Devi Ahilya University, Indore, India Institute of Engineering & Technology				I Year ME (Design & Thermal Engg.) Full Time				
Subject Code & Name	Instructions Hours per Week			Credits				
DTR1G4 **Finite Element Analysis**	L	T	P		L	T	P	Total
	3	1	0		3	1	0	4
Duration of Theory Paper: **3 Hours**								

Objectives & Pre requisites:

The basic objective of the subject is to deal with the fundamentals of Finite Element Methods. The subject is useful in understanding the concept of Solving problems using finite element approach.

COURSE OF CONTENTS

Unit-1

Introduction

Introduction, Approximate Methods of Analysis, Finite Element Method-An Introduction, Different Approaches in FEM.

Unit-2

Finite Elements and Interpolation Functions

Interpolation Functions, One Dimensional Elements, Two Dimensional Elements, Three Dimensional Elements.

Unit-3

One Dimensional Finite Element Analysis

Linear Spring, Truss Element, 1D Torsion of a Circular Shaft, 1D Steady State Heat Conduction, 1D Flow Through Porous Media, 1D Ideal Fluid Flow Through Pipes, Beam Element, Analysis of Plane Frames and Grids.

Unit-4

Two Dimensional Finite Element Analysis

2D Flow through Porous Media, 2D Stress Analysis, Iso-Parametric Formulation, Finite Element Solution of Partial Differential Equations by Method of Weighted Residual, FEM Formulation Based on Variational Principle, Finite Element Solution of Stokes Flow Equations.

Unit-5

Three Dimensional Finite Element Analysis

Axi-Symmetric Solids, 8 Node Isoparametric Element for 3D Stress Analysis, Computer Implementation of FEM, Applications of Finite Element Method.

Text Books

[1] Y. M. Desai, T. L. Eldho, A. H. Shah, "Finite Element Method with Applications in Engineering", Pearson Publication.
[2] Robert D. Cook, David S. Malkus, Michael E. Plesha, Robert J. Witt, "Concepts and Applications of Finite Element Analysis", Wiley India (P) Ltd.
[3] Chennakesava R. Alavala, "Finite Element Methods Basic Concepts and Applications", PHI Learning Private Limited.

Reference Books

[1] Daryl L. Logan, "A First Course in the Finite Element Method", Cengage Learning India.
[2] V. Ramamurti, "Finite Element Method in Machine Design", Narosa Publishing House.
[3] Klaus Jurgen Bathe, "Finite Element Procedures", PHI Learning India.