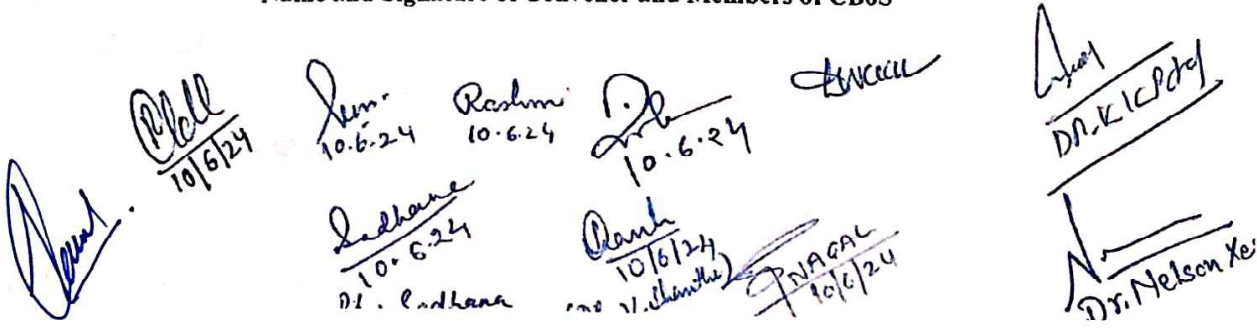


FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF MICROBIOLOGY
COURSE CURRICULUM

PART – A: Introduction			
Program: Bachelor in Life Science (Certificate/Diploma/Degree/Honors)		Semester - I	
		Session: 2024-25	
1	Course Code	MBSC- 01 T	
2	Course Title	Introductory Microbiology and Microbial techniques	
3	Course Type	DSC	
4	Prerequisite (If Any)	As per program	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to – <ul style="list-style-type: none"> ➤ relate the development and scope of Microbiology ➤ illustrate the contributions made by prominent scientists including Indian Vedic Knowledge on microbiology ➤ demonstrate the nomenclature and characteristics of different types of microorganisms ➤ identify the basic techniques in microbiology ➤ explain the methods of microbial control 	
6	Credit Value	03 Credits	Credit = 15 Hours - Learning & Observation
7	Total Marks	Max. Marks: 100	Minimum 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	History and scope of microbiology – History, development and Scope of Microbiology, Golden era of microbiology, Contributions of Anton von Leeuwenhoek, Louis Pasteur, Robert Koch, Alexander Fleming and Edward Jenner, The Forgotten Past of Microbiology in Indian Vedic Knowledge.		12
II	Systems of classification – Binomial nomenclature, principles of microbial classification, Whittaker’s five kingdom and Carl Woese’s three domain classification systems and their utility, Major groups of microorganisms; General features and structure of bacteria, virus, fungi, algae and protozoa.		11
III	Microbial culture and staining techniques – Obtaining pure culture by streaking, serial dilution and plating; types of culture media, maintenance and preservation/stocking of pure cultures; cultivation of anaerobic bacteria, cultivation of fungi, actinomycetes and algae. Principle, procedure and applications of Simple staining, negative staining; Differential staining- Gram’s staining, acid fast staining.		11
IV	Microbial control – Sterilization: Physical Agents - Heat: Boiling, Tyndallization, Steam under pressure (Autoclave), incineration, hot air Oven. Radiations: Ionizing and non-ionizing radiations. Filtration, Chemical agents - Disinfection, Antiseptic, Germicide, Sanitizer, Principle and application of Laminar airflow, Biological agents - Antibiotics		11
Key Words		History and scope, Nomenclature, Pure culture technique, Microbial control	

Name and Signature of Convener and Members of CBoS



 [Signatures and dates: 10/6/24, 10.6.24, 10.6.24, 10.6.24, 10/6/24, 10/6/24, 10/6/24, 10/6/24, 10/6/24, 10/6/24]

Part – C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

1. Microbiology: P. D. Sharma, Rastogi Publications.
2. A textbook of Microbiology: R. C. Dubey and Maheshwari, S Chand publications.
3. General Microbiology, Vol. II, C. B. Powar and Dagainawala
4. Fundamentals of Microbiology and Immunology, Ajit Kr. Banerjee and Nirmalya Banerji, Central publication.

