National Institute of Technology Rourkela

Defence Seminar

Seminar Title	: DESIGN AND DEVELOPMENT OF NOVEL DESICCANT COATED FIN TUBE HEAT EXCHANGER FOR AIR CONDITIONING APPLICATION
Speaker	: Gaurav Priyadarshi (Rollno : 519me1011)
Supervisor	: Dr. Bukke Kiran Naik
Venue	: ME Seminar Hall Room No.: 001 (Offline mode)
Date and Time	: 30 Oct 2024 (5:00 PM)
Abstract	: This research explores the potential of Desiccant Coated Fin Tube Heat Exchangers (DCFTHE) to enhance indoor air quality, energy efficiency, and reduce microbial pollutants in air conditioning systems. Using silica gel as a desiccant, DCFTHE decouples sensible and latent heat loads and utilizes low-grade thermal energy, offering an alternative to traditional systems. Two dynamic models and AI/ML approaches (ANFIS, KNN, ANN, PCA, and PINNs) are developed for performance prediction and optimization. Experiments show a maximum moisture uptake of 0.345 g/g for silica gel. The integration of phase change materials (PCMs) with DCFTHE is also studied, with Palmitic acid showing the highest thermal energy storage effectiveness. This research paves the way for novel DCFTHE designs and broader applications, including renewable energy integration.