



Master of Science, Chemistry  
M. Sc. Chemistry, Semester – II

Course Code	PS02ECHE52	Title of the Course	Introduction to Biochemistry
Total Credits of the Course	4	Hours per Week	4 hrs

Course Objectives:	<p>Its aim is to understand the fundamental chemical principles that govern complex biological systems.</p> <p>This subject is an interdepartmental major between biology and chemistry that emphasizes the importance of a solid foundation in the natural sciences, including mathematics and physics.</p> <p>The primary objectives of the major are :</p> <ol style="list-style-type: none"><li>1) To give students a solid foundation in biology and chemistry;</li><li>2) To develop analytical and critical-thinking skills that allow independent exploration of biological phenomena through the scientific method</li><li>3) To introduce students to modern methods of biochemical experimentation within the disciplines of biology and chemistry.</li></ol>
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Course Content		
Unit	Description	Weightage* (%)
1.	<p><b>Enzymes:</b> Nomenclature, Classification, Chemical Nature and properties of enzyme, Factor affecting enzyme activity, Active site, Enzyme inhibition, Enzyme Specificity, Co-enzyme &amp; Iso enzymes, Mechanism of enzyme action, Regulation of enzyme activity, Application of enzymes.</p> <p><b>Vitamins :</b> Introduction &amp; classification of vitamins, Chemistry, metabolism &amp; Biochemical function of Vitamin A, D, E, K C, B1, B2, B6, B12, H, CoA, Folic acid &amp; Niacin.</p>	25
2.	<p><b>Carbohydrates:</b> Functions &amp; Classification of carbohydrates, Monosaccharide – Structure of Glucose, reaction of Monosaccharide &amp; derivatives, Disaccharides, Polysaccharides – Homo and Heteropolysaccharides, Glycoprotein.</p> <p><b>Lipids :</b> Classification &amp; functions lipids, fatty acids – type &amp; nomenclature of fatty acids, Essential fatty acids, Importance of triacylglycerol, Phospholipids, Glycolipids, Steroids, lipoproteins &amp; amphiphatic lipids.</p>	25
3.	<p><b>Proteins &amp; Amino Acids:</b> Structure, classification, properties &amp; application of amino acids, Structure of proteins – primary, secondary, tertiary &amp; quaternary,</p>	25





	Properties of proteins. Denaturation, Classification of proteins, Biologically important peptides.	
4.	<b>Nucleic acid &amp; Nucleotides:</b> Functions & component of Nucleic acids, Nucleotides - Structure, Nomenclature, Purines & Pyrimidines, Analogs of nucleic acid, Structure of DNA -Chargoff's rule, DNA double helix, Conformational of DNA double helix, Size of DNA molecule, Denaturation of DNA strands, Organization of DNA in the cell, Structure & Types of RNA, Ribozymes.	25

Teaching-Learning Methodology	<ul style="list-style-type: none"><li>• Through chalk and talk method.</li><li>• Revising and asking questions from students at the end of class</li><li>• Motivating students to do some activity related to the topic</li><li>• Power point presentation.</li><li>• The use of audiovisual resources that are available on the internet such as virtual lab.</li><li>• Correlating the topic with real life cases.</li><li>• Quiz contest among students on important topic.</li></ul>
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Understood Chemical Nature and properties of enzyme, Application of enzymes.
2.	Understood the biochemical functions of vitamins: A, D, E, K, C, B <sub>1</sub> , B <sub>2</sub> , B <sub>6</sub> , B <sub>12</sub> , H, CoA, folic acid and niacin.
3.	Explain the structure and functions of Glucose, reaction of Monosaccharide & derivatives, Disaccharides, Polysaccharides.
4.	Explain the functions of some naturally occurring fatty acids, triacylglycerol, steroids, and lipids.





5	Describe the properties, classification and conventions of common amino acids.
6	Understood structure and properties of proteins and peptides.
7	Perform Sequencing of peptides and protein and their evolution.
8	Understood the classification and stereochemistry of biologically important hexose derivatives.
9	Explain the structure and role of some homo and hetero polysaccharides, glycol conjugates, proteoglycans, glycoproteins and glycolipids.
10	Explain the classification, nomenclature, extraction, catalytic activity and regulation of enzyme activity and, enzyme inhibition.
11	Explain the functions, structures of nucleic acids and nucleotides like DNA and RNA.

Suggested References:

Sr. No.	References
1.	Lehninger Principles of Biochemistry, By: David L. Nelson and Michael M. Cox Palgrave MacMillan / W. H. Freeman & Company, New York
2.	Biochemistry, By: U. Satyanarayana, Books & Allied (p) Ltd. , Kolkata(India)
3	Textbook of biochemistry for medical students By: DM. Vasudevan, Sreekumari S. Kannan Vaidyanathan
4	Textbook of medical biochemistry :7 <sup>th</sup> Edition – By: Rana Shinde, M.N. Chatterjee
5	Principles of Biochemistry, By: Donald J. Voet , Judith G. Voet , Charlotte W. Pratt [John Wiley & Sons]

On-line resources to be used if available as reference material

On-line Resources

[www.nptel.ac.in](http://www.nptel.ac.in)

[www.swayam.gov.in](http://www.swayam.gov.in)





**SARDAR PATEL UNIVERSITY**  
**Vallabh Vidyanagar, Gujarat**  
**(Reaccredited with 'A' Grade by NAAC (CGPA 3.25))**  
**Syllabus with effect from the Academic Year 2021-2022**

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[www.epgp.inflibnet.ac.in](http://www.epgp.inflibnet.ac.in) (e-PG pathshala)

[www.ndl.iitkgp.ac.in](http://www.ndl.iitkgp.ac.in) (National Digital Library)

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