

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
Department of Biochemistry
Course Curriculum

PART- A: Introduction			
Program: Bachelor in Science (Honors / Honors with Research)		Semester - VII	Session: 2024-2025
1	Course Code	BCSE - 07 T	
2	Course Title	Microbial Biochemistry	
3	Course Type	Discipline Specific Elective (Theory)	
4	Pre-requisite (if, any)	As per the Program	
5	Course Learning Outcomes (CLO)	<p><i>On successful completion of the course, the student shall be able to:</i></p> <ul style="list-style-type: none"> ➤ Explain the structure of bacteria and their microscopic examinations. ➤ Analyze the types bacterial toxins and the toxicology. ➤ Apply the knowledge of fermentation technology in production of antibiotics, enzymes etc. ➤ Apply the knowledge of enzyme technology in enzymes-based production in industry. 	
6	Credit Value	3 Credits	<i>Credit = 15 Hours - learning & Observation</i>
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40
PART -B: Content of the Course			
Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)			
Unit	Topics (Course contents)		No. of Period
I	FUNGI: General characteristics of fungi, classification of fungi, life cycle of selected fungal genus (Aspergillus, Pencillium, Fusarium and Mucor). Economic importance of fungi. Fungi and bioremediation, parasitism, mutualism and symbiosis with plants and animals. Heterothallism, sex hormone in fungi, Mycorrhiza, VAM. Algae: Distribution, classification, reproduction, ecology and importance.		12
II	BACTERIA: Morphology and ultra structure of bacteria, morphological types, cell wall of archaeobacteria, gram negative, gram positive eubacteria, eukaryotes. Cell membranes – structure, composition and properties. Structure and function of flagella, cilia, pili, gas vesicles. Cyanobacteria, protozoa, mycoplasma and Rickettsia. Gene transfer mechanisms, transformation, transduction, conjugation and transfection. Plasmids F: factors colicins and col factors, plasmids as a vector for gene cloning.		11
III	NUTRITION IN MICROORGANISM: Nutritional types (autotrophs, heterotrophs, phototrophs, chemotrophs), growth curves, measurement of growth, factors affecting growth, generation time, growth kinetics. Batch and continuous culture, asynchronous, synchronous culture. Basis of microbial classification, classification and salient feature of bacteria according to Bergey's manual of determinative bacteriology, cyanobacteria, prochlorons and cyanelles.		11
IV	VIRUSES: Structure and classification of viruses; morphology and ultra-structure; capsids and their arrangements, types of envelopes, viral genome, their types and structure, virus related agents (viroids, prions). General feature of virus reproductions, early events in virus multiplication, virus restriction and modification of host, virus mRNA. General overview of bacterial viruses, RNA and DNA bacteriophages (MS2, ϕ X174, M13, T3, T4). Lysogeny and Lytic phase. General account of plant and animal viruses (TMV, HIV and other oncogenic virus, Hepatitis virus).		11
Keywords		Fungi, Bacteria, Virus, nutrition, Infection, Disease	

Name and Signature of Convener & Members of CBoS:

PART-C: Learning Resources		
Text Books, Reference Books and Others		
<i>Text Books Recommended –</i>		
<ul style="list-style-type: none"> ➤ Microbiology L.M. Prescott, J.P. Harley and D.A. Klein ➤ General Microbiology RY Stanier, J L Ingrahamana, ML Wheelis& P. R. Painter ➤ Principles of Microbiology R.M. Atlas 		
PART -D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks: 100 Marks		
Continuous Internal Assessment (CIA): 30 Marks		
End Semester Exam (ESE): 70 Marks		
Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 20 +20 Assignment / Seminar - 10 Total Marks - 30	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
End Semester Exam (ESE):	Two section – A & B Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4= 20 Marks Section B: Descriptive answer type qts., 1out of 2 from each unit-4x10=40 Marks	

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1	Course Code	BCSE - 07 P	
2	Course Title	Microbial Biochemistry	
3	Course Type	Discipline Specific Elective (Practical)	
4	Pre-requisite (if, any)	As per the Program	
5	Course Learning Outcomes (CLO)	<i>On successful completion of the course, the student shall be able to:</i> <ul style="list-style-type: none"> ➤ Demonstrate the techniques of pure culture of bacteria or fungi. ➤ Interpret the motility of the microbes. ➤ Interpret the biochemical activities of microbes by various tests. ➤ Understand about the impact of antibiotics on microbial survival. 	
6	Credit Value	1 Credits	<i>Credit =30 Hours Laboratory or Field learning/Training</i>
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20
PART -B: Content of the Course			
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)			
Module	Topics (Course contents)		No. of Period
Lab./Field Training/ Experiment Contents of Course	<ul style="list-style-type: none"> ➤ Glassware preparation and sterilization techniques- wet heat- dry heat- ➤ Filter types- laminar flow chamber types- CDC- safety levels. ➤ Preparation of liquid & solid media, plating, pouring, inoculation and incubation for growth of microorganism ➤ Methods of obtaining pure culture of microorganisms (a) streak plate (b) Pour plate, and (c) spread plate methods ➤ Microscopic examination of the microorganisms, identification and staining methods ➤ Study of bacterial growth by turbidimetry / spectrophotometry ➤ Biomass measurement for fungi ➤ Isolation and enumeration of microorganisms from soil by serial dilution agar plating method. ➤ Enumeration of viruses by plaque assay technique. ➤ Motility of bacteria by hanging drop technique. 		30
Keywords	Sterlization, Growth, identification		


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PART -D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks:		50 Marks
Continuous Internal Assessment (CIA):		15 Marks
End Semester Exam (ESE):		35 Marks
Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 10 & 10 Assignment/Seminar +Attendance - 05 Total Marks - 15	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
End Semester Exam (ESE):	Laboratory / Field Skill Performance: On spot Assessment Performed the Task based on lab. work - 20 Marks Spotting based on tools & technology (written) – 10 Marks Viva-voce (based on principle/technology) - 05 Marks	Managed by Course teacher as per lab. status

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