

**UNIT I: Basis of Structural Design and Connection Design**

Introduction; Metallurgy of steel; Structural properties of steel; Design philosophies; Limit state method; Partial load factors; Loading and load combination on structures; Local buckling and section classification.

Types of connections; Welded connections; Types of joints and welds; Connection design; Concentric connection; Eccentric connections; Truss connections; Bolted connections; Force transfer mechanism; Failure mechanism; Analysis of bolt groups; Beam column connections, shear connection; Moment connection.

**UNIT II: Design of Compression and Tension Members**

Types of tension member; Behaviour of tension members; Factors affecting the strength of tension members; Design of tension member; for yielding; Net section rupture; Block shear; Tension splices; Lug angles; Concept of shear lag.

Types of compression members; Basis of current codal provision for compression member design; Slenderness ratio; Elastic buckling; Strength curves; Design of compression members.

**UNIT III: Design of Flexural Members**

Beam types; Lateral stability of beams; Lateral torsional buckling of symmetric beams; Design strength of Laterally supported and Unsupported beams in bending; Shear strength of steel beams; Web buckling and crippling; Design of beams; Built-up beams; Design of plate girders; Types of stiffeners; Flange and web splices; Design of beam-columns subjected to combined tension and bending.

**UNIT IV: Design of Columns and Column Bases**

Design of single section and compound section ; Design of laced and battened type columns; Design of column bases; Slab base; Gusseted base; Grillage foundation

**UNIT V: Design of Industrial Buildings**

Introduction, Frames; Multistory frames; Various types of trusses and their selection; Design of purlin and elements of truss; Effect of wind loads on purlin and truss; Bracing systems ,Design of Gantry Girder ,

**References:**

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3. Arya and Ajmani, Design of Steel Structures, NemChand Brothers, Roorkee, 2007
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6. Subramanian N, Design of Steel Structures, Oxford University Press, New Delhi, 2013.
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11. IS 875 (Part 1): latest version, Indian Standard Code of Practice for Design Loads (Other than Earthquake) for Buildings and Structures Part 1 Dead Loads - Unit Weights of Building Materials and Stored Materials, Bureau of Indian Standards, New Delhi.
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