Reference Books:

1. Microbiology: Pelczar, MJ Chan ECS and Krieg NR, McGraw-Hill.
2. Microbiology: 5th Edition Prescott, M.J., Harley, J.P. and Klein, D.A. WCB Mc Graw Hill, New York.
3. Microbiology: An Introduction: Pearson Education Tortora, G.J., Funke, B.R. and Case, C.L., Singapore.
4. Fundamentals of Microbiology: VI Edition Alcomo, I.E., Jones and Bartlett Publishers. Sudbury. Massachusetts, (2001).

Online Resources – e-Resources/ e-Books and e- learning portals

- <https://www.jsscacs.edu.in/sites/default/files/Department%20Files/History%20of%20Microbiology.pdf>
- <https://www.britannica.com/science/microbiology>
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7810802/>
- <https://www.slideshare.net/HarinathaReddyA/methods-for-isolation-of-pure-culture>
- <https://microbenotes-com.webpkgcache.com/doc/-s/microbenotes.com/sterilization-physical-and-chemical-methods/>

Part – D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks


Continuous Internal Assessment (CIA): 30 Marks

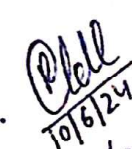
End Semester Exam (ESE): 70 Marks

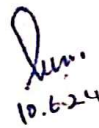
Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz – (2): 20+20	Better marks out of the two Test/ Quiz + obtained marks in Assignment shall be considered against 30 Marks
	Assignment/ Seminar – 10	
	Total Marks – 30	


End Semester Exam (ESE):	Two Section – A & B Section A: Q1. Objective 10 X 1 = 10 Mark; Q2. Short answer type – 5X4= 20 Marks Section B: Descriptive answer type qts., 1 out of 2 from each unit – 4X10 = 40 Marks
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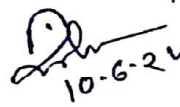
Name and Signature of Convener and Members of CBoS



Dr. Sachin Chaudhary
10/6/24



Dr. V. Venkatesh
10/6/24

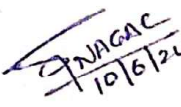

Dr. Rashmi
10.6.24

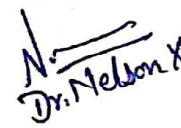

Dr. Rashmi
10-6-24


Dr. Sachin Chaudhary
10-6-24


Dr. Sachin Chaudhary


Dr. Sachin Chaudhary


Dr. Sachin Chaudhary
10/6/24


Dr. Sachin Chaudhary

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF MICROBIOLOGY
COURSE CURRICULUM

PART – A: Introduction		
Program: Bachelor in Life Science (Certificate/Diploma/Degree/Honors)		Semester I
		Session: 2024-25
1	Course Code	MBSC- 01 P
2	Course Title	Lab. Course – MBSC-01
3	Course Type	Laboratory Course
4	Prerequisite (If Any)	As per program
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to – > define the basic laboratory practices and safety measures > explain the principle, working and applications of Instruments > select the proper culture media for microbial growth > identify different microorganisms in the laboratory
6	Credit Value	1 Credit Credit = 30 Hours. Laboratory or Field learning/ Training
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	1. Good Laboratory Practices and Bio-safety in Microbiology. 2. To study the principle and applications of autoclave, incubator, BOD incubator, hot air oven, laminar air flow, light microscope. 3. Preparation of culture media (liquid & solid), sterilization and assessment of sterility 4. Isolation of microorganisms from environment by pour plate, streak plate and spread plate technique. 5. Observation of microorganisms - cyanobacteria, protozoa, fungi, yeasts and algae from natural habitats. 6. Observation of bacteria by Gram staining technique. 7. Study of common fungi, algae and protozoan using temporary / permanent mounts.	30

PART – C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Experiments in microbiology, plant pathology and biotechnology: K R Aneja
- Practical microbiology: R C Dubey and D K Maheshwari.

