



**Gyanmanjari**  
Innovative University

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

**Subject:** Basic Bacteriology-BSCMB11302

**Type of course:** Major

**Prerequisite:** Basic knowledge of Bacterial taxonomy, structure and its nutrition.

**Rationale:** This course has been designed to make the students know about improving and broadening our fundamental understanding of microorganisms, the science of microbiology investigates their morphology, physiology, metabolism, reproduction. This is how microbiology contributes significantly to several industries.

**Teaching and Examination Scheme:**

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P		C	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 voce; 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	Learn with Fun: Students need to prepare micro project in group of two and upload video clip of working model on Moodle	10
2	MCQ Test Faculty will provide the students a set of MCQs according to the learning objective of the course and students will answer it individually on Moodle.	10
3	Analysis Faculty will assign scientific pictures and students will analyze and prepare a report in 100 words and upload it to Moodle.	10
4	Poster Making: Students need to prepare a poster in group of two on the theme assigned by faculty and upload on Moodle	10
5	Attendance	10
Total		50



**Course Content:**

Unit No	Course content	Hrs	% Weightage
1	<b>Chapter-1: Introduction to bacterial taxonomy and nomenclature:</b> <ul style="list-style-type: none"> <li>• Introduction and concept of species, taxa and strain.</li> <li>• Principles of binomial system of nomenclature.</li> <li>• Classification systems.</li> <li>• Major characteristics.</li> <li>• Evolutionary chronometers and phylogenetic trees.</li> <li>• Whittaker's classification, The three-domain concept.</li> <li>• Difference between Bacteria, Archaea and Eukarya.</li> </ul>	15	25%
2	<b>Chapter-2: Morphology and fine structure of bacteria-I.</b> <ul style="list-style-type: none"> <li>• The size, shape &amp; arrangement of bacterial cells.</li> <li>• Bacterial cell structure, composition &amp; functions.</li> <li>• External: Cell wall, cell envelope, pili (fimbriae) &amp; flagella, capsule &amp; sheath, prosthecae.</li> <li>•</li> </ul>	10	25%
3	<b>Chapter-3: Morphology and fine structure of bacteria-II</b> <ul style="list-style-type: none"> <li>• Internal: Cytoplasmic membrane, cytoplasm, cytoplasmic inclusions, nuclear material and ribosomes.</li> <li>• Bacterial endospore: Spore structure, sporulation and spore germination.</li> </ul>	10	25%
4	<b>Chapter-4: Introduction to bacterial nutrition.</b> <ul style="list-style-type: none"> <li>• Nutritional requirements of bacteria.</li> <li>• Nutritional types of bacteria.</li> <li>• Culture media: Principles of media formulation, media ingredients &amp; types of culture media.</li> <li>• Physical conditions required for cultivation of bacteria (Temperature, gaseous requirement, acidity &amp; alkalinity, osmotic pressure etc).</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	Understand taxonomy analysis study by Whittaker's classification systems.
CO2	Know about morphological and Structural analysis of the organisms.
CO3	Learn about detailed structure study of the organisms.
CO4	Understand requirements for microbial growth, its formulation and components.

**List of Practicals:**

Sr. No	Descriptions	Unit No	Hrs
1	Study of bacterial structure by use of structural staining: Capsule staining by Hiss method.	2	3
2	Study of bacterial structure by use of structural staining: Cell wall staining by Ringer's method.	2	3
3	Study of bacterial structure by use of structural staining: Endospore staining by Dörner's method.	3	3
4	Isolation of bacteria from soil/water: Streak, Spread and Pour plate method.	3	3
5	Study of presence of microorganisms in air.	4	2

6	Study of presence of microorganisms in water.	4	2
7	Study of presence of microorganisms in soil.	4	2
8	Study of skin microflora.	4	2
9	Study of effect of temperature on growth of microorganisms.	4	2
10	Study of the effect of pH on growth of microorganisms.	4	2
11	Study of the effect of osmotic pressure (salt concentrations) on growth of microorganisms.	4	2
12	Study of the effect of osmotic pressure (sugar concentration) on growth of microorganisms.	4	2
13	Study of pigmented bacteria – (a) Staphylococcus aureus (b) Serratia marcescens (c) Pseudomonas aeruginosa.	ALL	3
		<b>Total</b>	<b>31</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 laboratory.

#### Reference Books:

- 1) Microbiology: Pelczar MJ, Chan ECS and Kreig NR. Tata Mc Grow Hill.
- 2) Microbiology: An introduction: Tortora GJ, Funke BR and Case CL, Pearson Education Inc.
- 3) Elementary Microbiology: Modi HA, volume- I & II.
- 4) General Microbiology: Dubey RC.
- 5) Practical Microbiology: Patel RJ, Aditya Publications.

