



Established Under Gujarat Private Universities Act No. 9 of 2016

Syllabus for Master of Science

Microbiology

Subject Code: 02MB0504

Subject Name: Pharmaceutical Microbiology

M. Sc. Semester - III

Objective: Application of Microbes in production of pharmaceutically active compounds.

Credits Earned: 6 Credits

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

- Identify different antimicrobial agents and it's mode of action.
- Process involved in Drug discovery and development
- Regulatory guidelines in pharmaceuticals product.

Pre-requisite of course: N.A.

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	Mid Sem (M)	Internal (I)	Viva (V)	Practical (PR)	
4	0	4	6	50	30	20	25	25	150

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Contents:

Unit	Topics	Contact Hours
1	Antibiotics and Synthetic antimicrobial agents Mechanism of action; microbial resistance; therapeutic, prophylactic usage and adverse reactions; Antibiotic and Synthetic antimicrobial agents: β -lactam, aminoglycosides, tetracyclines, macrolides. Antifungal antibiotics: Griseofulvin; Antiviral drugs: Amantidines; Nucleoside analogues, Interferons, Peptide antibiotics. Synthetic antibiotics: Sulphonamides; Chloramphenicol; Quinolone.	17
2	Mechanism of action of antibiotics Inhibition of cell wall synthesis; nucleic acid and protein synthesis. Bacterial resistance to antibiotics; Penetration of antimicrobial agents (cellular permeability barrier, cellular transport system and drug diffusion). Mode of action of non-antibiotic antimicrobial agents; Mode of action of bacterial killing by quinolinones; Bacterial resistance to quionolinones; Molecular principles of drug targeting; Drug delivery system in gene therapy.	17
3	Drug Discovery and Development Microbial, Recombinant, Biochemical and Molecular level screening systems and their construction/ design strategies. Conventional Process; Bio-prospecting. Search of database/data mining for Drug designing; Preclinical and Clinical trials; Estimation of toxicity: LD50 and ED50; Rational Drug Design – Principle (Structure activity relationship -SAR) and Tools (applications of High through Put Screening, Combinatorial synthesis, Pharmaco-genomics).	16
4	Regulatory aspects in pharmaceuticals Introduction to pharmacopoeia; FDA regulation and IP, BP, USP; Reimbursement of drugs and biological; legislative perspectives; GMP in pharmaceuticals; Quality control through WHO; ICH process.	10
	Total Hours	60



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References:

1. Hugo, WB and Russell, AD. *Pharmaceutical Microbiology*, (2003). Blackwell Science, Oxford, UK.
2. Krogsgaard L, Lilijefors T. and Madsen, U. *Textbook of Drug Design and Discovery*, (2004). Taylor and Francis, London.
3. Geoffrey Hanlon and Norman Hodges. *Essential Microbiology for pharmacy and pharmaceutical science*. (2013). Wiley Blackwell.
4. S. P. Vyas & V. K. Dixit. *Pharmaceutical Biotechnology*. (2003) CBS Publishers & Distributors, New Delhi.
5. Bhatia R and Ichhpujani RL. *Quality Assurance in Microbiology*. (1995). CBS Publishers, New Delhi.
6. Gregory Gregoriadis. *Drug Carriers in biology & Medicine*. (2001). Academic Press New York.
7. Davis, B. D., Dulbecco, R, Eisen, H. N., Ginsberg, R. S. *Microbiology*. (1990). Harper and Row Publishers, Singapore.

Instructional Method:

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

List of Practicals

Microbial Examination of Non-Sterile Products

Bacterial Endotoxin Testing by Gel Clot Method

Test for Confirmation of Labeled LAL Reagent Sensitivity (LAL Test)

Antibiotic Potency Testing

Bioburden Estimation for Medical Devices

Determination of D value, Z value for heat sterilization in pharmaceuticals.

Spectrophotometric / Microbiological methods for the determination of Griesofulvin

Prediction of binding site of macromolecules using MED-suMo software.



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