National Institute of Technology Rourkela

Registration Seminar

Seminar Title	: Design, Analysis, and stabilization of quadcopters with acoustic and vibration control strategies
Speaker	: Bipllab Chakraborty (Rollno : 523me6012)
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Venue	: ME Seminar Hall
Date and Time	: 06 Jun 2025 (11.30 am)
Abstract	: Quadcopters have wide applications in various civilian and military fields. The noise and vibration signals emitted by such structures are annoying and lead to flight instabilities. Right identification and control of excessive noise/vibration is therefore important. The proposed work deals with the problems in combination through noise reduction, vibration regulation, and stabilisation of multi-rotor quadcopter drone systems. The acoustic analysis of the system is initially performed using microphone sensor and the signals are recorded during up flight, hovering and forward motion. A novel design for passive constrained layer damper propeller blades is presented to absorb the noise associated with vortices. The amount of signal minimized with varying degrees of passive layer thickness is reported. In continuation, a semi-active method called phase synchronization is considered to reduce the acoustical interferences. Further, the stability and navigation with modified design of the propellers is analysed both theoretically and experimentally. Practically, wind disturbances and presence of gust loads during the flight are considered and autonomous trajectory tracking control with intelligent disturbance observer is planned. The future work plan is finally provided.