



**Gyanmanjari**  
Innovative University

Course Syllabus  
Gyanmanjari Science College  
Semester-5 (B.Sc)

**Subject:** Biochemistry- BSCCM15318

**Type of course:** Minor

**Prerequisite:** Basic understanding of chemistry, cell biology, biochemistry (macromolecules and enzymes), genetics, biophysical chemistry.

**Rationale:** Providing students with a deeper understanding of biochemical processes, molecular biology, and the structure-function relationship of biomolecules, which are essential for advanced studies in biochemistry, biotechnology, and related fields. It emphasizes the integration of chemistry, biology, and molecular techniques to prepare students for research, clinical applications, and further academic exploration.

### Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P	C	SEE		CCE			
				Theory	Practical	MSE	LWA/V	ALA	
4	0	0	4	100	00	30	00	70	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.*

4 Credits \* 25 Marks = 100 Marks (each credit carries 25 Marks) Theory

SEE 100 Marks will be converted in to 50 Marks

CCE 100 Marks will be converted in to 50 Marks





**Course Content**

Unit No	Course Content	Hrs	% Weightage
1	<b>Basic Biochemistry</b> Introduction to Biochemistry: Definition and scope. Importance of Biochemistry in life sciences. Basic biochemical concepts: Atoms, molecules, and chemical bonds. Water and its role in biological systems.	15	25%
2	<b>Bioenergetics</b> Introduction, concept of Free energy, Gibbs's Free energy, Endergonic and Exergonic reactions, relationship among Free energy, Enthalpy and Entropy, Redox potential, energy rich compounds, classification of high energy compound, high energy bonds, reactions involving energy rich compounds, ATP, ATP-ADP cycle: production, biological significance, cyclic adenosine monophosphate (cAMP): production, biological significance.	15	25%
3	<b>Genetic Information Transfer</b> Introduction, Deoxyribonucleic acid (DNA): components, structure, types and functions. Ribonucleic acid (RNA): components, structure, types and functions. Genetic information transfer: Introduction, Central dogma, gene expression, And DNA replication: models for DNA replication, Process of DNA replication, Termination of replication, Inhibitors of DNA replication. Transcription (RNA synthesis): Process, Post transcriptional modification, inhibitors. Genetic code, Translation (Protein synthesis), Requirements, stages of translation.	15	25%
4	<b>Enzymes</b> Introduction, properties, nomenclature, mechanism of enzyme action, enzyme-substrate complex formation, lowering of activation energy, enzyme kinetics, Michaelis-menten plot, factors affecting enzyme-activity, mechanism of enzyme catalysis, Reversible inhibition, irreversible inhibition, Allosteric inhibition, regulation of enzymes, Coenzymes: introduction, classification, structure and functions.	15	25%





**Continuous Assessment:**

Sr. No	Active Learning Activities	Marks
1	<b>Poster formation</b> Students create Poster of molecules like glucose (carbohydrates), amino acids (proteins), and fatty acids (lipids) using digital tools, and upload it on GMIU web Portal.	10
2	<b>Case study</b> Divide students into groups to analyze and discuss real life case studies related to biochemistry, such as metabolic disorder or nutritional deficiencies and upload it on GMIU web Portal.	10
3	<b>Report writing</b> Students have to prepare a Report on Role of Bimolecular in Day to Day life and upload it on GMIU web portal.	10
4	<b>Video analysis</b> Faculty will provide topics about bimolecular reactions and students have to find a video. Analyze it to make a report and upload it on GMIU web Portal.	10
5	<b>Predict a picture</b> Students analyze a picture and predict the name of reaction mechanism and write 100 words on it and upload it on the GMIU web portal.	10
6	<b>Bimolecular identification tests</b> Students will be provided with different bimolecular solutions with reagents for Benedict's, Iodine, Barcode's, they have to identify the bimolecular present and upload the photos on GMIU web portal	10
7	<b>Attendance</b>	10
Total		70





**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	30%	40%	30%	00	00	00

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	Predict Fundamental principles of biochemistry, including the role of water and basic biochemical concepts.
CO2	Learn the principles of energy flow in biological system including ATP and ADP production.
CO3	Explain the mechanism of genetic information transfer, DNA and RNA regulation.
CO4	Analyze the enzyme structure, function, kinetics, inhibition and their role in biological reactions.

**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] Biochemistry" by Dr. G.Murugananthan, Dr. Upama N. Trivedi, Anuradha singh.
- [2] Principles of Biochemistry" by Albert Lehninger, David L. Nelson, and Michael M. Cox.
- [3] Biochemistry: A Short Course" by John L. Tymoczko, Jeremy M. Berg, and Lubert Stryer
- [4] Biochemistry" by Jerry M. Berg, John L. Tymoczko, and Lubert Stryer.





[5] Biochemistry” by U. Satyanarayana and U. Chakrapani.

