

Semester	JAN 2022
Open to semester	6,8,12,14,22
Course code	BI3254/BI6254
Course title	Microbiology
Credits	4 /4
Course Coordinator & participating faculty (if any)	Sunish Radhakrishnan*, Gayathri Pananghat
Nature of Course	Lectures
Pre-requisites	None
Objectives (goals, type of students for whom useful, outcome etc)	To give an insightful overview of microbial biology, with more emphasis on prokaryotes. Since the principles of genetics, molecular biology, physiology, population biology are covered in other courses this course will focus on what is unique to microbial systems.
Course contents (details of topics /sections with no. of lectures for each)	<p>Microbiology (4 Credits, 42 lectures)</p> <ol style="list-style-type: none"> 1. Microbial characterization: diversity, nutrition, and growth in Bacteria and Fungi. (2) 2. Microbial Physiology: Structure of microbes (2) 3. Microbial Physiology: Bacterial growth and culturing-bacterial growth kinetics, di-auxy, auxotrophy, prototrophy, media and culture requirements (3) 4. Microbial development: Division (6) 5. Viruses and Prions: Introduction, general characteristics, viruses of Bacteria and Archea. (3) 6. Gene regulation (Bacteriophage life cycle-cro cI, two component systems) (3) 7. Bacterial genetics-conjugation, transformation, transduction, transposons (6) 8. CRISPR-Cas and RM system (2) 9. Practical aspects of bacterial genetics -targeted knockouts (variations for essential genes etc), mapping, complementation, phage based genetics (3) 10. Overview of bacterial development in the perspective of E.coli, Bacillus, Caulobacter; Sporulation, organelle (flagella, chemosensory apparatus etc) development (7) 11. Microbial Pathogenesis: Types, mode of infection with examples from Pseudomonas aeruginosa, Yersinia pestis and Mycobacterium tuberculosis. Antimicrobial agents and their

	<p>mode of action. (4)</p> <p>12. Cell-Cell communication in microbes. (1)</p> <p>13. Applied Microbiology: Biodegradation, Bioremediation, Fermentation, use of bacteria in recombinant protein production. (2)</p>
Evaluation /assessment	<p>End-Sem Examination-35%</p> <p>Mid-Sem Examination-35%</p> <p>Others-30 (Assignments/Quiz/Presentations)%</p>
Suggested readings (with full list of authors, publisher, year, edn etc.)	<p>i) Tortora GJ, Funke BR and Case CL (2004) Microbiology: An Introduction. 8th Edition. Pearson Education.</p> <p>ii) Nancy Trun, Janine Trempy, Basic Bacterial Genetics, Blackwell Publishers, 2004</p> <p>ii) Moat AG, Foster JW, Spector MP (2006) Microbial physiology, 4th edition, John Wiley & Sons.</p> <p>iii) Flint SJ, Enquist LW, Racaniello VR, Skalka AM (2008) Principles of Virology (Volume I), 3rd Edition.</p> <p>vi) The Genetic Switch by Mark Ptashne (2001), Cold Spring Harbor Limited</p> <p>vII) Relevant research articles and reviews suggested in class.</p>