Course Syllabus
Gyanmanjari Science College
Semester-2(B.Sc.)

Subject: Basic Biochemistry-BSCMB12303

Type of course: Major

Prerequisite: Basic knowledge of Biomolecules.

Rationale: This course has been which provides the foundation for understanding life processes at molecular level.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
				SEE		CCE			
CI	T	P	C	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.

Course Content:

Unit No.	Course content	Hrs	% Weightage
1	**Chapter-:1-Introduction of Biomolecules – I-Carbohydrates:** ➢ Introduction and classification • **Monosaccharides:** Introduction, characteristics (Chiral Center, Isomerism, epimers, cyclic hemiacetal (α and β), Anomers). • **Disaccharides:** Maltose, Lactose and sucrose, Reducing and non-Reducing sugar. • **Polysaccharide:** Storage- Starch and glycogen, Structural polysaccharides Cellulose, Chitin. • General functions of Carbohydrates.	15	25%
2	**Chapter-2: Introduction of Biomolecules – II - Protein:** • Introduction, Properties, Essential amino acids, • Non-protein amino acids. • General Classification, structure (primary, secondary,tertiary and quaternary. • General functions of Protein.	10	25%
3	**Chapter-3: Introduction of Biomolecules – III** • **Lipids:** (a) Introduction, Properties, essential fatty acids. (b) Classification and structure of triacylglycerol (c) General function of lipids. • **Nucleic acids:** (a) Introduction, properties, structure of DNA, RNA. (b) General functions of DNA and RNA.	10	25%
4	**Chapter-4: Introduction of Biomolecules – IV** **Definition, general properties, types and functions of:** • Antigen-Antibody • Vitamins • Hormones • Siderophores • Bacterial chlorophylls	10	25%

Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	**Chart preparation** Faculty will assign the particular topic and students shall prepare accordingly upload to the GMIU web portal.	10
2	**Compound Analysis** Faculty will assign one compound name and students will describe application and role of that compound in 100 words and upload it to GMIU web portal.	10
3	**Quiz** Faculty will conduct quiz sessions in the classroom per unit of their respective subject and marks will be uploaded to the GMIU web portal.	10
4	**Effect of different chemical on Microbes (Micro Project)** Faculty will assign different chemical agents for microbial control, Group of students (5 students) need to prepare report on that particular chemical agent in 250 words and upload it to GMIU web Portal.	10
5	**Attendance**	10
Total		**50**

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	Acquire the importance of various biomolecules such as carbohydrates, proteins, lipids and nucleic acids.
CO2	Define types and classification of various biomolecules.

CO3	Gain knowledge about structure, general properties and functions of various biomolecules.
CO4	Analyze quality of various biomolecules.

List of Practical:

Sr. No	Descriptions	Unit No	Hrs
1	Disposal of laboratory waste and cultures.	1	2
2	Method of using physical balance.	1	2
3	Preparation of standard solutions.	1	4
4	Study of vitamins (by chart).	2	2
5	Qualitative analysis of carbohydrate: Iodine test, Benedict's test and Barfoed's test.	2	4
6	Qualitative analysis of protein: Biuret test, Ninhydrine test and Nitroprusside test.	2	4
7	Study of principles and working of laboratory instruments – II: pH meter, autoclave, laminar air flow, incubator, rotary shaker, hot air oven, colony counter.	3	4
8	Contribution of scientists: Joseph Lister, Alexander Fleming, Edward Jenner, Paul Ehrlich, Robert Koch, Louis Pasteur, Selman Waksman	4	4
9	Study of Watson and Crick model of B-DNA (demonstration only).	4	2
10	Study of various structures of proteins (demonstration only).	4	2
11	Study of hormones (by chart).	4	2
Total			**32**

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 MJ, Chan ECS and Kreig NR, Tata Mc Grow Hill.
2) General Microbiology: Stanier RY, Adelberg EA and Ingraham JL, Mac Millan Press Inc.
3) General Microbiology Vol I & II: Powar & Daginawala, Himalaya Publishing House.
4) Introduction to Microbiology: Ingraham JL and Ingraham CA, Thomson Brooks/Cole.
5) Principles of Microbiology: Atlas RM, Wm C brown Publishers.
6) Brock's biology of Microorganisms Madigan MT and Martinko JM, Pearson Education Inc.
7) Microbiology: An introduction: Tortora GJ, Funke BR and Case CL, Pearson Education Inc.
8) Elementary Microbiology: Modi HA, volume- I & II.
9) General Microbiology: Dubey RC.
10) Practical Microbiology: Patel RJ, Aditya Publications.
11) Practical Microbiology: Dubey RC and Maheshwari DK, S Chand Publication