

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme		Bachelor of Technology			Branch/Spec.		Civil Engineering		
Semester		VII			Version		2.0.0.0		
Effective from Academic Year			2016-17		Effective for the batch Admitted in			2014-15	
Subject code		2CI711		Subject Name		ELECTIVE PAPER – I (COMPUTATIONAL TECHNIQUES IN STRUCTURAL ENGINEERING)			
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3		1		4	Theory	40	60	100
Hours	3		2		5	Practical	35	15	50
Pre-requisites:									
STRUCTURAL ANALYSIS-I & II									
Learning Outcome:									
After Completion of the Curriculum of this subject students can able to understand Advance method of Structural Analysis which helps to Analyse a high rise and Multi Story Building with computer application.									
Theory syllabus									
Unit	Content								Hrs
1	Stiffness method (a) Member Approach Overview of different stiffness & rotation-transformation matrices, analysis of beam, truss, plane frame with external load and secondary effects. Analysis of Grid & Space structures under loading & various secondary effects like deformation of support, restraint& temperature. Analysis of Composite structures having combination of different types members. (b) Special topics Symmetry/Anti-symmetry, Oblique supports, Elastic supports, Axial-flexural interaction.								11
2	Nonlinear Analysis Concepts of nonlinearity like Material nonlinearity, Geometry nonlinearity & Nonlinear analysis.								6
3	Finite Element Method Introduction to FEM, Types of problems, Stresses & Equilibrium, Strain-displacement relations, Stress-strain relations. Application of FEM to One dimensional (bar & beam) problems & two dimensional problems using Constant strain triangles.								10

	Two dimensional iso-parametric elements – Four noded quadrilateral elements, numerical integration, higher order elements.	
4	<p>Computer Applications</p> <p>Algorithm of Stiffness method Member Approach/Finite Element method.</p> <p>Different techniques for solution of equations using matrices, banded matrix, storage techniques for large size problem.</p> <p>Preparation of computer programs related to Curriculum using C, C++ and/or any computer programming language.</p> <p>Use of any professional Structural Engineering package to analyse & design real life structural engineering problem related to curriculum.</p>	6
5	<p>CAD Application</p> <p>Overview of CAD & various CAD software's, features of CAD software, Preprocessing & Post processing, Mesh Generation, Use of professional CAD software for detailing of Structures.</p>	6
Practical content		
<p>Term work shall consists of</p> <p>(a) minimum 5 problems from each topics no.1, 2 & 3 & cross checking with any professional Software and/or user made program.</p> <p>(b) Analysis of at least one real-life problem related to curriculum using Professional Software. (AutoCAD , Structural design – Steel & RCC,CAD lab ESR/GSR, STAAD-Pro/STRUDS/SAP-2000/STRAP/ETABS/ANSYS)</p> <p>(c) Minimum 5 CAD applications related to detailing of structure.</p> <p>Practical examination shall consist of oral based on above course.</p>		
Text Books		
1	Gere & Weaver ; Matrix Analysis of Framed Structures	
2	Bhavikatti; Finite Element Analysis	
Reference Books		
1	S SKhandare; CAD Application	
2	Meghre&Deshmukh ; Matrix Analysis of Structures	
3	Desai & Abel; Finite Element Method	