

Details of course: -

Course Title	Course Structure			Pre-Requisite
	L	T	P	
Microbiology (BT 206)	3	0	2	

Course Objective:

To impart basic knowledge of all classes of micro-organisms namely, bacteria, viruses, algae, fungi and protozoa and also methods of sterilization and culturing of microbes. The course also aims to give a broad overview of the applications of microbiology in our present world.

Course Outcome (CO):

- 1 Elucidating the discovery of the microbial world and illustrating the methods of microbial culture and enrichment techniques, and analyzing characteristics of viruses
- 2 Demonstrate the Prokaryotic Structure and Function. Understand the methods of controlling undesirable microorganisms and Bacterial Inactivation kinetics.
- 3 Summarize Microbial Nutrition and Growth, mathematical expression of growth, Analyze culture for the utilization of Biomass yield.
- 4 Demonstrate the Microbial Taxonomy, nomenclature and Bergey's manual
- 5 Compare and contrast Host–Pathogen interactions; Pathogenicity islands and their role in bacterial virulence

S.No.	Content	Contact Hours
Unit 1	Introduction and Methods in Microbiology: Discovery of the microbial world, controversy over spontaneous generation, principles of microbial nutrition, Culture media, Theory and practice of sterilization, pure culture techniques, Enrichment culture techniques for isolation of different microorganism, culture collection and maintenance of cultures..	8
Unit 2	Prokaryotic Structure and Function: functional anatomy of bacteria: cell envelope, cell wall, cytoplasmic membrane, capsule, surface appendages, cytoplasm and cytoplasmic inclusions. Methods of Controlling Undesirable Microorganisms, Disinfectant Decay and Bacterial Inactivation kinetics	8
Unit 3	Microbial Nutrition and Growth: The definition of growth, mathematical expression of growth, growth curve, measurement of growth and growth yields, synchronous growth, continuous culture, growth as affected by environmental factors like temperature, acidity, alkalinity, water availability and oxygen, Chemolithotrophy; nitrate and sulfate reduction; methanogenesis and acetogenesis. Fermentation diversity, syntropy, role of anoxic decompositions. Nitrogen metabolism; nitrogen fixation; antimicrobial agents, sulfa drugs, antibiotics – penicillins and cephalosporins, broad spectrum antibiotics.	9
Unit 4	Microbial Taxonomy: New approaches to bacterial taxonomy, classification including ribotyping, ribosomal RNA sequencing, characteristics of primary domains, taxonomy, nomenclature and Bergey's manual	8
Unit 5	Host-parasite Relationship: Normal microflora of skin, oral cavity, gastrointestinal tract; entry of pathogens into the host, colonization factors predisposing to infections, types of toxins (exo-, endo-, entero-)	9

	<p>and their structure, mode of actions, vigilance and pathogenesis. Plant – Microbe Interactions</p> <p>Microbial Pathogenesis: Disease reservoirs; Epidemiological terminologies; Infectious disease transmission; Respiratory infections caused by bacteria and viruses, Tuberculosis; Sexually transmitted disease including AIDS, Disease transmitted by animals (rabies and plague) and insects and ticks (rickettsias and malaria); Food and waterborne diseases; pathogenic fungi, emerging and resurgent infectious diseases; Viruses, viroids, and prions; Microbial control of pathogenesis.</p>	
Total		42

Books:-

S.No.	Name of Books/ Author/Publisher
1.	Microbiology by M.J. Pelczar, E.C.S. Chan and N.R. Kreig. Publisher: Tata McGraw Hill (2005)
2.	Microbiology by Bernard D. Davis, Renato Dulbecco, Herman N. Eisen and Harold S. Ginsberg. Publisher: Lippincott Williams & Wilkins (1990)
3.	Brock Biology of Microorganisms by M.T. Madigan, J.M. Martinko and J. Parker. Publisher: Prentice-Hall, Inc (1997)
4.	General microbiology by R.Y. Stanier, J.L. Ingraham, M.L. Wheelis and P.R. Painter. Publisher: Macmillan (1987)
5.	Microbiology by Prescott Harley and Kliein. Publisher: Mc Graw Hill (2007)

Details of course:-

Course Title	Course Structure			Pre-Requisite
	L	T	P	
Advances in computational biology (BT 208)	3	0	2	

Course Objective: The course advances in computational biology integrates genetics and genetics with recent advancement in the field, including personalized medicine, soft computation in biological sciences. The course also integrates laboratory skills necessary for implementation of research ideas