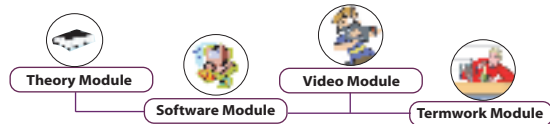


# Theory Of Structure

Introduces, Global e-Learning System in Education & Training in the form of Learning Resources with Computer Aided Instructions



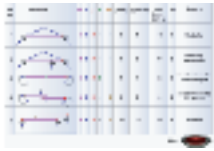
System Requirement:- IBM-PC Compatible Min P-III with Window-OS, 128 MB RAM/Multimedia Kit

## Theory module

**Features :** Theory, Figures, Photographs, Animations With Controller, Highlighter Tool, Note Creation Facility, Systematic Page Navigation, Printing Facility, Access to Videos at Appropriate Locations.

## List of Topics

### Basic Concepts of Structural Analysis



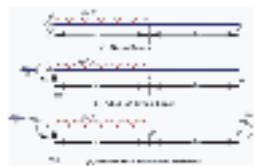
Structural systems, Types of skeletal structures, Structural behaviour, Primary concepts, Energy theorems, The unit load method, Force-displacement relations and stiffness and flexibility of prismatic members, Member end forces for restrained members, Structural analysis, Methods of analysis of skeletal structures, Sign convention

### Strain Energy

Introduction, Strain energy due to axial force, Strain energy due to axial force, Proof resilience, Modulus of resilience, Stress due to various types of axial loads

### Deflection of Beams and Frames

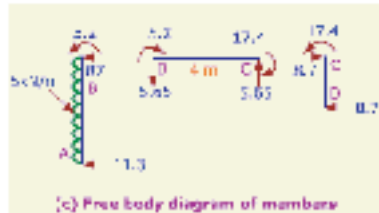
Castigliano's first theorem of complementary energy.



### Indeterminate Beams

Principle of superposition, Clerk-Maxwell's theorem of reciprocal deflection, Maxwell-Bette's law, Fixed beams, Equation for fixed end moments, Advantages and disadvantages of fixed beams over simply supported beams, Different types of loading on the fixed beams, Steps to be followed for analysis of fixed beams, Different cases, Continuous beams, Clapeyron's theorem, Modified theorem of three moments for uniformly distributed loads, Different types of continuous beams.

### Energy Method for Displacement



Introduction, Castigliano's second theorem, Frames.

### Deflection of Trusses

Introduction, Strain energy, Strain energy, The unit load method, Castigliano's first theorem

### Slope Deflection Method

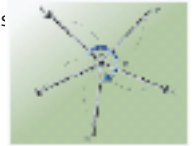
Introduction, Slope deflection method, Different types of beams

### Indeterminate Trusses

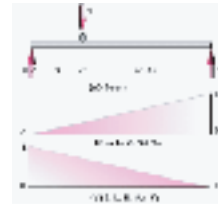
Introduction, Force method for analysis of indeterminate trusses, Basic formulation of force method for trusses, Externally indeterminate trusses, Internally indeterminate trusses, Indeterminate trusses with lack of fit, Temperature effects in indeterminate trusses, Effects of yielding of support in indeterminate trusses

### Moment Distribution Method

Introduction, Stiffness and carry over, Relative stiffness and distribution factors, Continuous beam: with sinking of supports, Moment distribution applied to different types of beams.



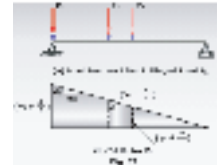
### Influence Lines



Introduction, Influence lines for simply supported beam, Influence line diagram for shear force at a given section of girder, Influence line diagram for the B.M. at a given section, Simply supported beams with overhang, Influence lines for compound beam

### Rolling Loads

Introduction, Train of moving loads, Uniformly distributed loads, Maximum shear at a given section of girder, Condition for maximum B.M. at a given section, Maximum B.M. under chosen when load, Absolute maximum bending moment in the girder, Equivalent uniformly distributed loads



### Influence Line Diagrams for Plane Trusses

Introduction, I.L.D. for different members of N type types, I.L.D. for deck type bridge truss

### Three Hinged Arches

Introduction, Theoretical arch or line of thrust, Eddy's theorem for bending moment, Three hinged arch, Influence line for horizontal thrust H, I.L. for bending moment at a section X, I.L. for shear forces at section X, I.L. for normal or axial thrust at a section X, Absolute maximum bending moment for three hinged parabolic arch

### Two Hinged Arches

Introduction, Derivation for horizontal thrust, Horizontal thrust for concentrated load at crown, Two hinged parabolic arch subjected to any general system of loads, Two hinged arch loaded with UDL, Normal thrust and radial shear