

Course Code	COURSE TITLE	L	T	P	C
1151BT103	Microbiology	3	0	0	3

- Course Category : *Program Core*
- a. Preamble : *This course introduces the Biotechnology student to the concepts and techniques used in Microbiology*
- b. Prerequisite Courses : *Biology for Engineers*
- c. Related Courses : *Basic concepts of Biotechnology*
- d. Course Outcomes : *Upon the successful completion of the course, students will be able to:*

CO Nos.	Course Outcomes	Knowledge Level (Based on revised Bloom's Taxonomy)
CO1	To understand the basic history, importance and scope of microbiology and the basic methods.	K2
CO2	Appreciate the diversity of different micro-organisms with their corresponding life cycles	K3
CO3	Enable to understand culture techniques for growing different micro-organisms	K3
CO4	Understand principles of Sterilization, Disinfection and control methods	K3
CO5	Appreciate Industrial and Environmental applications of Microbiology	K3

COs		PROGRAMME OUTCOMES											
		1	2	3	4	5	6	7	8	9	10	11	12
CO1	To understand the basic history, importance and scope of microbiology and the basic methods.	H	M	L	L	L	H	L	L	H	M	L	H
CO2	Appreciate the diversity of different micro-organisms with their corresponding life cycles	L	H	L	L	L	H	L	L	L	L	H	M
CO3	Enable to understand culture techniques for growing different micro-organisms	L	M	L	H	H	L	L	L	L	L	L	M
CO4	Understand principles of Sterilization, Disinfection and	M	L	H	L	L	H	H	L	L	L	L	L

	control methods													
CO5	Appreciate Industrial and Environmental applications of Microbiology	H	L	L	H			H	M	L	L	L	L	H

e. Course Content:

UNIT I: INTRODUCTION TO MICROBIOLOGY

History of Microbiology, Basics of Microbial existence, Classification, Nomenclature and Identification of microorganisms, Microscopic examination of microorganisms, light, electron microscopy, different staining methods such as gram staining, acid fast staining, capsular staining, flagellar staining, fungal staining, cultivation of bacteria, reproduction and growth.

UNIT II: MICROBIAL STRUCTURE AND ORGANIZATION

Structure and multiplication of bacteria, viruses, algae, fungi. Special mention of life history of Actinomycetes, Yeast, Mycoplasma, Bacteriophage (Lytic, Lysogeny cycle).

UNIT III: MICROBIAL NUTRITION, GROWTH AND METABOLISM

Nutritional requirements of bacteria, different media used for bacterial culture, growth curve, different methods to quantitative bacterial growth, pure culture techniques (spread plate, streak plate), preservation methods. Aerobic and anaerobic bioenergetics, utilization of energy for biosynthesis of important molecules.

UNIT IV: CONTROL OF MICROORGANISMS

Methods of Sterilization and Disinfection – Physical and Chemical – host-microbe interactions, Anti-bacterial, anti-fungal, anti-viral agents, mode of action and resistance to antibiotics, Microbial diseases of nervous system, digestive system, respiratory system, urinary and reproductive system.

UNIT V: INDUSTRIAL AND ENVIRONMENTAL MICROBIOLOGY

Introduction to Industrial Microbiology, primary and secondary metabolites, their applications, production of penicillin, alcohol, vitamin B12, Environmental Microbiology and Microbial ecology, Biogas, Microbial leaching of mineral ores, Biofertilizers, Biopesticides, Bioremediation, pollution control and Biosensors.

TEXT BOOKS

1. Ananthanarayan and Paniker's Textbook of Microbiology Tenth edition with booklet Paperback – Jun 2017 by Reba Kanungo (Author)
2. Talaron K, Talaron A, Casita, Pelczar and Reid. Foundations in Microbiology, W.C.Brown Publishers, 1993.
3. Pelczar MJ, Chan ECS and Krein NR, Microbiology, Tata McGraw Hill Edition, NewDelhi, India.

REFERENCE BOOKS:

1. Prescott, Dunn, Industrial Microbiology, Agrobios (India).2006
2. Murrey Moo & Young, Comprehensive Biotechnology, Pergamon.2007
3. Ratledge& Kristiansen, Basic Biotechnology, IInd edition,; Cambridge University press. 2004.