

Finite Element Methods

Course Code: ME-478	Credit Hrs: 2-1
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Text Books & Reference Books:

1. Richard G. Budynass, Advanced Strength and Applied Stress Analysis, McGrawHill
2. Saeed Moaveni, Finite Element Analysis – Theory and Applications with ANSYS , Prentice Hall
3. M J Fagan , Finite Element Analysis – Theory and Practice , Pearson Publications

Course Outline:

- Introduction to FEA and Element Performance: Introduction to Finite Element Modeling and preliminary decisions, Element types and their properties, Basic concepts of equilibrium & compatibility, General factors affecting element performance – Sources of errors & Convergence.
- FE Methods, Shape Functions, Stiffness Matrix, and Transformation: Direct Stiffness Method, Energy Methods, Shape Function: Linear and Quadratic Element, Beam Elements, Truss Elements, Linear and Planar elements & Stiffness matrix, Local to Global Coordinate Transformation Assembly
- Static Structural Analysis: Modeling and analysis of 1D, 2D and 3D structures under static loading
- Heat Transfer and Thermal Stress Analysis: Introduction to Heat transfer, Thermal and Thermal Stress analysis concepts, Selection of Boundary Conditions based on the identification of problem, Thermal Analysis (Steady State) & Thermal stress Analysis.

- Dynamic Analysis: Introduction to different types of dynamic analysis, Modal Analysis, Frequency Response Analysis, Transient Response Analysis, master's degrees of Freedom

Assessments:

Quizzes, Assignments, Mid Exam, Final Exam