

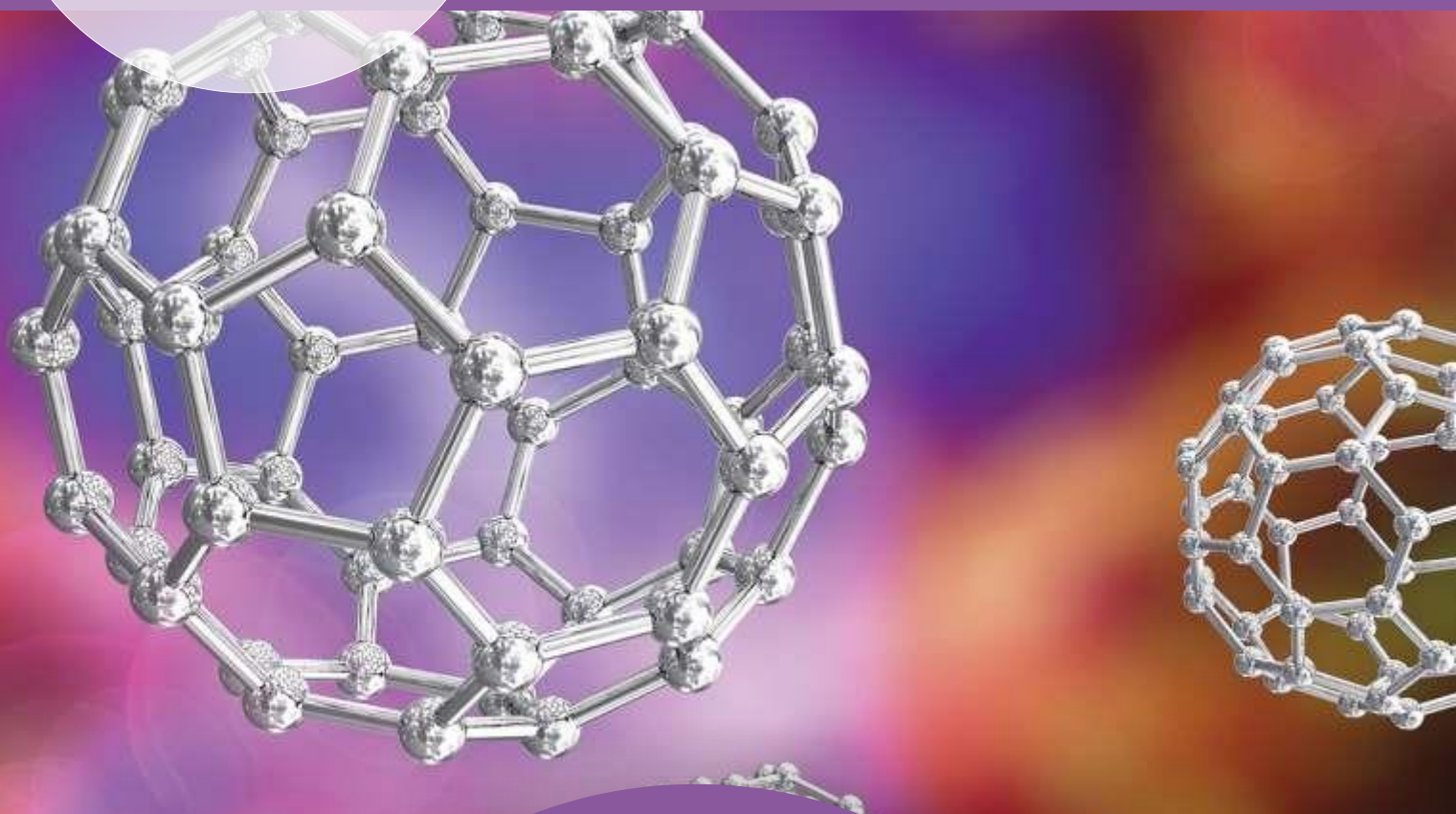


SHARDA
UNIVERSITY
Beyond Boundaries



**SHARDA SCHOOL OF
BASIC SCIENCES
& RESEARCH**

Department of Chemistry and Biochemistry



COURSE

**Nanomaterials:
Synthesis and
Applications**
(VAS304)

**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 has completed her Ph.D. from IIT Guwahati. She is working as an Assistant Professor in the Department of Chemistry & Biochemistry, SSBSR, Sharda University. In her research work she has successfully shown the chemical-guided hierarchical angular stacking of two-dimensional crystalline nanosheets with specific twist angles generating quasiperiodic lattices and moiré superlattices of luminescence copper nanoclusters. The discovery of twisted stacking based on chemical principles might open a great opportunity to chemists to unravel many exciting novel phenomena using the idea of moiré physics. She has sound knowledge of - Spectrofluorimeter, UV-Vis Spectrophotometer, Transmission Electron Microscope (TEM), FTIR Spectrometer, Circular Dichroism Spectrophotometer (CD), Gamry Electrochemical Workstation, Centrifuge, Time-resolved photoluminescence spectrometer (TRPL).

