & Distributors, 2003

3 Drug Carriers in biology & Medicine, Gregory Gregoriadis, Academic Press, 2001

References:

1 Pharmaceutical Microbiology, Pharmaceutical Microbiology, Hugo, WB and Russell, Blackwell Science, Oxford, UK., 2003

2 Textbook of Drug Design and Discovery,, Textbook of Drug Design and Discovery,, Krogsgaard L, Lilijefors T. and Madsen, U., Taylor and Francis, London., 2004

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation

Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
5.00	10.00	30.00	30.00	20.00	5.00

Instructional Method:

1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, etc.

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Instructional Method:

2 The internal evaluation will be done on the basis of continuous evaluation of students in the class-room in the form of attendance, assignments, verbal interactions etc.

3 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.

Supplementary Resources:

1 https://onlinecourses.nptel.ac.in/noc19_bt23/preview

2 https://onlinecourses.nptel.ac.in/noc23_cy58/preview

3 https://onlinecourses.nptel.ac.in/noc25_bt38/preview

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