

St. Xavier's College (Autonomous), Ahmedabad
Syllabus of Semester – II of the following departments under Faculty of Science
based on Under Graduate Curriculum Framework – 2023 (NEP)
to be implemented from the Academic Year 2023-24.

FACULTY OF SCIENCE

DEPARTMENT OF BIOCHEMISTRY

Course	Title	Content	Hours/Week	Credit
SEC	BC – 2650 Biophysical Techniques - II	U-1: Spectroscopy U-2: Chromatography	4 hrs	2

BSC. (HONS.) BIOCHEMISTRY SYLLABUS

SEMESTER - II

Skill Enhancement Course – 1: Spectroscopy and Chromatography

Course Code	Title &	Credit Distribution of The Course			Eligibility Criteria	Prerequisite(s) of the Course (if any)
		Lecture	Tutorial	Practical / Practice		
BT – 2650	Spectroscopy and Chromatography	2 (30 hr)	0	0	10 + 2 from a recognized board in any stream	Nil

I. Course Learning Objectives

Thus, the knowledge from this course can help in the following:

- The students could pursue a career in industries that specialize in Instrumentation specifically for Life Science Research and Analysis
- Avail jobs in Production, Quality Control and Rand D divisions of Pharmaceutical and Biotech companies.
- The students can carry out basic research in various areas of biology due to their understanding of the techniques
- Start up companies supplying basic instruments like colorimeters, pH meters, etc.

II. Course Outcome

By the end of the paper, a student should be able to:

- CO 1: Correlate the basic concepts of physics like adsorption, surface tension, absorption of light with concepts in biochemistry and biotechnology
- CO 2: Correlate the use of a particular technique to understand a fundamental.

- CO 3: Evaluate the advancement of biophysics opening up understanding pathways and mode of actions of various biological systems.
- CO 4: Apply the techniques for production, analysis and modifications of biomolecules.
- CO 5: Design experiments with appropriate techniques in the methodologies and analyze the data obtained.

III. Course Content

Unit 1: Colorimeter and Spectroscopy (Credit 1)

Beer-Lambert's law, principle, working of single cell and double cell colorimeter.

Principle, working, applications, advantages and disadvantages of spectrophotometers and spectrofluorimeters (expand in detail monochromators, light source)

Principle and applications of NMR, IR spectroscopy and atomic absorption spectroscopy

Analysis of spectra

Unit 2: Chromatography (1 Credit)

Principle of adsorption, orientation of molecules on a surface, factors affecting adsorption, application of adsorption

Principle, technique, applications, advantages and disadvantages of: Ion exchange, gel filtration, affinity chromatography. Adsorption chromatography. Thin layer chromatography, reverse phase chromatography, hydrophobic interaction chromatography, HPLC, GLC.

IV. Recommended learning Resources

1. Berg JM, and Tymoczko TJ, Stryer L,: Biochemistry (6th Ed)
2. Daniel, C Harris: Quantitative Chemical Analysis
3. David Freifelder: Physical biochemistry (2nd Ed) WH Freeman, USA)
4. Donald Voet and Voet J: Biochemistry (4th Ed) 2011
5. Ghatak KL: Techniques and methods in Biology. PHI learning Pvt Ltd. 2011
6. Nelson DL and Cox MM: Lehninger's Principles of Biochemistry (5th Ed) 2008
7. Oser: Hawks Physiological Chemistry (4th Ed) 1965.
8. Upadhyay and Nath: Biophysical chemistry: Principles and Techniques (3rd Ed)
9. Van Holde KE: Physical Biochemistry. Prentice Hall, NJ.
10. Vogel AI: A text book of quantitative inorganic analysis (3rd Ed), 1975.
11. Westand Todd: Text book of biochemistry ((4th Ed) 1970
12. Wharton and McCarty: Experiments and methods in Biochemistry
13. Willard and Merrit: Instrumental methods of analysis (4th Ed) 1971.
14. Wilson K and Walker J: Principles and Techniques of Biochemistry and Molecular Biology (6th Ed) 2006. Cambridge University Press.

V. Pedagogy

A. For Theory

1. Classroom engagement through lectures and PowerPoints
2. Lecture videos and online resources
3. Workbooks/Group activities/Assignments/Class Tests

VI. Evaluation

The course paper is evaluated out of 50 marks, of which 50 percent weightage is of Internal Assessment and 50 percent weightage is of the End semester examination (External)

ASSESSMENT CRITERIA	INTERNAL EVALUATION	EXTERNAL EVALUATION
Continuous Internal Assessment (CIA) I and II	15	-
Assignment	05	-
Attendance	05	-
End Semester Exam	-	25
Total	25	25

**The internal evaluation of CIA II and Assignment will be based on evaluative modules prepared by the concerned faculty members, which will be outlined during the course work.*