Schedule

Week 1	15 July - 21 July	2 lectures
Week 2	22 July - 28 July	2 lectures
Week 3	29 July - 04 August	2 lectures
Week 4	05 August - 11 August	2 lectures
Week 5	12 August - 18 August	2 lectures
Week 6	19 August - 25 August	2 lectures
Week 7	26 August - 01 September	2 lectures
Week 8	02 September - 08 September	2 lectures
Week 9	09 September - 15 September	2 lectures
Week 10	16 September - 22 September	2 lectures
Week 11	30 September - 06 October	2 lectures
Week 12	07 October - 13 October	2 lectures
Week 13	14 October - 20 October	2 lectures
Week 14	21 October - 27 October	2 lectures
Week 15	28 October - 03 November	2 lectures
Week 16	04 November - 10 November	2 lectures
Week 17	11 November - 17 November	2 lectures
Week 18	18 November - 24 November	2 lectures

MODULE

School: SBSR		Batch : 2024-27
Program: B.Sc.		Current Academic Year: 2024-25
Branch: Chemistry/Biochemistry		Semester: Odd(Sem V)
1. Course Code	VAS304	
2. Course Title	Nanomaterials : Synthesis and Applications	
3. Credits	0	
4. LTPC	3-0-0-0	
Course Type	Value added course	
5. Course Objective	<p>To -</p> <ol style="list-style-type: none"> 1. Teach the advanced methods towards the synthesis of nano materials. 2. Demonstrate the advanced methods towards the synthesis of nanomaterials/nanocomposites. 3. Discuss the mechanical and magnetic behaviour of nano materials. 4. Illustrate the basics and phenomenon associated with the electrical and optical behaviour. 5. Explain modern spectroscopic and microscopic methods towards the characterization of nano materials. 6. Demonstrate the novel materials from synthetic, analysis and application perspectives. 	
6. Course Outcomes	<p>Students will be able to</p> <p>CO1: Formulate the synthetic methods towards preparation of novel nanomaterials.</p> <p>CO2: Understand the diverse magnetic behavior of nanomaterials</p> <p>CO3: Prepare the mechanistic pathway towards facile synthesis of nanomaterials</p> <p>CO4: Apply the various electro-optical phenomenon of the materials and characterize the materials via spectroscopic and microscopic tools.</p> <p>CO5: Evaluate the diverse applications of nanomaterials</p> <p>CO6: Execute the advanced synthetic perspectives along with physical properties and the applications of nanomaterials</p>	
7. Course Description	The Value Added Course on Chemistry of Materials aims to teach the modern and advanced methods of synthesis, characterization and properties of novel nanomaterials.	
8. Outline syllabus		CO Mapping
Unit 1	Introduction to nanomaterials (3 hrs)	
A	Introduction: Definitions, Classification of nanomaterials,	CO1/CO6
B	Size & Scale, Units Scaling, Atoms, Molecules,	CO1/CO6
C	Clusters and Quantum dots	CO1/CO6
Unit 2	Properties of nanomaterials (6h)	
A	Properties and Size dependence of properties	CO2/CO6
B	Chemical, Optical properties	CO2/CO6
C	Magnetic Mechanical properties	CO2/CO6
Unit 3	Nanomaterial Synthesis (6h)	
A	Chemical synthesis of metal/metal oxide nanoparticle	CO3/CO6
B	Bio inspired synthesis of metal/metal oxide nanoparticle	CO3/CO6
C	Nanocomposite fabrication on polymer matrix	CO3/CO6
Unit 4	Nanomaterial characterization techniques (6h)	
A	Introduction to characterization techniques for nanomaterials	CO4/CO6
B	Interpretation of SPR band by UV-Vis	CO4/CO6
C	Functional group identification by FTIR spectrum of nanomaterials	CO4/CO6
Unit 5	Applications of nanomaterials (9h)	
A	Applications in bio-sensing	CO5/CO6
B	Catalytic applications of nanomaterials	CO5/CO6
C	Biological/bio-medical applications	CO5/CO6
Mode of examination	Assignments, Quizzes & Viva	