

# AMEV12 BASIC STRUCTURAL ENGINEERING

## UNIT-1 ENERGY PRINCIPLES

- 1.1 Strain energy and strain energy density- strain energy due to axial load,
- 1.2 Shear, flexure and torsion- castigliano's theorems
- 1.3 Principle of virtual work
- 1.4 Application of energy theorems for computing deflections in beams and trusses
- 1.5 Maxwell's reciprocal theorems

## UNIT-2 DEFLECTION OF DETERMINATE STRUCTURES

- 2.1 Principles of virtual work for deflections
- 2.2 Deflections of pin-jointed plane frames and rigid plane frames
- 2.3 Williot's diagram.

## UNIT-3 SLOPE DEFLECTION METHOD

- 3.1 Slope deflection equations
- 3.2 Analysis of continuous beams and rigid frames
- 3.3 Support settlements.

## UNIT-4 MOMENT DISTRIBUTION METHOD

- 4.1 Stiffness and carry over factors- Distribution and carry over of moments
- 4.2 Analysis of continuous Beams
- 4.3 Plane rigid frames with and without sway
- 4.4 Support settlement.

## UNIT-5 COLUMNS AND CYLINDER

- 5.1 Euler's theory of long columns-critical loads for prismatic columns with different end conditions;
- 5.2 Rankine-Gordon formula for eccentrically loaded columns- Eccentrically loaded short columns
- 5.3 middle third rule- core section- Thick cylinders- Compound cylinders

## References Books

- 1 William Weaver, Jr & James M.Gere, "Matrix analysis of framed structures", CBS Publishers & Distributors, Delhi, 1--5
- 2 Vaidyanathan,R & Perumal P, "Structural Analysis, Vol.1 & 2", Laxmi Publications, New Delhi, 2004
4. Ashok K.Jain, "Advanced Structural Analysis", Nem Chand & Sons, 1--6