

## ADVANCED STRUCTURAL ANALYSIS (Professional Elective- III)

**Course Code: 15CE1135**

L	T	P	C
3	0	0	3

### Pre-requisites:

Strength of materials, Structural analysis – I & II.

### Course Outcomes:

At the end of the Course, the Student will be able to:

- CO 1** Analyse portal frames with inclined legs and gable frames using slope deflection method.
- CO 2** Analyse two and three-hinged arches using ILD concept.
- CO 3** Solve frames and trusses using flexibility method
- CO 4** Solve frames and trusses by stiffness method
- CO 5** Discuss the concept of plastic analysis and its application to beams.

### UNIT-I (10 Lectures)

#### SLOPE DEFLECTION METHOD:

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

### UNIT-II (10 Lectures)

#### ARCHES:

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

### UNIT-III (10 Lectures)

#### FLEXIBILITY METHOD:

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

**UNIT-IV****(10 Lectures)****STIFFNESS METHOD:**

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

**UNIT-V****(10 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 single portal frame.

**TEXT BOOKS:**

1. G.S. Pandit and S.P.Gupta, “Matrix Methods of Structural Analysis”, 2<sup>nd</sup> Edition, Tata McGraw Hill, 2000.
2. V.N. Vazirani and M.M. Ratwani, “Analysis of structures”, Vol. I & II, 4<sup>th</sup> Edition, Khanna publications, 2009.

**REFERENCES:**

1. Prakash Rao D.S.,”Structural Analysis”, 3<sup>rd</sup> edition, Sagarbooks, 2008.
2. BhaviKatti S.S, “Structural Analysis”, Vol. I & II, 4<sup>th</sup> Edition, Vikas Publications, 2010.
3. DevdasMenon, “Advanced Structural Analysis”, Narosapublishing house pvt ltd, 2012.