CE 428: FINITE ELEMENT METHODS IN ENGINEERING (3-0-0: 3)

Fundamental Concepts: Introduction to FE method, Basic Steps in FEM Formulation, Approximate methods of analysis (Method of weighted residuals, Rayleigh-Ritz Method); Approaches in FEM. Shape functions for 1-D, 2-D and 3-D elements. Formulations of 1-D and 2-D (e.g. plane stress and plane strain elements, plane axisymmetric elements) elements. Numerical integration.

Applications: Framed structures: plane stress and plane strain problems; axisymmetric problems;

FE Softwares: FE analyses using commercial softwares, Pre- and Post Processing (demonstration)

Text Books:

1. C. R. N. Alavala, "Finite Element Methods – Basic Concepts and Applications", PHI Learning Pvt. Ltd.
2. Y. M. Desai, T. I. Eldho and A.H. Shah, "Finite Element Method with Applications in Engineering", Pearson.

References:

1. J. N. Reddy, "An Introduction to Finite Element Method", Tata MGraw-Hill.
2. S. S. Rao, "The Finite Element Method in Engineering", Elsevier.
3. R. D. Cook, D.S. Malkus and M.E. Plesha, "Concepts and Applications of Finite Element Analysis", John Wiley & Sons.
4. T. R. Belegundu, "Finite Elements in Engineering", PHI Learning Pvt. Ltd.