
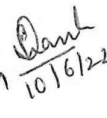
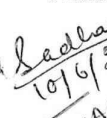
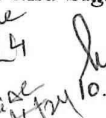
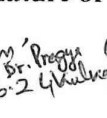
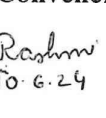
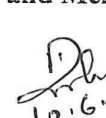
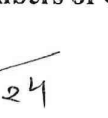





**FOUR YEAR UNDERGRADUATE PROGRAM (NEP 2020)**  
**PROGRAM: BACHELOR OF SCIENCE (2024-28)**  
**DISCIPLINE: MICROBIOLOGY**  
**Session: 2024-25**

DSC- 01 to 08		DSE- 01 to 12		DGE- 01 to 02			
MBSC- 01 T	Introductory Microbiology and Microbial Techniques	MBSE- 01 T	Microbial Enzyme Technology	MBGE- 01 T	Introductory Microbiology and Microbial Techniques		
MBSC- 01 P	Lab Course	MBSE- 01 P	Lab Course	MBGE- 01 P	Lab Course		
MBSC- 02 T	Bacteriology, Virology and Protozoology	MBSE- 02 T	Industrial Microbiology	MBGE- 02	Bacteriology, Virology and Protozoology		
MBSC- 02 P	Lab Course	MBSE- 02 P	Lab Course	MBGE- 02 P	Lab Course		
MBSC- 03 T	Cell Biology and Biochemistry	MBSE- 03 T	Food and Dairy Microbiology				
MBSC- 03 P	Lab Course	MBSE- 03 P	Lab Course				
MBSC- 04 T	Bioinstrumentation and Biostatistics	MBSE- 04 T	Microbial Biotechnology				
MBSC- 04 P	Lab Course	MBSE- 04 P	Lab Course				
MBSC- 05 T	Microbial Physiology and Metabolism	MBSE- 05 T	Medical Microbiology				
MBSC- 05 P	Lab Course	MBSE- 05 P	Lab Course				
MBSC- 06 T	Molecular Biology and Microbial Genetics	MBSE- 06 T	Mycology and Plant Pathology			MBSEC- 01	Mushroom Cultivation
MBSC- 06 P	Lab Course	MBSE- 06 P	Lab Course				
MBSC- 07 T	Immunology	MBSE- 07 T	Agriculture and Veterinary Microbiology	VAC			
MBSC- 07 P	Lab Course	MBSE- 07 P	Lab Course				
MBSC- 08 T	Environmental Microbiology and Microbial Ecology	MBSE- 08 T	Fermentation Technology	MBVAC- 01	Microbes and Human Health		
MBSC- 08 P	Lab Course	MBSE- 08 P	Lab Course				
		MBSE- 09 T	Clinical Microbiology				
		MBSE- 09 P	Lab Course				
		MBSE- 10 T	Pharmaceutical Microbiology				
		MBSE- 10 P	Lab Course				
		MBSE- 11 T	Metagenomics, Basic Computer and Bioinformatics				
		MBSE- 11 P	Lab Course				
		MBSE- 12 T	Biosafety and Intellectual Property Rights				
		MBSE- 12 P	Lab Course				

Name and Signature of Convener and Members of CBoS

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

<b>PART – A: Introduction</b>			
<b>Program: Bachelor in Life Science (Certificate/Diploma/Degree/Honors)</b>		<b>Semester - I</b>	
		<b>Session: 2024-25</b>	
<b>1</b>	<b>Course Code</b>	MBSC- 01 T	
<b>2</b>	<b>Course Title</b>	Introductory Microbiology and Microbial techniques	
<b>3</b>	<b>Course Type</b>	DSC	
<b>4</b>	<b>Prerequisite (If Any)</b>	As per program	
<b>5</b>	<b>Course Learning Outcomes (CLO)</b>	<b>At the end of this course, the students will be able to –</b> <ul style="list-style-type: none"> <li>➤ relate the development and scope of Microbiology</li> <li>➤ illustrate the contributions made by prominent scientists including Indian Vedic Knowledge on microbiology</li> <li>➤ demonstrate the nomenclature and characteristics of different types of microorganisms</li> <li>➤ identify the basic techniques in microbiology</li> <li>➤ explain the methods of microbial control</li> </ul>	
<b>6</b>	<b>Credit Value</b>	<b>03 Credits</b>	<b>Credit = 15 Hours - Learning &amp; Observation</b>
<b>7</b>	<b>Total Marks</b>	<b>Max. Marks: 100</b>	<b>Minimum Passing marks: 40</b>
<b>PART – B: Content of the Course</b>			
<b>Total No. of Teaching-Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)</b>			
<b>Unit</b>	<b>Topics (Course contents)</b>		<b>No. of Period</b>
<b>I</b>	<b>History and scope of microbiology</b> – 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.		<b>12</b>
<b>II</b>	<b>Systems of classification</b> – 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.		<b>11</b>
<b>III</b>	<b>Microbial culture and staining techniques</b> – 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.		<b>11</b>
<b>IV</b>	<b>Microbial control</b> – 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		<b>11</b>
<b>Key Words</b>		<b>History and scope, Nomenclature, Pure culture technique, Microbial control</b>	

