

**FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)**  
**Department of Biochemistry**  
**Course Curriculum**

<b>PART- A: Introduction</b>			
<b>Program: Bachelor in Science</b> <i>(Certificate / Diploma / Degree/Honors)</i>		<b>Semester - I</b>	<b>Session: 2024-2025</b>
1	<b>Course Code</b>	BCSC – 01 T	
2	<b>Course Title</b>	Introductory Biochemistry and Biomolecules	
3	<b>Course Type</b>	Discipline Specific Course (Theory)	
4	<b>Pre-requisite (if, any)</b>	As per program	
5	<b>Course Learning Outcomes (CLO)</b>	<p><i>After completion of the course, the students would be able to:</i></p> <ul style="list-style-type: none"> <li>➤ Understand the history of Biochemistry and key contributions of Indian scientists.</li> <li>➤ Understand the properties of carbohydrates, proteins, lipids, cholesterol, DNA, RNA and their importance in biological systems.</li> <li>➤ Understand the methods of determination of amino acid &amp; Proteins.</li> <li>➤ Understand the structure and function of determination of DNA &amp; RNA.</li> </ul>	
6	<b>Credit Value</b>	3 Credits	<i>Credit = 15 Hours - learning &amp; Observation</i>
7	<b>Total Marks</b>	<b>Max. Marks: 100</b>	<b>Min Passing Marks: 40</b>
<b>PART -B: Content of the Course</b>			
<b>Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)</b>			
Unit	Topics (Course contents)		No. of Period
I	<b>General understanding of Biochemical</b> Molecular Logic of Life. Definition. Experiments and discoveries of Acharya Nagarjuna. Famous Indian and foreign Biochemists and their inventions/ Discoveries. Importance of Yog, Pranayam, food and healthy lifestyle for balance of biochemical (kaf, vat, pitta) of our body and role in maintaining good mental and physical health. Biochemical basis of Lifestyle disorders.		09
II	<b>Structure and functions of Carbohydrates and lipids:</b> Definition, classification, biological importance. Monosaccharides: Stereochemistry of monosaccharides, (+) and (-), D and L, epimers, anomers Disaccharides: Establishment of structures of sucrose and lactose and maltose. Polysaccharides: Partial structure, occurrence and importance of starch, glycogen, inulin, cellulose, chitine. heparin, hyaluronic acid. <b>Lipids:</b> Classification and biological role. Fatty acids – Nomenclature of saturated and unsaturated fatty acids. Phosphoglycerides: Structure and function of lecithin, cephalins, phosphotidylinosital, plasmalogens, and cardiolipin Structure and importance of sphingomyelin, gangliosides and cerebrosides.		12
III	<b>Structure and functions of Amino acids and Proteins:</b> Structure and classification of amino acids based on polarity. Amino acids D & L notation. <b>Peptides:</b> Peptide bond, structure and biological importance. <b>Proteins:</b> Peptides, Primary Structure of proteins, N- and C- terminal amino acids, Secondary Structure – $\alpha$ Helix. $\beta$ -sheet, $\beta$ -bend. Tertiary and quaternary structure, denaturation and renaturation of proteins.		12
IV	<b>Structure and functions of Nucleic acids:</b> Composition of DNA and RNA. Nucleosides and nucleotides. Chargaff's rule. Primary and secondary structure of DNA, Watson and Crick model of DNA. Melting of DNA ( $T_m$ ).		12
<b>Keywords</b>		Biomolecules, Carbohydrate, Lipids, Fatty acids, Nucleotides, Nucleosides, Nucleic acids,	

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<b>PART-C: Learning Resources</b>		
<b>Text Books, Reference Books and Others</b>		
<i>Text Books Recommended –</i>		
<ul style="list-style-type: none"> <li>➤ Nelson, Cox and Lehninger Principles of Biochemistry, 7<sup>th</sup> Edition</li> <li>➤ Medical Biochemistry By Styanarayan.</li> </ul>		
<b>Online Resources–</b>		
<ul style="list-style-type: none"> <li>➤ <b>e-Resources / e-books and e-learning portals</b></li> <li>➤ <a href="https://www.britannica.com/">https://www.britannica.com/</a></li> <li>➤ <a href="https://en.wikibooks.org/wiki/Biochemistry">https://en.wikibooks.org/wiki/Biochemistry</a></li> <li>➤ <a href="https://www.pdfdrive.com/biomolecules-books.html">https://www.pdfdrive.com/biomolecules-books.html</a></li> <li>➤ <a href="https://byjus.com/biology/biomolecules/">https://byjus.com/biology/biomolecules/</a></li> <li>➤ <a href="https://www.vedantu.com/biology/biomolecules">https://www.vedantu.com/biology/biomolecules</a></li> </ul>		
<b>PART -D: Assessment and Evaluation</b>		
<b>Suggested Continuous Evaluation Methods:</b>		
<b>Maximum Marks:</b>		<b>100 Marks</b>
<b>Continuous Internal Assessment (CIA):</b>		<b>30 Marks</b>
<b>End Semester Exam (ESE):</b>		<b>70 Marks</b>
<b>Continuous Internal Assessment (CIA): (By Course Teacher)</b>	Internal Test / Quiz-(2): <b>20 +20</b> Assignment / Seminar - <b>10</b> Total Marks - <b>30</b>	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against <b>30 Marks</b>
<b>End Semester Exam (ESE):</b>	<b>Two section – A &amp; B</b> Section A: Q1. Objective – <b>10 x1= 10 Mark</b> ; Q2. Short answer type- <b>5x4 =20 Marks</b> Section B: Descriptive answer type qts., <b>1out of 2</b> from each unit- <b>4x10=40 Marks</b>	

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<b>Program: Bachelor in Science</b> <i>(Certificate / Diploma / Degree/Honors)</i>		<b>Semester - I</b>	<b>Session: 2024-2025</b>
1	<b>Course Code</b>	BCSC – 01 P	
2	<b>Course Title</b>	Introductory Biochemistry and Biomolecules	
3	<b>Course Type</b>	Discipline Specific Course (Practical)	
4	<b>Pre-requisite (if, any)</b>	As per the Program	
5	<b>Course Learning Outcomes (CLO)</b>	<i>On successful completion of the course, the student shall be able to:</i> <ul style="list-style-type: none"> <li>➤ Describe the basic lab requirements and their uses.</li> <li>➤ Analyze the characteristics of the compound on the basis of their pH.</li> <li>➤ Formulate to prepare normal, molar and stock solution.</li> <li>➤ Estimate Biomolecules in mixture.</li> </ul>	
6	<b>Credit Value</b>	1 Credits	<i>Credit =30 Hours Laboratory or Field learning/Training</i>
7	<b>Total Marks</b>	<b>Max. Marks: 50</b>	<b>Min Passing Marks: 20</b>
<b>PART -B: Content of the Course</b>			
<b>Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)</b>			
<b>Module</b>	<b>Topics (Course contents)</b>		<b>No. of Period</b>
<b>Lab./Field Training/ Experiment Contents of Course</b>	<ul style="list-style-type: none"> <li>➤ Safety measures in laboratories.</li> <li>➤ Preparation of normal, molar and stock solution.</li> <li>➤ Preparation of buffers.</li> <li>➤ Qualitative tests for carbohydrates, lipids, amino acids, proteins and nucleic acids.</li> <li>➤ Separation of amino acids/ sugars/ bases by Paper / Thin layer chromatography.</li> <li>➤ Estimation of vitamin C titrimetric method.</li> <li>➤ Determination of saponification value and iodine number of fats.</li> <li>➤ Short write-ups on disease privations practices in Indian Knowledge system.</li> </ul>		<b>30</b>
<b>Keywords</b>	Laboratory Safety, Estimation, Sugar, Fat, Proteins		

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<b>PART-C: Learning Resources</b>		
<b>Text Books, Reference Books and Others</b>		
<b>Text Books Recommended –</b>		
<ul style="list-style-type: none"> <li>➤ Lehninger: Principles of Biochemistry (2013) 6th ed., Nelson, D.L. and Cox,</li> <li>➤ Experimental Biochemistry by Beedu Shashidhar Rao</li> </ul>		
<b>Online Resources–</b>		
<ul style="list-style-type: none"> <li>➤ e-Resources / e-books and e-learning portals</li> <li>➤ <a href="https://en.wikibooks.org/wiki/Biochemistry">https://en.wikibooks.org/wiki/Biochemistry</a></li> <li>➤ <a href="https://www.pdfdrive.com/biomolecules-books.html">https://www.pdfdrive.com/biomolecules-books.html</a></li> <li>➤ <a href="https://ncert.nic.in/textbook.php">https://ncert.nic.in/textbook.php</a></li> </ul>		
<b>PART -D: Assessment and Evaluation</b>		
<b>Suggested Continuous Evaluation Methods:</b>		
<b>Maximum Marks: 50 Marks</b>		
<b>Continuous Internal Assessment (CIA): 15 Marks</b>		
<b>End Semester Exam (ESE): 35 Marks</b>		
<b>Continuous Internal Assessment (CIA): (By Course Teacher)</b>	Internal Test / Quiz-(2): 10 & 10 Assignment/Seminar +Attendance - 05 Total Marks - 15	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
<b>End Semester Exam (ESE):</b>	<b>Laboratory / Field Skill Performance: On spot Assessment</b> A. Performed the Task based on lab. work - 20 Marks B. Spotting based on tools & technology (written) – 10 Marks C. Viva-voce (based on principle/technology) - 05 Marks	<b>Managed by Course teacher as per lab. status</b>

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