National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Kinematic analysis and Optimal design of three-stage flapping wing mechanism
Speaker	: Sudhir Kumar Yadav (523me1015)
Supervisor	: Prof. S Datta (PIC, Departmental Seminar)
Venue	: Seminar Hall (Department of Mechanical Engineering)
Date and Time	: 11 Sep 2025 (04:00 PM)
Abstract	: Ornithopters are unmanned aerial vehicles developed based on the inspiration of bird flight with flapping wings This paper proposes an optimization methodology of a double rocker-crank foldable flapping wing mechanism of an ornithopter. Initially, kinematic analysis of the mechanism is presented and the optimum design formulation is proposed. The constrained multi-objective optimization problem is solved using teaching learning-based optimization approach and the results are compared. The flapping angle limits and minimum transmission angle constrains are arrived. Then a 3-D model of the mechanism is developed in SOLIDWORKS and the output angular displacements are obtained from the motion simulation. Further, the static analysis of the wing is performed to obtain maximum stress for a known motor torque as input. The fabrication procedure of laboratory scaled model is also illustrated. Future work plan is provided at the end.