

GANPAT UNIVERSITY										
FACULTY OF ENGINEERING & TECHNOLOGY										
Programme		Master of Technology			Branch/Spec		Structural Engineering			
Semester		II			Version		2.0.0.0			
Effective from Academic Year			2020-21		Effective for the batch Admitted in			2020-21		
Subject code		3 SE 202		Subject Name		Finite Element Method				
Teaching scheme					Examination scheme (Marks)					
(Per week)		Lecture (DT)		Practical (Lab.)		Total	CE	SEE	Total	
		L	TU	P	TW					
Credit		3		1		4	Theory	60	40	100
Hours		3		2		5	Practical	30	20	50
Pre-requisites:										
Course Outcomes:										
CO1	Achieve Knowledge of design and development of problem solving skills.									
CO2	Understand the principles of stress-strain behaviour of continuum.									
CO3	Design and develop analytical skills.									
CO4	Describe the state of stress in a continuum									
CO5	Understand the concepts of elasticity and plasticity.									
Theory syllabus:										
Unit	Content								Hrs	
1	Introduction to Finite Element Method Brief history of the development, Advantages & disadvantages of finite element method, Displacement approach, Foundations of the FEM-energy principles								02	
2	Plane stress and Plane strain Linear elasticity, equations of equilibrium, stress, strain, constitutive relations, Boundary conditions, description of an elasticity problem as a boundary value problem, Plane stress, strain, axial symmetric problems, Introduction to plasticity, yield condition, ideal elastic-plastic material								04	
3	One Dimensional Finite Elements Stiffness matrix for the basic bar & beam element representation of distributed loading, The assembly process within the PMPE approach, Element stresses, shape functions & interpolation polynomials, refined one dimensional elements								08	
4	Finite Elements for Two Dimensional Planar Bodies Triangular elements for plane stress or strain conditions, Higher order triangular elements, Rectangular elements for plane stress or strain conditions, Higher order rectangular elements: Lagrange element family								06	
5	Finite Elements for Three Dimensional Analysis Tetrahedral elements, higher-order tetrahedral, Rectangular hexahedral elements, higher-order rectangular hexahedral: Lagrange element family								10	
6	Advanced Concepts in the Formulation of Two & Three Dimensional Elasticity Elements Natural co-ordinates, Area or triangular co-ordinates, Serendipity rectangles & hexahedral, Isoperimetric concept, properties of isoperimetric elements, numerical integration								10	
7	Finite Elements for Plate Bending Analysis 12-Degree of Freedom rectangular element, Triangular Elements								05	
Practical content										

