

Course Code	Course Title	Credit Hours
ENE-845	Environmental Catalysis	3 (3+0)

Course Description

This course will provide students with an introduction to the role of catalysis in abating pollutant emissions and developing future environmentally friendly energy technologies. A review of catalysis fundamentals, including modern preparation and characterization techniques, will be provided.

Course Outline

Catalysis and environment: Examines how catalysts reduce environmental impacts by promoting cleaner processes, minimizing pollutants, and supporting sustainable industrial and chemical practices.

Catalyst Synthesis: Covers methods to create catalysts, emphasizing techniques to control size, surface area, and active site distribution for enhanced catalytic performance.

Characterization of catalyst materials: Discusses techniques like XRD, SEM, and spectroscopy to analyze catalyst structure, composition, and properties, linking these to performance.

Application in green energy production: Explores catalysts in hydrogen production, fuel cells, and biofuels, highlighting their role in enhancing renewable energy processes.

Catalysis in Chemical Industry: Focuses on catalysts in industrial chemical production, improving efficiency, reducing energy use, and minimizing waste.

Application in abatement of pollutants: Details catalyst use in pollution control, including catalytic converters, water purification, and wastewater treatment to reduce environmental contaminants.

Recommended Books

1. Nanostructured Catalysts for Environmental Applications by Marco Piumetti, Samir Bensaid (2021)
2. Environmental Catalysis and the Corresponding Catalytic Mechanism by Andres Fullana, Hongqi Sun, Zhimin Ao (2019)
3. Nanotechnologies for Environmental Remediation (2019), Giusy Lofrano, Giovanni Libralato, Jeanette Brown, ISBN 331953162X