

3/4 B.Tech. FIFTH SEMESTER

CE5T4

STRUCTURAL ANALYSIS – II

Credits: 3

Lecture: 3 periods/week

Internal assessment: 30 marks

Tutorial: 1 period /week

Semester end examination: 70 marks

Pre-requisites: Mechanics of solids- I, Mechanics of solids- II and Structural analysis- I

Learning objectives:

- To learn classical methods for analyzing indeterminate structures and special structures and
- To solve indeterminate structures by influence lines. To learn classical methods for analyzing indeterminate structures and special structures and
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Course outcomes:

At the end of course the student will be able to:

1. Analyse a continuous beam and frame by using slope deflection method with or without side sway.
2. Analyse a continuous beam and frame by using moment distribution method with or without side sway
3. Analyse a continuous beam and frame by using Kani's method with or without side sway
4. Determine the deflections in beams, frames and trusses from strain energy theorems
5. Calculate the horizontal thrust, max. bending moment, normal thrust and radial shear for a 2 hinged arch

UNIT I

SLOPE-DEFLECTION METHOD

Introduction, derivation of slope deflection equation, application to continuous beams with and without settlement of supports, Analysis of frames with and without sway.

UNIT – II

MOMENT DISTRIBUTION METHOD

Stiffness and carry over factors – Distribution factors – Analysis of continuous beams with and without sinking of supports –portal frames, single bay, single storey with and without sway - Substitute frame analysis by two cycles.

UNIT-III

KANIS' METHOD

Analysis of continuous beams – including settlement of supports and single bay, single storey, portal frames with and without sway

UNIT – IV

ENERGY METHODS

Reciprocal deflection theorem, Betti's theorem, Castigliano's theorems, Muller- Breslau principle – analysis of indeterminate beams and rigid jointed frames – problems on first degree of indeterminacy.

REDUNDANT PIN JOINTED FRAMES

Analysis of redundant pin jointed frames for axial forces, problems on first degree of redundancy.

UNIT – V

DEFLECTIONS USING ENERGY METHODS

Determinate pin jointed frames and determinate rigid jointed frames

TWO HINGED ARCHES

Determination of horizontal thrust bending moment, normal thrust and radial shear – Rib shortening and temperature stresses, tied arches.

Learning resources:

Text books:

1. Analysis of Structures – Vol. I & II by Bhavikatti, Vikas publications
2. Analysis of structures by Vazrani & Ratwani – Khanna Publications.
3. Strength of Materials and mechanics of solids Vol-2 by B.C. Punmia, Laxmi Publications, New Delhi
4. Comprehensive Structural Analysis-Vol.I&2 by Dr. R. Vaidyanathan & Dr. P.Perumal- Laxmi publications pvt. Ltd., New Delhi

Reference books:

1. Theory of structures Vol. I and Vol. II – Pandit and Gupta
2. Structural Analysis by C.S. Reddy, Tata Macgrawhill, New Delhi

e-learning resources:

<http://nptel.ac.in/courses.php>

<http://jntuk-coeerd.in/>