SILVER OAK UNIVERSITY

Engineering and Technology (M.Tech.)

Civil Engineering (Computer Aided Structural Analysis & Design)
Subject Name: Advanced Structural Analysis
Subject Code:
Semester: I

Prerequisite: Structural Analysis-I, II

Objective: To impart knowledge on the analysis of indeterminate structures like continuous beams, trusses and portal frames.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Evaluation Scheme				Total Marks
L	T	P	C	Internal		External		
				Th	Pr	Th	Pr	
2	0	0	2	40	-	60	-	100

Content:

Unit No.	Course Contents	Teaching Hours	Weightage %
1	Introduction to matrix methods of analysis – static indeterminacy and kinematic indeterminacy – degree of freedom – coordinate system – structure idealization stiffness and flexibility matrices – suitability element stiffness equations – elements flexibility equations – mixed force – displacement equations – for truss element, beam element and tensional element. Transformation of coordinates – element stiffness matrix – and load vector – local and global coordinates.	10	30
2	Assembly of stiffness matrix from element stiffness matrix – direct stiffness method – general procedure – band matrix – semi bandwidth – computer algorithm for assembly by direct stiffness matrix method.	05	20
3	Analysis of plane truss – continuous beam – plane frame and grids by flexibility methods.	04	15
4	Analysis of plane truss – continuous beam – plane frame and grids by stiffness methods.	04	15

5	Special analysis procedures – static condensation and sub structuring – initial and thermal stress. Shear walls- Necessity – structural behaviour of large frames with and without shear walls – approximate methods of analysis of shear walls	05	20

Course Outcome:
The learner will be able to analyse different indeterminate structures using Matrix methods.

Sr. No.	CO statement	Unit No
CO-1	Analysis stiffness matrix from element stiffness matrix	1,2
CO-2	Analysis of plane truss – continuous beam	3
CO-3	Analysis of plane frame and grids	4
CO-4	Analysis of shear walls.	5

Books Recommended:-

- Basic Structural Analysis by C.S. Reddy, Tata Mc-Graw hill
- Matrix Structural Analysis by Madhu B. Kanchi, John Willey publishers
- Indeterminate Structural Analysis by K.U. Muthuet al., I.K. International Publishing House Pvt. Ltd.
- Matrix Methods of Structural Analysis by J.L. Meek, Mc-Graw hill

List of Open Source Software/learning website:

http://nptel.ac.in/