ADVANCED METHODS OF STRUCTURAL ANALYSIS

Course Code: 15CE2204

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Course Outcomes:

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

CO1: Know the type of non-linearity and its analysis.
CO2: Analyse beams and building frames by stiffness method.
CO3: Apply the concept of ILDs for beams and trusses.
CO4: Analyse cables and suspension bridges.
CO5: Apply Rayleigh Ritz method and Galerkin's method for beams and bars.

UNIT-I (10-Lectures)

Non-Linear Analysis: Introduction, types of non-linearity, Methods of non-linearity, analysis of material non-linear problems, analysis of geometric non-linear problems.

UNIT-II (10-Lectures)

Stiffness Method: Analysis of Indeterminate beams, frames and trusses by stiffness matrix method (up to maximum Kinematic indeterminacy of 3 and support settlements not included).

UNIT-III (10-Lectures)

Influence lines: Analysis of indeterminate beams, two hinged arches, three hinged arches using influence lines.

UNIT-IV (10-Lectures)

Cables and Suspension Bridges: Introduction, Equation of the cable, General Cable theorem, horizontal reaction for uniformly loaded cable, Tension in the cable supported at same and different levels, lengths of the cable when supported at the same level.

UNIT-V (10-Lectures)

Rayleigh Ritz method: Analysis of axially loaded bars and beams by Rayleigh Ritz method.

Gelarkin's method: Analysis of axially loaded bars and beams by Gelarkin's method.

TEXT BOOKS

1. G.S. Pandit& S.P. Gupta, *"Structural Analysis–A matrix approach",* 2nd Edition, Tata Mc Grah Hill Companies, 2011.
2. S.B. Junarkar, *"Mechanics of Structures",* 3rd Edition, Dhanpat Rai Publications, 2011.

REFERENCES

1. Devdas Menon, *"Structural Analysis",* 2nd Edition, Narosa Publications, 2012.
2. V.K. Manicka Selvam, *"Finite Element Premier",* 3rd Edition, Dhanapat Rai Publications, 2011.
3. S. Ramamrutham & R. Narayanan, *"Theory of Structures",* 9th Edition, Dhanapat Rai Publications, 2012.