



Gyanmanjari
Innovative University

Course Syllabus
Gyanmanjari Institute of Technology
Semester-2 (B.Tech)

Subject: Human Health and Diseases – I (BETBT12202)

Type of course: Skill Enhancement Course

Prerequisite: Basic understanding and analysis of human health and diseases.

Rationale: This course has been designed to focus on foundational biology, emphasizing cellular and molecular aspects. Integrate practical skills through lab work, introducing novel techniques. Explore biotechnological applications in healthcare, such as diagnostic tools and genetic engineering. Emphasize hands-on experiences to bridge theoretical concepts with practical applications in the context of biotechnology and human health.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P		C	Theory Marks		Practical Marks		
			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.



Continuous Assessment:

Sr. No.	Active Learn	
1.	Quiz: Unit MCQ test will be conducted. Per unit maximum of 5 Questions will be allocated to the students.	5
2.	Look & Learn 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.	Article Summary Submit Any article summary in your own words in the prescribed format given by the faculty 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 <ul style="list-style-type: none"> A. Definition: Pure culture and axenic culture B. Principles and methods of obtaining pure culture C. Maintenance and preservation of pure culture D. Culture collection centers E. 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): Not Applicable

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

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.

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.



List of Practicals:

Sr. No	Descriptions	Unit No.	Hrs
1	To understand the basic concept of biotechnological instruments	1	2
2	Extraction of Crude Material from Plant source	1	2
3	Extraction of targeted compounds from Plant source	1	2
4	Extraction of Crude Material from Bacterial source	1	2
5	Extraction of targeted compounds from Bacterial source.	2	2
6	Identification of bacteria by Gram Staining	2	2
7	Observation of stained bacterial under a compound microscope	2	2
8	Serial Dilution of Bacteria from Soil Sample	3	2
9	Isolation of bacteria from soil sample	3	2
10	Identification of bacteria by morphological analysis	3	2
11	Sterility Test by from unknown samples (Injectable water)	4	2
12	Sterility Test by from unknown samples (RO water)	4	2
13	Sterility Test by from unknown samples (Autoclaved RO water)	4	2
14	To perform <i>in-silico</i> PCR	4	2
15	Analysis of <i>in-silico</i> PCR and annotations	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

