



Gyanmanjari
Innovative University

Course Syllabus
Gyanmanjari Institute of Technology
Semester-3 (B. Tech.)

Subject: Basic Food Technological Techniques – BETFT13203

Type of course: Skill Enhancement Course

Prerequisite: Basic understanding of Instrumentation & Analysis.

Rationale: This course has been designed to focus on providing fundamental skills crucial for research and industry. Understanding techniques like PCR, gel electrophoresis, and cloning empowers scientists to manipulate DNA, analyze proteins, and engineer organisms. These skills are foundational for advancements in medicine, agriculture, and environmental science. Mastering these techniques enhances problem-solving abilities and fosters innovation in biotechnology.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P	C	Theory Marks		Practical Marks		CA	
				ESE	MSE	V	P	ALA	
0	0	4	2	-	-	10	40	50	100

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.

Course Outcome:

After learning the course, the students should be able to:	
CO1	Analyze and understand the basic instruments for biotechnological applications
CO2	Acquire comprehensive skills to extract crude material from any biological sources
CO3	Gain detailed knowledge about the microbiological world and its morphological analysis
CO4	Discuss and deliver detailed key insights in <i>in-silico</i> techniques.



Continuous Assessment:

Sr. No.	Active Learn	Marks
1.	Quiz: Unit MCQ test will be conducted. Per unit maximum of 5 Questions will be allocated to the students.	5
2.	Analyze & Interpret Lab instrument or Quiz Photograph will be provided by faculty and students have to Identify, describe, and upload the working principle of the assigned photograph to the GMIU Web Portal.	5
3.	Research-Review Talk To Prepare video and PowerPoint presentations on research papers/short communications given by faculty and upload them on the GMIU web portal.	10
4.	Model Preparation. Prepare any one disease model and submit by making a video explanation of it and upload on the GMIU web portal	10
5.	Research Methodology Analyze and find out the different types of articles like Research, Review, Chapter, and Letter to the editor from various databases and submit in a single PDF on GMIU Web Portal	10
6.	Research Identification Enlist anyone Noble laureate in Medicine/Biochemistry and write his/her research in one page, why he/she got Noble for it, and upload it on the GMIU web portal.	10
Total		50



Course Content:

Sr. No.	Course Content	Hrs	% Weightage
1.	Introduction to Lab Instruments <ul style="list-style-type: none"> Autoclave Weighing balance UV-Visible Spectrophotometer Laminar Air Flow Hot Air Oven Soxhlet for Extraction Introduction to Solvent for Extraction pH Meter 	8	30
2.	Introduction to Microbiology <ul style="list-style-type: none"> Understand the Morphology and microscopic structure of Bacteria. The size, shape & arrangement of bacterial cells Bacterial cell structure, composition & function. Purification of secondary metabolites from various solvents. 	6	20
3.	Introduction to Microbial Biotechnology <ul style="list-style-type: none"> Isolation and study of pure culture isolation from environmental sources for example soil, and water which are routinely used. Quality and quantitative analysis of water and other samples by performing serial dilution and streaking methods. Pure culture techniques and Principles of Microbial control <ol style="list-style-type: none"> Definition: Pure culture and axenic culture Principles and methods of obtaining pure culture Maintenance and preservation of pure culture Culture collection centres General principles of control 	6	20
4.	Application of Tools and Techniques <ul style="list-style-type: none"> Introduction to Biotechnology. Tissue culture: Plant and animal tissue culture. Components, working and applications of: PC, TLC, and Column chromatography. Components, working and applications of analytical methods: Electrophoresis, molecular hybridization, DNA microarray. Blotting: Southern and Western blot technique. 	10	30
Total		30	100



Suggested Specification table with Marks (Theory): NA

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	NA	NA	NA	NA	NA	NA

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 the above table.

List of Practical:

Sr. No	Descriptions	Unit No.	Hrs
1	Autoclave operation advanced sterilization techniques for laboratory applications.	1	2
2	Calibration and usage of weighing balances.	1	2
3	UV-Visible spectrophotometer for concentration measurement.	1	2
4	Maintaining aseptic conditions with laminar air flow.	1	2
5	Sterilization of glassware using hot air oven.	2	2
6	To identify given unknown sample of carbohydrate.	2	2
7	To identify given unknown sample of protein.	2	2
8	Quantitative analysis of water quality using serial dilution.	3	2
9	Pure culture techniques: Streaking plate methods	3	2
10	Pure culture techniques: Pour plate methods	3	2
11	Pure culture techniques: Spread plate methods	4	2
12	Identification of bacteria by morphological analysis.	4	2
13	Isolation of bacteria from a saliva sample.	4	2
14	Blotting techniques: Southern and Western Blotting.	4	2
15	To estimate creatinine in blood sample by calorimeter.	4	2
16	Mini Project	-	30
		Total	60



Instructional Method:

The course delivery method will depend upon the requirement of content and the needs of students.

The teacher in addition to the conventional teaching method by blackboard, may also use any of the tools such as demonstration, role play, Quiz, brainstorming, MOOCs, etc.

From the content, 10% of 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 based on the 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 in Biochemistry and Clinical Pathology: Dr. Ramesh Goyal et, al. Shah Prakashan

