



**Gyanmanjari**  
Innovative University

Course Syllabus  
Gyanmanjari Science College  
Semester-1(B.Sc.)

**Subject :** Introduction to Microbial World-BSCMB11301

**Type of course:** Major

**Prerequisite:** Basic knowledge of Microbiology.

**Rationale:** This course has been designed to make the students know about basic principles of Microbiology. The students learn history, microscopy types of bacteria and techniques to study organisms.

**Teaching and Examination Scheme:**

Teaching Scheme			Credits C	Examination Marks					Total Marks
CI	T	P		SEE		CCE			
				Theory	Practical	MSE	LWA/V	ALA	
3	0	2	4	75	25	30	20	50	200

*Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; SEE - Semester End Evaluation; MSE- Mid Semester Examination; LWA - Lab Work Assessment; V – Viva voice; CCE-Continuous and Comprehensive Evaluation; ALA- Active Learning Activities*

3 Credits \* 25 Marks = 75 Marks (each credit carries 25 Marks) Theory

1 Credits \* 25 Marks = 25 Marks (each credit carries 25 Marks) Practical

SEE 100 Marks will be converted in to 50 Marks

CCE 100 Marks will be converted in to 50 Marks

It is compulsory to pass in each individual component.



**Continuous Assessment:**

Sr. No	Active Learning Activities	Marks
1	<b>Test</b> Faculty will conduct the particular chapter test that will be arranged in the class and marks will be uploaded to the Moodle.	10
2	<b>Poster Making</b> Students need to prepare a poster in group of two on the theme assigned by faculty and upload on Moodle.	10
3	<b>Analysis</b> Faculty will assign scientific pictures and students will analyze and prepare a report in 100 words and upload it to Moodle.	10
4	<b>Quiz</b> Faculty will conduct quiz sessions in the classroom per unit of their respective subject and marks will be uploaded to the Moodle.	10
5	<b>Attendance</b>	10
Total		50

**Course Content:**

Unit No.	Course content	Hrs	% Weightage
1	<b>Chapter-1: History and Scope of Microbiology:</b> <ul style="list-style-type: none"> <li>• Discovery of Microbial world: Establishment of theory of biogenesis.</li> <li>• Development of pure culture techniques.</li> <li>• Establishment of Germ theory of diseases &amp; fermentation.</li> <li>• Work of Lister &amp; principle of aseptic surgery.</li> <li>• Scope of Microbiology: Pure &amp; Applied areas of Microbiology.</li> <li>• Introduction to Genetic engineering and Biotechnology.</li> </ul>	15	25%



2	<b>Chapter-2: The Microbial World:</b> <ul style="list-style-type: none"> <li>• Distribution of microorganisms in nature.</li> <li>• Introduction to prokaryotic world, eukaryotic microorganisms.</li> <li>• Difference between prokaryotes and eukaryotes.</li> <li>• Types of Microorganisms: Bacteria, Viruses, Fungi, Yeasts, Actinomycetes, Protozoa.</li> </ul>	10	25%
3	<b>Chapter-3: Microscopy and its principle:</b> <ul style="list-style-type: none"> <li>• Principles of microscopy, magnification and resolving power.</li> <li>• Light microscopy: Simple and compound microscope.</li> <li>• Bright field and dark field microscopy</li> <li>• Principles and applications of phase contrast and fluorescence microscopy</li> </ul>	10	25%
4	<b>Chapter-4: Techniques used to study microorganisms:</b> <ul style="list-style-type: none"> <li>• Smear preparation and fixation.</li> <li>• Use of mordant, intensifier and decolorizer.</li> <li>• Wet mounting: Hanging drop technique.</li> <li>• Vital and supravital staining.</li> </ul>	10	25%

**Suggested Specification table with Marks (Theory):75**

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	20%	40%	30%	10%	-	-

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.



**Course Outcome:**

After learning the course the students should be able to:	
CO1	Know discovery of the microbial world and various areas of pure and applied Microbiology.
CO2	Get aware of microbial community analysis in nature and their cellular features.
CO3	Learn about the study of various microscopes and techniques related to it.
CO4	Acquire skill in study of culture preparation and different staining procedures.

**List of Practical:**

Sr. No	Descriptions	Unit No	Hrs
1	Study of principle, components and working of compound light microscopes.	3	3
2	Cleaning and preparation of glass wares for sterilization.	1	2
3	Study of principles and working of laboratory instruments – Colorimeter & Spectrophotometer, Centrifuge, bacteriological filters.	1	3
4	Contributions of Scientists: Antony van Leeuwenhoek, Francisco Redi, John Needham, Robert Hooke, Theodor Schwann, Sergei Winogradsky, Martinus Beijerinck.	1	2
5	Study of Hay infusion by hanging drop technique.	4	3
6	Study of bacteria by positive staining.	4	3
7	Study of bacteria by negative staining.	4	3
8	Study of differential staining of bacteria by Gram staining.	4	3
9	Study of permanent slides: cocci, bacilli, spirochetes, curved bacteria.	2	2



10	Study of permanent slides of Fungi – Mucor sp., Rhizopus sp., Aspergillus sp., Penicillium sp.	2	2
11	Study of permanent slides of Algae – Diatoms and Spirogyra sp.	2	2
12	Study of permanent slides of Protozoa – Amoeba sp., Paramecium sp., Plasmodium sp.	2	2
		<b>Total</b>	<b>30</b>

**Instructional Method:**

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in the laboratory.

**Reference Books:**

- 1) Microbiology: Pelczar M. J, Chan EC. S and Kreig N. R, Tata Mc Grow Hill.
- 2) Microbiology: An introduction: Tortora G. J, Funke B. R and Case C. L, Pearson Education Inc. Elementary Microbiology: Modi H. A, volume- I & II.
- 3) General Microbiology: Dubey R. C.
- 4) Practical Microbiology: Patel R. J, Aditya Publications.