Online Resources:

- <https://www.youtube.com/watch?v=HndcMvuEXs>
- <https://www.youtube.com/watch?v=CbMGr9wFV2y>

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 A. Performed the Task based on lab. work – 20 Marks B. Spotting based on tools & technology (written) - 10 Marks C. Viva-voce (based on principle/ technology) – 05 Marks	Managed by course teacher as per lab. status

Name and Signature of Convener and Members of CBoS

Convener: [Signature] 10.6.24
 Members: [Signatures] 10.6.24, [Signature] 10.6.24, [Signature] 10.6.24, [Signature] 10.6.24, [Signature] 10.6.24, [Signature] 10.6.24, [Signature] 10.6.24

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF MICROBIOLOGY
COURSE CURRICULUM



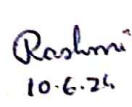

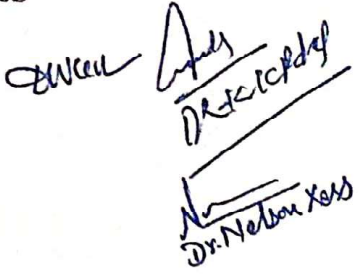

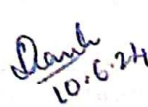
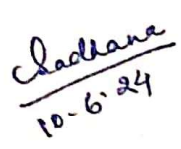

PART – A: Introduction			
Program: Bachelor in Life Science (Certificate/Diploma/Degree/Honors)		Semester - II	
		Session: 2024-25	
1	Course Code	MBSC-02 T	
2	Course Title	Bacteriology, Virology and Protozoology	
3	Course Type	DSC	
4	Prerequisite (If Any)	As per program	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to – <ul style="list-style-type: none"> ➤ recall the ultrastructure of bacteria ➤ relate ecological distribution of microorganism and their significances for society ➤ illustrate the essential and current knowledge of bacteria ➤ identify virus, protozoa and archaeobacteria with their special characteristics ➤ outline the beneficial & harmful behavior of viruses, bacteria, protozoan and other microbes 	
6	Credit Value	03 Credits	Credit = 15 Hours - Learning & Observation
7	Total Marks	Max. Marks: 100	Minimum Passing marks: 40
PART – B: Content of the Course			
Total No. of Teaching-Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)			
UNIT	TOPIC (Course Contents)		No. of Period
I	Morphology and Ultra structure of Bacteria: Cell size, shape and arrangements. Composition, structure and function of cell membrane, cell wall of gram-positive, gram-negative bacteria, capsule, flagella, pili, ribosomes, inclusions, nucleoid, plasmids. Structure and stages of spore formation.		12
II	Gram negative, positive bacteria & Archaeobacteria: Gram negative and positive bacteria; characteristics and examples - Gram negative (non-proteobacteria– <i>Deinococcus</i> , <i>Spirochetes</i> . Alpha proteobacteria, <i>Rhizobium</i> , <i>Agrobacterium</i> . Gamma proteo-bacteria– <i>Escherichia</i> , <i>Pseudomonas</i>). Gram positive low G+C; <i>Bacillus</i> , <i>Clostridium</i> , <i>Staphylococcus</i> . High G+C: <i>Streptomyces</i> , <i>Frankia</i> . General characteristics, Ecological significance and economic importance of Archaea: Methanogens, thermophiles (<i>Thermococcus</i> , <i>pyrococcus</i> , <i>thermoplasma</i>) and halophiles (halobacteria and halococcus).		11
III	Morphology, ultrastructure, Classification & multiplication of viruses: General introduction, morphology and ultra- structure of viruses, capsid, envelopes. Types of Viral genome. Viral related forms -virions, viroids, virusoids, and prions. Classification of viruses. Salient features and life cycle of viruses: Bacteriophages (T4 & Lambda), Plant (TMV & CMV), Animal (Adenovirus & Pox virus).		11
IV	Introduction to protozoa; Occurrence and classification of protozoa. Structure, reproduction, life cycle and diseases caused by important protozoans - <i>Entamoeba</i> , <i>Giardia</i> , <i>Leishmania</i> , <i>Trypanosoma</i> and <i>Plasmodium</i>		11
Key Words		Bacteria, Archaea, Virus, Bacteriophage, Prions, Protozoan	