Name and Signature of Convener and Members of CBoS

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*Rashmi*  
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*Sadhana*  
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Dr. Sadhana  
Taiswal

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P. NAGAL  
10/6/24

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Dr. Nelson Xe

## 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 Daginawala
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 Alcom, 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


<b>Continuous Internal Assessment (CIA):</b> (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	


<b>End Semester Exam (ESE):</b>	<b>Two Section – A &amp; B</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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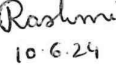
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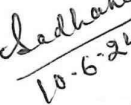
  
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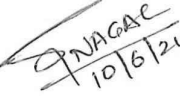
  
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Dr. Sadhana  
Jaiswal

  
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Dr. Nelson Xe

  
Dr. Nelson Xe

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

<b>PART – A: Introduction</b>	
<b>Program: Bachelor in Life Science</b> (Certificate/Diploma/Degree/Honors)	<b>Semester I</b>
<b>1</b>	<b>Course Code</b> MBSC- 01 P
<b>2</b>	<b>Course Title</b> Lab. Course – MBSC-01
<b>3</b>	<b>Course Type</b> Laboratory Course
<b>4</b>	<b>Prerequisite (If Any)</b> As per program
<b>5</b>	<b>Course Learning Outcomes (CLO)</b> At the end of this course, the students will be able to – <ul style="list-style-type: none"> <li>➤ define the basic laboratory practices and safety measures</li> <li>➤ explain the principle, working and applications of Instruments</li> <li>➤ select the proper culture media for microbial growth</li> <li>➤ identify different microorganisms in the laboratory</li> </ul>
<b>6</b>	<b>Credit Value</b> 1 Credit <i>Credit = 30 Hours. Laboratory or Field learning/ Training</i>
<b>7</b>	<b>Total Marks</b> 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
<b>Lab./ Field Training/ Experiment contents of Course</b>	<ol style="list-style-type: none"> <li>1. Good Laboratory Practices and Bio-safety in Microbiology.</li> <li>2. To study the principle and applications of autoclave, incubator, BOD incubator, hot air oven, laminar air flow, light microscope.</li> <li>3. Preparation of culture media (liquid &amp; solid), sterilization and assessment of sterility</li> <li>4. Isolation of microorganisms from environment by pour plate, streak plate and spread plate technique.</li> <li>5. Observation of microorganisms - cyanobacteria, protozoa, fungi, yeasts and algae from natural habitats.</li> <li>6. Observation of bacteria by Gram staining technique.</li> <li>7. Study of common fungi, algae and protozoan using temporary / permanent mounts.</li> </ol>	<b>30</b>

**PART – C: Learning Resources**

<b>Text Books, Reference Books and Others</b>
<b>Text Books Recommended:</b> <ol style="list-style-type: none"> <li>1. Experiments in microbiology, plant pathology and biotechnology: K R Aneja</li> <li>2. Practical microbiology: R C Dubey and D K Maheshwari.</li> </ol>
<b>Online Resources:</b> <ul style="list-style-type: none"> <li>• <a href="https://www.youtube.com/watch?v=HIndcMyuEXs">https://www.youtube.com/watch?v=HIndcMyuEXs</a></li> <li>• <a href="https://www.youtube.com/watch?v=CbMGr9wFV2w">https://www.youtube.com/watch?v=CbMGr9wFV2w</a></li> </ul>

**PART – D: Assessment and Evaluation**

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

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