

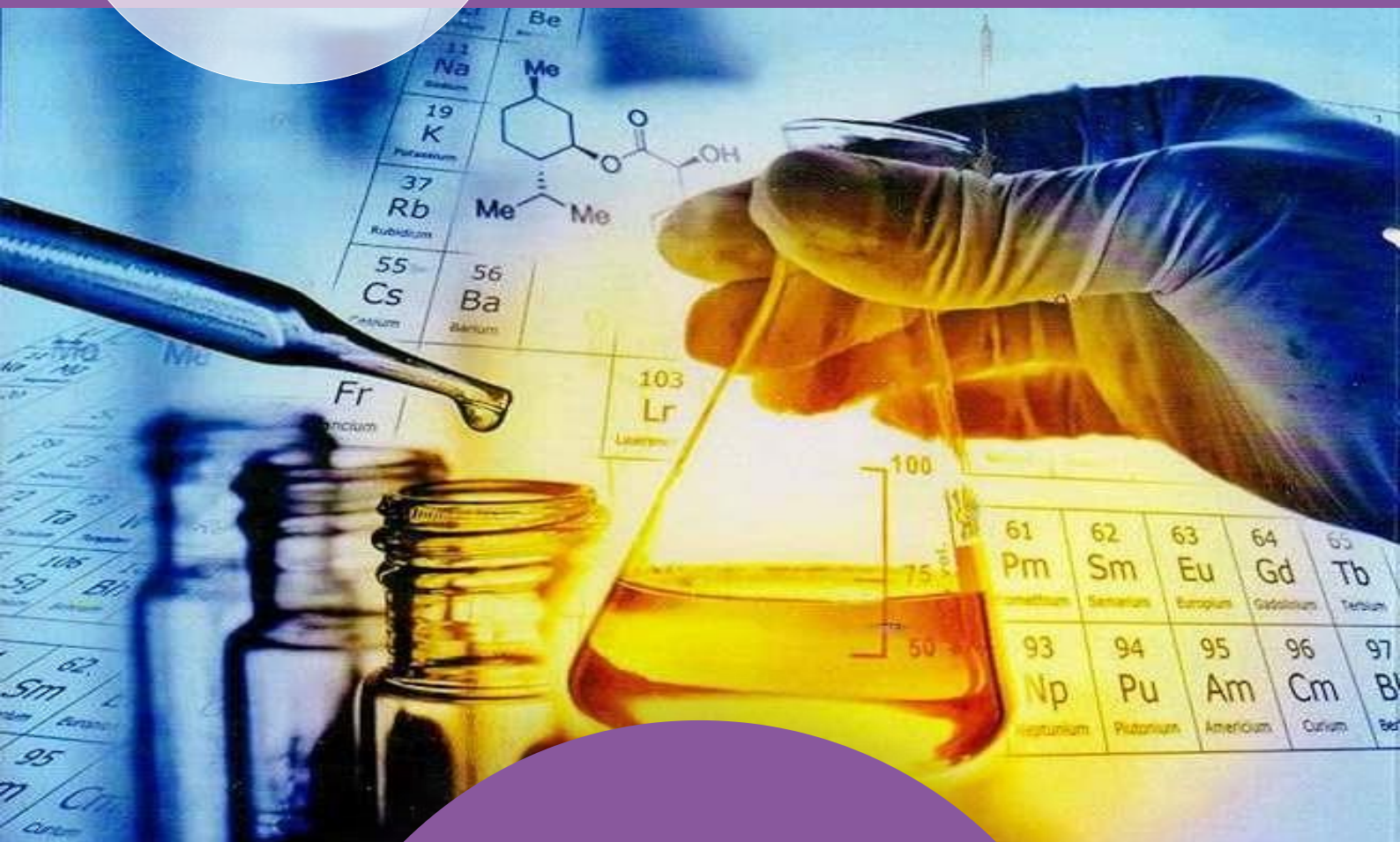


SHARDA
UNIVERSITY
Beyond Boundaries



**SHARDA SCHOOL OF
BASIC SCIENCES
& RESEARCH**

Department of Chemistry and Biochemistry



COURSE
**Introduction
to Analytical
Methods
(NV33011)**

**VALUE ADDED
COURSE BROCHURE
2024-25**

SHARDA UNIVERSITY

Sharda University envisions to serve the society by being a global University of higher learning in pursuit of academic excellence, innovation and nurturing entrepreneurship. It has 13,000+ students from 95+ countries, 29 states, and Union Territories, providing cultural diversity and global exposure to students. It has 26000+ alumni who are today leaders in their realms. Sharda University is NAAC A+ University with Overall NIRF Rank of 87. Teaching Learning Center at Sharda University is to equip the faculty members with the expertise, skills and knowledge they need for capacity building of students. Teaching as a profession requires highly specialized skills and knowledge to impact significantly on student learning and therefore teachers must refine their conceptual and pedagogical skills.

ABOUT THE SCHOOL

Sharda School of Basic Sciences and Research (SSBSR) boasts of providing an interdisciplinary approach, exposure to different disciplines in science including Chemistry, Bio-Chemistry, Physics, Mathematics, Life Sciences, and Environmental Sciences. The Sharda School of Basic Sciences and Research is unique from other institutions of higher learning as it is committed to imparting knowledge in pure and applied sciences, which not only forms the foundation for further academic pursuits in science and technology but also acts as the foundation for students to pursue a career in multi facet directions. The academic programs are designed to meet the requirement of the latest technological developments and envisages to become a state-of-the-art department that cater the students at Graduate, Post- Graduate and Research level along with providing high- quality education and cutting-edge interdisciplinary research in sciences. SSBSR has well-equipped laboratories for Physics, MATLAB, Microbiology, Molecular Biology, Cell Culture, Virology, Biochemistry, Physical, Organic and Inorganic chemistry for Graduate and Post-Graduate Programs. In addition, there are Central Instrumentation Facility (CIF) and other advance research labs to promote research culture.