Name and Signature of Convener and Members of CBoS

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Part – C: Learning Resources		
Text Books, Reference Books and Others		
Text Books Recommended:		
<ol style="list-style-type: none"> 1. General Microbiology; Vol I & II, Powar C.B. and Dagainawala H. L., Himalay Pub. House, Bombay. 2. A Text Book of Microbiology; Dubey & Maheshwari. 3. A Text Book of Microbiology; R. P. Singh. 4. Fundamentals of Microbiology and Immunology, Ajit Kr. Banerjee and Nirmalya Banerji, Central publication. 5. Parasitology; H.S. Singh and P. Rastogi, First Edition, Rastogi Publications. 		
Reference Books:		
<ol style="list-style-type: none"> 6. Prescott's Microbiology. Wiley J M, Sherwood L M and Woolverton C J. 7. Microbiology. Pelczar M J, Chan E C S and Krieg N R. 8. General Microbiology. Stanier R Y, Ingraham J L, Wheelis M L, and Painter P R. 9. Microbiology: An Introduction. Tortora G J, Funke B R and Case C L. 		
Online Resources – e-Resources/ e-Books and e- learning portals		
<ul style="list-style-type: none"> • https://www.ncbi.nlm.nih.gov/books/NBK8477/ • https://www.britannica.com/science/archaea • https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7150055/ • https://nios.ac.in/media/documents/dmlt/Microbiology/Lesson-53.pdf • http://ecoursesonline.iasri.res.in/Courses/Agricultural%20Microbiology/ 		
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 X 1 = 10 Mark; Q2. Short answer type – 5X4= 20 Marks Section B: Descriptive answer type qts., 1 out of 2 from each unit – 4X10 = 40 Marks	

Name and Signature of Convener and Members of CBoS

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FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF MICROBIOLOGY
COURSE CURRICULUM

PART – A: Introduction		
Program: Bachelor in Life Science (Certificate/Diploma/Degree/Honors)		Semester - II
		Session: 2024-25
1	Course Code	MBSC-02 P
2	Course Title	Lab. Course – MBSC-02
3	Course Type	Laboratory Course
4	Prerequisite (If Any)	As per program
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to – <ul style="list-style-type: none"> ➤ culture microorganisms and get the knowledge about their morphological features ➤ illustrate different staining procedures ➤ identify bacteria and protozoa from different samples ➤ get practice of identification of colonies on different culture media
6	Credit Value	1 Credit Credit = 30 Hours. Laboratory or Field learning/ Training
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	1. Isolation and characterization of bacteria by colony characteristics. 2. Growth on simple media – Nutrient agar and Nutrient broth 3. Growth on complex media – Blood agar, Chocolate agar, Maconkey's, and EMB agar. 4. Differential Staining Techniques: Gram staining and acid-fast staining 5. Special Staining Techniques: Negative staining and Endospore staining 6. Study of cytopathic effects of viruses using photographs. 7. Observation of protozoa from different samples.	30
Key Words	Isolation, Identification, Staining Techniques, Cytopathic effects, Protozoa	
PART – C: Learning Resources		
Text Books, Reference Books and Others		
Text Books Recommended:		
1. Laboratory Manual of Microbiology and Biotechnology: Aneja K. R. 2. Practical Microbiology: R. C. Dubey and D. K. Maheshwari. 3. Laboratory Manual in Microbiology: P. Gunasekaran.		
Online Resources:		
<ul style="list-style-type: none"> • https://books.google.co.in/books?id=Wh9OTbjcsfUC&printsec=age&q&f=false 		
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 A. Performed the Task based on lab. work – 20 Marks B. Spotting based on tools & technology (written) – 10 Marks C. Viva-voce (based on principle/ technology) – 05 Marks	Managed by course teacher as per lab. status

Name and Signature of Convener and Members of CBoS