5th Semester	RME5D006	Finite Element Methods in Engineering	L-T-P 3-0-0	3 Credits

Finite Element Methods in Engineering

MODULE – I **(12 HOURS)**

Review of 2-D and 3-D stress analyses, vibration, fluid flow and heat conduction problems. FEMfundamental concepts, Variational principles, Rayleigh Ritz and Galerkin Methods.Finite Element Modeling of one dimensional problems.Finite Element Analysis of 2-D and 3-D framed structures.

MODULE – II **(12 HOURS)**

FEM formulation of 2-D and 3-D stress analysis problems.Axisymmetric solids subjected to axisymmetric loadings.Two-dimensional isoparametric elements and numerical integration.

MODULE – III **(12 HOURS)**

FE modeling of basic vibration problemsFinite element modeling of fluid flow and heat conduction problemsComputer programs: preprocessing and post processing.Exposure to commercial FE codes such as ANSYS, NASTRAN and IDEAS etc.

Books:

[1] Finite Elements in Engineering, T.R.Chandraputla and A.D.Belegundu, PHI
[2] The Finite Element Method – Its Basis & Fundamentals, Zienkiewicz, Taylor and Zhu, Elsevier, 6th Edn

[3] Introduction to Finite Element Method, C.Desai and J.F.Abel, CBS publishers
[4] Introduction to Finite Element Method, J.N.Reddy, Tata McGraw Hill
[5] Numerical Methods in Finite Element Analysis, K.J.Bathe and E.L.Wilson, PHI
[6] Concepts & Applications of Finite Element Analysis,Cook, D.S.Malkus&M.E.Plesha, Wiley
[7] The Finite Element Method in Engineering, S.S.Rao, Elsevier
[8] A First Course in the Finite Element Method, D.L.Logan, Cengage Learning
[9] Fundamentals of Finite Element Analysis, David V. Hutton, Tata McGraw Hill

NPTEL MOOCs:

Course Name:	Basics Of Finite Element Analysis-I
Course Link:	https://nptel.ac.in/courses/112/104/112104193/
Course Instructor:	Prof. Nachikata Tiwari, IIT Kanpur