



Course Syllabus  
Gyanmanjari institute of technology  
Semester-1 (B.Tech)

**Subject:** General Biology-BETBT11301

**Type of course:** Major

**Prerequisite:** Basic knowledge of biology

**Rationale:** This course has been designed to make the students know about basic principles and knowledge about Plant Tissue Culture, Animal Biotechnology, Bimolecular and Fundamentals knowledge about Cell Biology.

**Teaching and Examination Scheme:**

Teaching Scheme			Credits C	Examination Marks					Total Marks
CI	T	P		Theory Marks		Practical Marks		CA	
				ESE	MSE	V	P	ALA	
4	0	2	5	60	30	10	20	30	150

*Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.*

**Continuous Assessment:**

Sr. No.	Active Learn	
1.	<b>Quiz:</b> Unit wise MCQ test will be conducted on Moodle. Per unit maximum 10 Questions will be allocated to the students.	10
2.	<b>Look &amp; Learn</b> Lab instrument Photograph will be provided by faculty and students have to Identify, describe and upload the working principle of assigned photograph on Moodle.	10
3.	<b>Presentation</b> To prepare video presentation on given topic and upload on Moodle.	10
<b>Total</b>		<b>30</b>



**Course Content:**

Unit No.	Course content	Hrs	% Weightage
1	<p><b>Chapter-1: Plant Biotechnology</b></p> <ul style="list-style-type: none"> <li>• Brief introduction &amp; definition of Biotechnology.</li> <li>• Scope and Importance of Biotechnology in crop improvement.</li> <li>• Plant Tissue Culture (PTC)</li> <li>• Definition and Important aspects of Plant Tissue Culture.</li> <li>• Laboratory organization.</li> <li>• Steps of plant tissue culture technique.</li> <li>• Applications of Plant Tissue Culture.</li> </ul>	10	25%
2	<p><b>Chapter-2: Fundamentals of Cell Biology</b></p> <ul style="list-style-type: none"> <li>• Ultrastructure of Prokaryotic cell</li> <li>• Ultrastructure of Eukaryotic cell                             <ol style="list-style-type: none"> <li>1. Plant cell</li> <li>2. Animal cell</li> </ol> </li> <li>• Ultrastructure of Cell wall and Plasma membrane</li> <li>• Structure and Functions of Cell Organelles                             <ol style="list-style-type: none"> <li>1. Nucleus</li> <li>2. Mitochondria</li> <li>3. Endoplasmic reticulum</li> <li>4. Golgi complex</li> <li>5. Ribosomes</li> </ol> </li> </ul>	16	25%
3	<p><b>Chapter-3: Principles of Animal Biotechnology and Inheritance</b></p> <ul style="list-style-type: none"> <li>• Introduction to Gene</li> <li>• Introduction to Mendelian laws of Heredity, Monohybrid and Dihybrid cross, Incomplete dominance (e.g., <i>Mirabilis Jalapa</i>), Co dominance (e.g., Roan cattle),</li> <li>• Multiple alleles e.g., ABO blood group in humans, Rh factor- Erythroblastosis fetalis, Polygenic inheritance (e.g., skin color in humans), Lethal Genes (e.g., yellow coat color in mice, thalassemia).</li> <li>• Animal Biotechnology:                             <ul style="list-style-type: none"> <li>▪ Brief introduction &amp; Definition: • Fields of animal biotechnology • Requirements for setting up a tissue culture laboratory. • Glass wares • Autoclave • pH meter</li> </ul> </li> </ul>	17	25%





4	<p><b>Chapter-4: Introduction to Biomolecules</b></p> <ul style="list-style-type: none"> <li>• Carbohydrates: Introduction and classification - Monosaccharides, Introduction, characteristics (Chiral Center, Isomerism, epimers, cyclic hemiacetal (<math>\alpha</math> and <math>\beta</math>), Anomers) - Disaccharides, Maltose, fructose and sucrose, Reducing and non Reducing sugar - Polysaccharide: Storage- Starch and glycogen Structural polysaccharides-Cellulose, Chitin-General functions of Carbohydrates.</li> <li>• Protein: Introduction, Properties, Essential amino acids, nonprotein amino acids. - General Classification, structure (primary, secondary, tertiary and quaternary - General functions of Protein.</li> <li>• Lipid: Introduction, Properties, essential fatty acids. -Classification and structure of triacylglycerol -General function of lipids.</li> <li>• DNA-RNA: Introduction, Types, Structural analysis, Significance.</li> </ul>	17	25%
---	---	----	-----

**Suggested Specification table with Marks (Theory):60**

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	Pursue Knowledge about Plants and their structural morphology.
CO2	Analyze the fundamentals of general cell biology.
CO3	Gain information regarding scope and significance of genetics by imbibing the principles of hereditary genetic transmission and interactions of genes with the environment.
CO4	Understanding about biomolecules such as carbohydrates, protein, DNA and lipids.



**List of Practical:**

Sr. No	Descriptions	Unit No.	Hrs
1	To study Lab instruments.	2	3
2	To study genetic problems of Dominance.	3	2
3	To study Monohybrid and Dihybrid cross.	3	3
4	Mounting of Fungi.	2	2
5	Mounting of Algae.	2	2
6	Blood grouping.	3	3
7	Qualitative estimation of carbohydrate.	4	3
8	Qualitative estimation of protein.	4	3
9	To study lifecycle of Sunflower.	1	3
10	To study Zygomycota, Ascomycota and Basidiomycota.	1	3
11	Study of permanent slides of Protozoa – Amoeba sp., Paramecium sp., Plasmodium sp.	2	3
		Total	30





**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

**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.

