RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Civil Engineering, VIII-Semester

CE801- Design of Steel Structures

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:

1. Gambhir M. L., Fundamentals of Structural Steel Design, McGraw Hill Education., First edition, 2017.
2. Dayaratnam P., Design of Steel Structures, A. H. Wheeler & Co. Ltd., Allahabad, 2008
3. Arya and Ajmani, Design of Steel Structures, NemChand Brothers, Roorkee, 2007
4. Punmia B.C., Ashok Kumar Jain and Arun Kumar Jain, Design of Steel Structures, Arihant Publications, Bombay, 2008

5. Shiyekar M. R., Limit State Design in Structural Steel, Prentice Hall of India Pvt. Ltd, Learning Pvt. Ltd., 2nd Edition, 2013.
6. Subramanian N, Design of Steel Structures, Oxford University Press, New Delhi, 2013.
7. Narayanan R.et.al., Teaching Resource on Structural Steel Design, INSDAG, Ministry of Steel Publications, 2002
8. Duggal S. K., Limit State Design of Steel Structures, Tata McGraw Hill Publishing Company, Third edition, 2019.
9. Bhavikatti S. S, Design of Steel Structures by Limit State Method as per IS:800-2007, IK International Publishing House Pvt. Ltd., 2009
10. IS 800: latest version, General Construction in Steel - Code of Practice, Bureau of Indian Standards, New Delhi.
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.
12. IS 875 (Part 2): latest version, Indian Standard Code of Practice for Design Loads (Other than Earthquake) for Buildings and Structures Part 2 Imposed Loads, Bureau of Indian Standards, New Delhi.
13. IS 875 (Part 3): latest version, Indian Standard Code of Practice for Design Loads (Other than Earthquake) for Buildings and Structures Part 3 Wind Loads, Bureau of Indian Standards, New Delhi.
14. IS 875 (Part 4): latest version, Indian Standard Code of Practice for Design Loads (Other than Earthquake) for Buildings and Structures Part 4 Snow Loads, Bureau of Indian Standards, New Delhi.
15. IS 875 (Part 5): latest version, Indian Standard Code of Practice for Design Loads (Other than Earthquake) for Buildings and Structures Part 5 Special Loads and Combinations, Bureau of Indian Standards, New Delhi.