

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

PART- A: Introduction			
Program: Bachelor in Science <i>(Certificate / Diploma / Degree / Honors)</i>		Semester - II	Session: 2024-2025
1	Course Code	BCSC - 02T	
2	Course Title	Bio-analytical Techniques	
3	Course Type	Discipline Specific Course (Theory)	
4	Pre-requisite (if, any)	As per the Program	
5	Course Learning Outcomes (CLO)	<p><i>On successful completion of the course, the student shall be able to:</i></p> <ul style="list-style-type: none"> ➤ Understand basic concepts of Spectroscopy. ➤ Describe amino acids with application of chromatography. ➤ Understand basic concepts of centrifugation. ➤ Understand working principle, instrumentation and applications of various electrophoretic techniques. 	
6	Credit Value	3 Credits	Credit = 15 Hours - learning & Observation
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40
PART -B: Content of the Course			
Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)			
Unit	Topics (Course contents)		No. of Period
I	Spectroscopy - Concepts of spectroscopy, Laws of photometry. Beer-Lambert's law, Principles and applications of colorimetry. Visible and UV spectroscopy. Electrophoretic techniques – Principles of electrophoretic separation. Types of electrophoresis including paper and gel. PAGE and SDS-PAGE. Isoelectric focussing.		12
II	Chromatography – Principles and applications of paper, thin layer, ion exchange, affinity, gel permeation, adsorption and partition chromatography. HPLC and FPLC.		09
III	Centrifugation – 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
IV	Microscopy – Bright field, Dark field, Phase contrast and Fluorescence microscopy Transmission and scanning microscopy, freeze fracture techniques, specific staining of biological materials Immunological Techniques: Immuno diffusion, immune electrophoresis, radioimmunoassay, ELISA, Immuno fluorescence.		12
Keywords	Spectroscopy, Chromatography, Centrifugation, Electrophoresis, Microscope, ELISA.		

Name and Signature of Convener & Members of CBoS:

PART-C: Learning Resources		
Text Books, Reference Books and Others		
Text Books Recommended –		
<ul style="list-style-type: none"> ➤ K Wilson and John Walker Practical Biochemistry: Principles & Techniques ➤ RF Boyer Biochemistry Laboratory: Modern Theory & Techniques ➤ Physical biochemistry by D Friefelder, WH Freeman & Co., USA. ➤ Biophysical Chemistry By Upahyaya & Nath 		
Online Resources–		
<ul style="list-style-type: none"> ➤ e-Resources / e-books and e-learning portals ➤ https://en.wikibooks.org/wiki/Biochemistry ➤ https://www.pdfdrive.com/biomolecules-books.html ➤ https://ncert.nic.in/textbook.php 		
PART -D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks:		100 Marks
Continuous Internal Assessment (CIA):		30 Marks
End Semester Exam (ESE):		70 Marks
Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 20 +20 Assignment / Seminar - 10 Total Marks - 30	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
End Semester Exam (ESE):	Two section – A & B Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts., 1out of 2 from each unit-4x10=40 Marks	

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PART- A: Introduction			
Program: Bachelor in Science <i>(Certificate / Diploma / Degree/ Honors)</i>		Semester -II	Session: 2024-2025
1	Course Code	BCSC- 02P	
2	Course Title	Bioanalytical Techniques	
3	Course Type	Discipline Specific Course (Practical)	
4	Pre-requisite (if, any)	As Per the Program	
5	Course Learning Outcomes (CLO)	<i>On successful completion of the course, the student shall be able to:</i> <ul style="list-style-type: none"> ➤ Examine different components present in the extract of radish leaves by using chromatography technique. ➤ Analysis independently of various biomolecules in the laboratory. ➤ Demonstrate the effect of inorganic compound and its percent purities in various types of samples. ➤ Analyze characteristics of UV absorption spectra of by different methods in samples in different biomolecules. 	
6	Credit Value	1 Credits	Credit =30 Hours Laboratory or Field learning/Training
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20
PART -B: Content of the Course			
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)			
Module	Topics (Course contents)		No. of Period
Lab./Field Training/ Experiment Contents of Course	<ul style="list-style-type: none"> ➤ Verification of Beer-Lambert's law. ➤ Separation of sugars using paper chromatography. ➤ Separation of amino acids by paper chromatography ➤ Differential centrifugation of cell organelles ➤ SDS-PAGE gel electrophoresis of protein ➤ Separation of plant pigments by Paper chromatography ➤ Estimation of DNA and RNA. 		30
Keywords	Spectroscopy, Estimation, Quantitative, Separation, Techniques		

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PART-C: Learning Resources		
Text Books, Reference Books and Others		
Text Books Recommended –		
<ul style="list-style-type: none"> ➤ K Wilson and John Walker Practical Biochemistry: Principles & Techniques ➤ RF Boyer Biochemistry Laboratory: Modern Theory & Techniques ➤ Physical biochemistry by D Friefelder, WH Freeman & Co., USA. ➤ Biophysical Chemistry By Upahyaya & Nath 		
Online Resources–		
<ul style="list-style-type: none"> ➤ e-Resources / e-books and e-learning portals ➤ https://en.wikibooks.org/wiki/Biochemistry ➤ https://www.pdfdrive.com/biomolecules-books.html ➤ https://ncert.nic.in/textbook.php 		
PART -D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks:		50 Marks
Continuous Internal Assessment (CIA):		15 Marks
End Semester Exam (ESE):		35 Marks
Continuous Internal Assessment (CIA): (By Course Teacher)	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
End Semester Exam (ESE):	Laboratory / Field Skill Performance: On spot Assessment 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	Managed by Course teacher as per lab. status

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