

**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 - II</b>	
		Session: 2024-2025	
1	<b>Course Code</b>	<b>BCGE – 02 T</b>	
2	<b>Course Title</b>	<b>Bioanalytical Techniques</b>	
3	<b>Course Type</b>	<b>Generic Elective (Theory)</b>	
4	<b>Pre-requisite (if, any)</b>	As per the Programm	
5	<b>Course Learning Outcomes (CLO)</b>	<p><i>On successful completion of the course, the student shall be able to:</i></p> <ul style="list-style-type: none"> <li>➤ Understand basic concepts of Spectroscopy.</li> <li>➤ Describe amino acids with application of chromatography.</li> <li>➤ Understand basic concepts of centrifugation.</li> <li>➤ Understand working principle, instrumentation and applications of various electrophoretic techniques.</li> </ul>	
6	<b>Credit Value</b>	<b>3 Credits</b>	<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>			
Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)			
Unit	Topics (Course contents)		No. of Period
<b>I</b>	<b>Spectroscopy</b> - Concepts of spectroscopy, Laws of photometry. Beer-Lambert's law, Principles and applications of colorimetry. Visible and UV spectroscopy.  <b>Electrophoretic techniques</b> – Principles of electrophoretic separation. Types of electrophoresis including paper and gel.		12
<b>II</b>	<b>Chromatography</b> – Principles and applications of paper, thin layer, ion exchange, affinity, gel permeation, adsorption and partition chromatography. HPLC and FPLC.		09
<b>III</b>	<b>Centrifugation</b> – Principle of centrifugation, concepts of RCF, different types of instruments and rotors, preparative, differential and density gradient centrifugation, analytical, ultra-centrifugation, determination of molecular weights and other applications.		12
<b>IV</b>	<b>Microscopy</b> – Bright field, Dark field, Phase contrast and Fluorescence microscopy Transmission and scanning microscopy, freeze fracture techniques,  <b>Immunological Techniques:</b> Immuno diffusion, immune electrophoresis, radioimmunoassay, ELISA, Immuno fluorescence.		12
<b>Keywords</b>	Spectroscopy, Chromatography, Centrifugation, Electrophoresis, Microscope, ELISA.		

Name and Signature of Convener & Members of CBoS:

<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>➤ K Wilson and John Walker Practical Biochemistry: Principles &amp; Techniques</li> <li>➤ RF Boyer Biochemistry Laboratory: Modern Theory &amp; Techniques</li> <li>➤ Physical biochemistry by D Friefelder, WH Freeman &amp; Co., USA.</li> <li>➤ Biophysical Chemistry By Upahyaya &amp; Nath</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://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:</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 – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 <b>Marks</b> Section B: Descriptive answer type qts., 1out of 2 from each unit-4x10=40 <b>Marks</b>	

Name and Signature of Convener & Members of CBoS:




**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 -II</b>	<b>Session: 2024-2025</b>
1	<b>Course Code</b>	<b>BCGE- 02P</b>	
2	<b>Course Title</b>	<b>Bioanalytical Techniques</b>	
3	<b>Course Type</b>	<b>Generic Elective (Practical)</b>	
4	<b>Pre-requisite (if, any)</b>	As Per the Course	
5	<b>Course Learning Outcomes (CLO)</b>	<p><i>On successful completion of the course, the student shall be able to:</i></p> <ul style="list-style-type: none"> <li>➤ Examine different components present in the extract of radish leaves by using chromatography technique.</li> <li>➤ Analysis independently of various biomolecules in the laboratory.</li> <li>➤ Demonstrate the effect of inorganic compound and its percent purities in various types of samples.</li> <li>➤ Analyze characteristics of UV absorption spectra of by different methods in samples in different biomolecules.</li> </ul>	
6	<b>Credit Value</b>	<b>1 Credits</b>	<b>Credit =30 Hours Laboratory or Field learning/Training</b>
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>➤ Verification of Beer-Lambert's law.</li> <li>➤ Separation of sugars using paper chromatography.</li> <li>➤ Separation of amino acids by paper chromatography</li> <li>➤ Separation of plant pigments by Paper chromatography</li> </ul>		<b>30</b>
<b>Keywords</b>	<b>Spectroscopy, Estimation, Quantitative, Separation, Techniques</b>		

Name and Signature of Convener & Members of CBoS:



<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>➤ K Wilson and John Walker Practical Biochemistry: Principles &amp; Techniques</li> <li>➤ RF Boyer Biochemistry Laboratory: Modern Theory &amp; Techniques</li> <li>➤ Physical biochemistry by D Friefelder, WH Freeman &amp; Co., USA.</li> <li>➤ Biophysical Chemistry By Upahyaya &amp; Nath</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://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):</b> (By Course Teacher)	Internal Test / Quiz-(2): <b>10 &amp; 10</b> Assignment/Seminar +Attendance - <b>05</b> Total Marks - <b>15</b>	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against <b>15 Marks</b>
<b>End Semester Exam (ESE):</b>	<b>Laboratory / Field Skill Performance: On spot Assessment</b> A. Performed the Task based on lab. work - <b>20 Marks</b> B. Spotting based on tools & technology (written) – <b>10 Marks</b> C. Viva-voce (based on principle/technology) - <b>05 Marks</b>	<b>Managed by Course teacher as per lab. status</b>




Name and Signature of Convener & Members of CBoS: