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Synopsis Seminar

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Seminar Title	: A study of nonlinear elliptic PDEs with Navier and Dirichlet boundary conditions
Speaker	: Rupali Kumari ( Rollno : 520ma1005)
Supervisor	: Rasmita Kar
Venue	: Seminar Room(Department of Mathematics)
Date and Time	: 30 Jun 2025 (5:00pm)
Abstract	: Our work is devoted to the analysis of elliptic boundary value problems within the framework of weighted Sobolev spaces, with a particular focus on problems involving the biharmonic operator under the Navier boundary conditions. Weighted spaces naturally arise when studying PDEs in nonhomogeneous media, domains with singularities, degenerate or singular coefficients. Additionally, this work explores nonlinear operators of divergence form with Dirichlet boundary conditions. Special attention is given to the equation with nonlinear $p$ -Laplacian operator. These problems introduce significant analytical challenges, stemming both from the degeneracy and singularity introduced by the weights, and from the inherent nonlinearity of the operators. The main contribution of our work include the establishment of existence, uniqueness for various classes of boundary value problems. We also proved the properties of solutions set for some problems. Appropriate functional settings and formulations are developed, highlighting the interplay between the geometry of the domain, choice of weights and the nature of the differential operators involved.