

SARDAR RAJA COLLEGE OF ENGINEERING, ALANGULAM

DEPARTMENT OF CIVIL ENGINEERING

MICRO LESSON PLAN



SUBJECT NAME : STRUCTURAL ANALYSIS-II

SUBJECT CODE : CE 2351

YEAR/SEM : III / VI

STAFF NAME : K.MANIKANDAN

ASST.PROF / CIVIL

UNIT I FLEXIBILITY METHOD

12

Equilibrium and compatibility – Determinate vs Indeterminate structures – Indeterminacy - Primary structure – Compatibility conditions – Analysis of indeterminate pin-jointed plane frames, continuous beams, rigid jointed plane frames (with redundancy restricted to two).

UNIT II STIFFNESS MATRIX METHOD

12

Element and global stiffness matrices – Analysis of continuous beams – Coordinate transformations – Rotation matrix – Transformations of stiffness matrices, load vectors and displacements vectors – Analysis of pin-jointed plane frames and rigid frames(with redundancy vertical to two)

UNIT III FINITE ELEMENT METHOD

12

Introduction – Discretisation of a structure – Displacement functions – Truss element – Beam element – Plane stress and plane strain - Triangular elements

UNIT IV PLASTIC ANALYSIS OF STRUCTURES

12

Statically indeterminate axial problems – Beams in pure bending – Plastic moment of resistance
– Plastic modulus – Shape factor – Load factor – Plastic hinge and mechanism – Plastic analysis of indeterminate beams and frames – Upper and lower bound theorems

UNIT V SPACE AND CABLE STRUCTURES

12

Analysis of Space trusses using method of tension coefficients – Beams curved in plan Suspension cables – suspension bridges with two and three hinged stiffening girders

TOTAL PERIODS:60**TEXT BOOKS**

- T1. Vaidyanathan, R. and Perumal, P., “Comprehensive structural Analysis – Vol. I & II”, Laxmi Publications, New Delhi, 2003
T2. L.S. Negi & R.S. Jangid, “Structural Analysis”, Tata McGraw-Hill Publications, New Delhi, 2003.
T3. BhaviKatti, S.S, “Structural Analysis – Vol. 1 Vol. 2”, Vikas Publishing House Pvt. Ltd., New Delhi, 2008

REFERENCES

1. Ghali.A, Nebille,A.M. and Brown,T.G. “Structural Analysis” A unified classical and Matrix approach” –5th edition. Spon Press, London and New York, 2003.
2. Coates R.C, Coutie M.G. and Kong F.K., “Structural Analysis”, ELBS and Nelson, 1990
3. Structural Analysis – A Matrix Approach – G.S. Pandit & S.P. Gupta, Tata McGraw Hill 2004.

4. Matrix Analysis of Framed Structures – Jr. William Weaver & James M. Gere, CBS Publishers and Distributors, Delhi.

SUBJECT DESCRIPTION AND OBJECTIVES

DESCRIPTION

This subject aims to enable students to: understand key concepts and fundamental principles, together with the assumptions made in their development, pertaining to fluid behaviour, both in static and flowing conditions; deal effectively with practical engineering situations, including the analysis and design of engineering systems and devices involving fluids and flow; appreciate possible applications and links to other disciplines; and engage in further specialised study or research. The subject also aims to enhance interests in fluid phenomena and applications. Topics include: fluid properties and statics; conservation laws of mass, momentum and energy; flow in pipes; external flow (lift and drag); boundary layers; flow measurements; and environmental fluid mechanics.

Subject Aims

This subject aims to enable students to:

- understand key concepts and fundamental principles, together with the assumptions made in their development, pertaining to fluid behaviour, both in static and flowing conditions
- deal effectively with practical engineering situations, including analysis and design of engineering systems and devices involving fluids and flow
- engage in further specialised study or research

The subject also aims to enhance interests in fluid phenomena and applications.

OBJECTIVES

The student is introduced to the definition and properties of fluid. Principles of fluid statics, kinematics and dynamics are dealt with subsequently. The application of similitude and model study are covered subsequently. After undergoing this course, the student would have learnt fluid properties and application to real situations of fluid flow.

MICRO LESSON PLAN

HOURS	LECTURE TOPICS	READING
UNIT I FLEXIBILITY METHOD		
1	Equilibrium and compatibility	T1
2	Determinate vs Indeterminate structures	T1
3	Indeterminacy - Primary structure	T1
4	Problems	T1
5	Compatibility conditions	T1
6	Analysis of indeterminate pin-jointed plane frames	T1
7	Problems	T1
8	continuous beams, (with redundancy restricted to two).	T1
9	Problems	T1
10	Problems	T1
11	rigid jointed plane frames	T1
12	Problems	T1
UNIT II STIFFNESS MATRIX METHOD		
13	Element and global stiffness matrices	T1
14	Analysis of continuous beams	T1
15	Problems	T1
16	Problems	T1
17	Co-ordinate transformations	T1
18	Rotation matrix	T1
19	Transformations of stiffness matrices	T1
20	load vectors and displacements vectors	T1
21	Problems	T1
22	Analysis of pin-jointed plane frames and rigid frames(with redundancy vertical to two)	T1
23	Problems	T1
24	Problems	T1
UNIT III FINITE ELEMENT METHOD		
25	Introduction	T1
26	Discretisation of a structure	T1
27	Problems	T1
28	Problems	T1
29	Displacement functions	T1
30	Problems	T1
31	Problems	T1
32	Truss element	T1

33	Beam element	T1
34	Problems	T1
35	Problems	T1
36	Plane stress and plane strain	T1
37	Triangular elements	T1
UNIT IV PLASTIC ANALYSIS OF STRUCTURES		
38	Statically indeterminate axial problems	T1
39	Problems	T1
39	Beams in pure bending	T1
40	Plastic moment of resistance	T1
41	Problems	T1
42	Problems	T1
43	Plastic modulus	T1
44	Shape factor – Load factor	T1
45	Problems	T1
46	Plastic hinge and mechanism	T1
47	Plastic analysis of indeterminate beams and frames	T1
48	Problems	T1
49	Problems	T1
50	Problems	
51	Upper and lower bound theorems	
UNIT V - SPACE AND CABLE STRUCTURES		
52	Analysis of Space trusses using method of tension coefficients	T1
53	Problems	T1
54	Problems	T1
55	Problems	T1
56	Beams curved in plan Suspension cables	T1
57	Problems	T1
58	Problems	T1
59	suspension bridges with two hinged stiffening girders	T1
60	Scale effect and	T1
61	suspension bridges with three hinged stiffening girders	T1
62	Problems	T1
63	Problems	T
64	Problems	T1