National Institute of Technology Rourkela

Registration Seminar

Seminar Title	: Dynamical Problems of Size-Dependent Perforated Structures
Speaker	: Ramanath Garai (Rollno : 523ma1011)
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Venue	: Seminar Room, Department of Mathematics
Date and Time	: 08 Sep 2025 (11:30 AM)
Abstract	: This study investigates the vibrational characteristics namely, the natural frequencies of size-dependent perforated beam structures having periodic square perforations. The governing differential equation is formulated based on the Euler-Bernoulli beam theory, incorporating the effects of material non-homogeneity and geometric discontinuities. The perforation is taken as periodic square hole perforation with a filling ratio parameter. The Rayleigh-Ritz method, supported by suitable admissible functions, is employed to extract non-dimensional frequency parameters under different boundary conditions. Mathematical expression specifically the modified equivalent models are presented due to the perforation. The study investigates how variations in material density and Young&rsquos modulus, along with perforation characteristics such as filling ratio, number of holes, and foundation stiffness parameters, affect the vibrational response of the beam. These findings are of significant importance for the design and optimization of perforated beam structures and devices.