
Registration Seminar

Seminar Title	: Development and performance evaluation of microencapsulated phase change materials for long-term seasonal thermal energy storage in built environment
Speaker	: Shovit Kumar Sahu (Rollno : 523me1002)
Supervisor	: Sushil Kumar Rathore
Venue	: Seminar Hall (Mechanical Engineering Department) : ME-001
Date and Time	: 16 Apr 2025 (10:00 AM)
Abstract	: The rising global energy demand and negative environmental impact associated with fossil fuel consumption have emphasized the necessity of renewable energy sources. However, the irregularity and unpredictability of many renewable energy sources require efficient energy storage solutions. Thermal energy storage is a reliable method frequently utilized to address misalignments between energy supply and demand. Latent heat storage using phase change materials is highly preferred due to its high energy storage density and ability to maintain an almost constant temperature during phase transitions. Despite their benefits, phase change materials face challenges like low thermal conductivity, corrosion, and leakage during melting, which limit their practical applications. Microencapsulation technology has been developed to overcome these challenges by surrounding the phase change material within a polymeric or inorganic shell. The study provides a complete overview of microencapsulated phase change materials, including encapsulation materials, synthesis methods, characterization techniques, and their various applications. It also discusses recent experimental and numerical studies on microencapsulated phase change materials, highlighting recent advancements and future research directions in thermal energy storage. The general solutions of the air enthalpy model, PCM enthalpy model, and PCM interface enthalpy model are obtained using the Laplace transformation method.