DEPARTMENT OF CHEMISTRY & BIOCHEMISTRY

The Department of Chemistry & Biochemistry endeavors to be nationally recognized model for nurturing students who can contribute to the ever changing technology of 21st century. The Department is committed to provide an excellent teaching & learning atmosphere for Undergraduate as well as post graduate students.

RESOURCE PERSON

Dr. Priya Das

Dr. Priya Das is currently serving as an assistant professor in the Department of Chemistry and Biochemistry at Sharda University. I obtained my bachelor's degree from Presidency University, Kolkata and completed my masters degree at IIT Guwahati with a specialization in physical chemistry. I pursued my doctoral studies at IIT Guwahati under the guidance of Prof. Arun Chattopadhyay, specializing in the fascinating field of materials science.

Throughout my doctoral journey, a significant research accomplishment was achieving hierarchical angular stacking of two-dimensional crystalline nanosheets with specific twist angles through chemical guidance.

This resulted in the creation of quasiperiodic lattices and moiré superlattices comprised of luminescent nanoclusters. This breakthrough in twisted stacking, based on chemical principles, holds great promise for chemists to explore a wide array of exciting new phenomena utilizing the concept of moiré physics.

My research focuses on the synthesis and characterization of novel materials, with specific interests in materials chemistry, 2D materials, nanomaterials, and moiré superlattices. My work aims to contribute to the development of advanced materials with diverse applications in various fields.

MODULE

School: SSBSR		Batch : 2024-27
Program: B.Sc. (UG)		Current Academic Year: 2024-25
Branch: Chemistry/Biochemistry		Term : Even (2402), Semester : II
1. Course Code	NV33011	
2. Course Title	Introduction to Analytical Methods	
3. Credits		
4. LTPC	(30 Hours)	
Course Type	Value added course	
5. Course Objective	<p>Students will gain the knowledge and skill on the various instrumental techniques adopted in the laboratory. They will become conversant of how to do sample preparation, separation of mixture into pure ingredients, safe handling of chemicals and setting up the reaction assembly.</p> <p>Student will have the knowledge of:</p> <ul style="list-style-type: none"> • Instrumental measurements & Calibration (HPLC and UV-Vis Spectroscopy) • Standards, Blank and sample preparation • Separation, purification and characterization of functional properties <p>Setting up of apparatus for chemical reactions; pressure reactions, vapor phase reactions, photochemical reactions, electro-chemical reactions etc.</p>	
6. Course Outcomes	<p>CO1: The student will be able to understand the use of analytical practices used for data acquisition in chemical laboratory.</p> <p>CO2: The student will be able to understand the sample preparation techniques adopted in laboratory.</p> <p>CO3: The student will be able to learn mixture separation, purification and characterization techniques.</p> <p>CO4: The student will be able to measure the chemical properties of materials.</p> <p>CO5: The student will be able to adopt safe chemical laboratory handling & storage of chemicals.</p> <p>CO6: The student will be able to gain knowledge on assembling of glass apparatus to perform specialized laboratory reactions.</p>	
7. Course Description	This course will introduce instrumental methods and practices adopted in chemical laboratory related to mixture separation, material purification, characterization and synthesis of commercial products while practicing safe handling and storage instructions of hazardous and explosive chemicals.	
8. Outline syllabus		CO Mapping
Unit 1	Introduction to Instrumental Chemistry	
A	Review of the Analytical Chemistry, Analysis Methods,	CO1/CO6
B	Basics of Measurement; Sensors, Detectors, and Thermocouples	CO1/CO6
C	Calibration of an Instrument and Data Acquisition	CO1/CO6
Unit 2	Standards, Blanks & Sample Preparation	
A	Sample Preparation: Particle Size Reduction, Sample Homogenization, Solid-Liquid Extraction	CO2/CO6
B	Extraction from Liquid Solutions, Separatory Funnel, Percent Extracted, Dilution, Concentration using Evaporators, and Solvent Exchange, Sample Stability	CO2/CO6
C	Preparation of Standards, Blanks and Controls	CO2/CO6
Unit 3	Separation, Identification & Characterization	
A	Introduction to basic Chromatography, Spectroscopy,	CO3/CO6
B	Qualitative/Quantitative Analysis using analytical techniques, HPLC (High-performance liquid chromatography)	CO3/CO6
C	Qualitative/Quantitative Analysis using analytical techniques, UV-Vis Spectroscopy (Ultraviolet-visible spectroscopy)	CO3/CO6
Unit 4	Laboratory Apparatus & Reaction Procedures	
A	General Laboratory Apparatus, Ground glass joints	CO4/CO6
B	Mechanical Agitation, Reaction assemblies for standard reaction procedure	CO4/CO6
C	Pressure Reactions and Vapour Phase Reaction	CO4/CO6
Unit 5	Material Handling & Storage	
A	Preparation of Material Safety Data Sheet (MSDS) including General Instruction for safe handling of chemicals in laboratory	CO5/CO6
B	Hazards in Chemical laboratory, Explosion & Fire Hazards	CO5/CO6
C	Reactive Reagents, Toxic Chemicals, Hazards Symbols	CO5/CO6
Mode of examination	Assignments, Quizzes & Viva	