



Nanotechnology & Material Synthesis Workshop



INTRODUCTION:

Nanotechnology is a rapidly evolving field that focuses on the study, design, and application of materials at the nanoscale (1–100 nm), where materials exhibit unique physical, chemical, and biological properties that differ significantly from their bulk counterparts. These nanoscale materials play a vital role in modern technologies, including energy storage systems, electronics, healthcare applications, environmental remediation, and advanced functional coatings. Material synthesis forms the core of nanotechnology, enabling the controlled fabrication of nanomaterials with tailored properties for specific applications. A strong understanding of nanotechnology fundamentals and material synthesis techniques is therefore essential for students, researchers, and professionals interested in emerging scientific and technological innovations. This workshop aims to provide a structured introduction to nanotechnology concepts along with practical exposure to material synthesis methods, effectively bridging the gap between theoretical knowledge and real-world applications.

ABSTRACT:

This workshop introduces participants to the fundamentals of nanotechnology, beginning with basic concepts and progressing toward advanced applications and innovations, providing a clear understanding of nanoscale phenomena, types of nanomaterials, and their significance in

various technological domains. The core focus of the workshop is hands-on training in material synthesis, where participants will practically learn the synthesis of zinc oxide (ZnO) nanomaterials, gaining insight into precursor selection, reaction conditions, and essential synthesis principles. By the end of the workshop, participants will have practical experience in zinc oxide nanomaterial synthesis and a clear understanding of how nanotechnology and material synthesis are applied in research, industry, and emerging technological applications.

DISCUSSION IN WORKSHOP:

Total Duration: 120 Minutes

Laboratory / Tools Required: Nano lab setup for material synthesis.

TOPIC	DETAILS
1.Introduction to Nanotechnology	Basics of nanotechnology, nanoscale effects, classification of nanomaterials, and real-world applications
2.Fundamentals of Material Synthesis	Overview of material synthesis methods, bottom-up and top-down approaches
3.Applications & Advanced Innovations	Use of nanomaterials in energy, electronics, healthcare, sensors, and environmental applications
4. Hands-on Nanomaterial Synthesis	Practical synthesis of Zinc Oxide (ZnO) nanomaterials

PREREQUISITES:

This workshop is beginner-friendly and open to participants from all academic backgrounds, **requiring no prior experience in nanotechnology or material synthesis**, a keen interest in learning and experimentation is sufficient, and by the end of the workshop participants will gain a clear understanding of nanotechnology fundamentals, material synthesis techniques, and practical applications of nanomaterials in modern technology and research.