ADVANCED STRUCTURAL ANALYSIS
(ELECTIVE - II)

Course Code : 13CE1136

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Course Educational Objectives:

- To impart the knowledge of advanced and Matrix methods of structural analysis.
- To familiarize student with the knowledge of influence lines for arches and plastic analysis.

Course Outcomes:

- The students will demonstrate the ability to analyse arches and frames by matrix methods.
- Student will be able to analyse structures using plastic analysis concepts.

UNIT-I (12 Lectures)

SLOPE DEFLECTION METHOD:

Application to the analysis of portal frames with inclined legs, gable frames

UNIT-II (12 Lectures)

ARCHES:

Analysis of two hinged and Three hinged arches using influence line concept.

UNIT-III (12 Lectures)

FLEXIBILITY METHOD:

Introduction to the structural analysis by flexibility concept using Matrix approach and application to frames and trusses. (Maximum indeterminacy of 3)

UNIT-IV (12 Lectures)

STIFFNESS METHOD:

Introduction to the structural analysis by stiffness concept using Matrix approach and application to frames and trusses. (Maximum degrees of freedom of 3)

UNIT-V (16 Lectures)

PLASTIC ANALYSIS:

Introduction – Idealized stress – Strain diagram – shape factors for various sections – Moment curvature relationship – ultimate moment – Plastic hinge formation – lower and upper bound theorems – ultimate strength of fixed and continuous beams.

TEXT BOOKS:

1. Pandit and Gupta, *"Matrix Methods of Structural Analysis"*, 2nd Edition, Tata McGraw Hill, 2000.
2. Vazirani and Ratwani, *"Analysis of structures",* Vol. I & II, 4th Edition, Khanna publications, 2009.

REFERENCES:

1. Prakash Rao D.S., "Structural Analysis", 3rd edition, Sagar books, 2008.
2. Bhavi Katti S.S, *"Structural Analysis",* Vol. I & II, 4th Edition, Vikas Publications, 2010.