

Registration Seminar

Seminar Title	: Metal (Fe)-organic Framework-Derived α -Fe ₂ O ₃ -based heterostructures for Multimodal Photocatalytic Applications
Speaker	: Sesadeva Mallick (Rollno : 523cy1003)
Supervisor	: Aparna Mondal
Venue	: Seminar Hall, Chemistry Department
Date and Time	: 23 Jul 2025 (11 a.m.)
Abstract	: With increasing industrialization and urbanization, the release of effluents from industries, mines, and landfills into water bodies has become widespread. Among these pollutants, hexavalent chromium Cr (VI), used in wood preservation, textiles, steel production, and leather processing, is highly toxic and poses serious health risks due to its mutagenic and carcinogenic nature. Additionally, organic dyes like Rhodamine B (RhB), commonly used in textile and dyeing industries, contribute significantly to water pollution due to their high stability and toxicity. These concerns have intensified the demand for efficient water treatment technologies. Photocatalytic reduction has emerged as a promising strategy for removing both heavy metals like Cr (VI) and persistent organic dyes such as RhB from wastewater. In this study, we developed nanocomposites designed to enhance the photocatalytic reduction of Cr (VI) and degradation of RhB, offering a dual-function solution for tackling complex water pollution challenges. These composites were characterized using techniques such as X-ray diffraction (XRD), Fourier Transform Infrared Spectroscopy (FT-IR), Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), UV-Vis Diffuse Reflectance Spectroscopy (UV-Vis DRS), Energy Dispersive X-ray Analysis (EDX), and Photoluminescence (PL) spectroscopy. Notably, the metal (Fe)-organic framework-derived α -Fe ₂ O ₃ -based heterostructures i.e. α -Fe ₂ O ₃ @Ag ₂ CO ₃ (FAC-X) binary heterostructures functioning as photocatalysts showed superior performance due to effective charge separation and improved visible light absorption. This enhanced photocatalytic activity highlights the potential for further applications through structural and surface modifications.