Year & Sem:	Course Code: CE3507	Course Name: **Introduction to Finite Element Analysis**	No. of Credits: 4	L 2	T&PS 2	P 0

UNIT I:
Approximate solution of boundary value problems-Methods of weighted residuals, approximate solution using variational method, Modified Galerkin method, Boundary conditions and general comments.

UNIT II:
Basic finite element concepts-Basic ideas in a finite element solution, General finite element solution procedure, Finite element equations using modified Galerkin method, Application: Axial deformation of bars, Axial spring element.

UNIT III:
Analysis of trusses-Two dimensional truss element, three dimensional space truss element, Stresses due to lack of fit and temperature changes.

UNIT IV:
Beam bending-Governing differential equation for beam bending, two node beam element, exact solution for uniform beams subjected to distributed loads using superposition, Calculation of stresses in beams, Thermal stresses in beams.

UNIT V:
Higher order elements for one dimensional problems-Shape functions for second order problems, Isoperimetric mapping concept, Quadratic isoparametric element for general one dimensional boundary value problem, One dimensional numerical integration, Application: Heat conduction through a thin film.

UNIT-VI:
Two dimensional boundary value problems using triangular elements, Equivalent functional for general 2D BVP, A triangular element for general 2D BVP, Numerical examples.

References/Text Books:
1. Concepts and applications of Finite Element Analysis – Robert D. Cook, Michael E Plesha, John Wiley & sons Publications.
2. Introduction to Finite Elements in Engineering- Tirupati R. Chandrupatla, Ashok D. Belgunda, PHI publications.
3. Bhatti, M.A., Fundamental Finite Element Analysis and Applications: with Mathematica and Matlab Computations, Wiley, 2005.
4. Fundamentals of Finite Element Analysis- David V. Hutton, Tata McGraw-Hill
5. Finite element Analysis- Theory and programming – C.S. Krishna Murthy, Tata McGra Hill.

Lecture Plan: Unit-I & -II syllabus for MID-I, Unit-III & -IV syllabus for MID-II and Unit-V & -VI syllabus for MID-III examinations.
Video Lectures (Web Links):
1. http://nptel.ac.in/courses/105106051/