
ADVANCED METHODS OF STRUCTURAL ANALYSIS

Course Code: 13CE 2204

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Course Educational Objectives:

1. To impart knowledge of analyzing beams and framed structures using matrix methods
2. To develop analytical skills of solving beams and trusses using influence lines.
3. To impart analyzing axial bars and beams using Galarkin's method and Rayleigh Ritz method.

Course Outcomes:

1. The students shall be able to analyze beams and building frames by matrix and approximate methods for gravity loads and wind loads.
2. The student will demonstrate the ability to analyze cable and suspension bridges.
3. To impart the students, with the knowledge of Flexibility Method, Stiffness Method

UNIT-I

Flexibility Method: Analysis of Indeterminate beams, Frames and trusses by flexibility matrix method (upto maximum Static indeterminacy of 3 and support settlements not included).

UNIT-II

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

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

UNIT-IV

Cable 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. Temperature effect on the cable.

UNIT-V

Rayleigh's 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.
