

3SE03: DESIGN OF STEEL STRUCTURES
CREDITS – 4 (LTP: 3,1,0)

Course Objectives:

1. To impart the concepts of design philosophies and material behavior.
2. To introduce design of structural steel elements as per IS codes of practice.
3. To introduce design of structural steel connections.

Teaching and Assessment Scheme:

Teaching Scheme (Hours per Week)			Credits	Assessment Scheme				Total Marks
L	T	P		Theory Marks		Practical Marks		
			ESE	CE	ESE	CE		
3	1	0	4	60	40	20	30	150

Course Contents:

Unit No.	Topics	Teaching Hours
1	Introduction: Design philosophy: Working stress method, Limit state method, Concepts of strength, stiffness, stability and serviceability, Advantages and Disadvantages of steel structures, Introduction to structural steel and standard rolled sections, Introduction to IS:800, Concepts of loading and load combinations as per IS:875.	03
2	Industrial Shed: Introduction to various structural elements and its layout. Calculation for gravity loads, wind loads and load combinations.	03
3	Introduction to Connections for Axially Loaded Members: Bolted connections: Types of bolts, types of failures, strength of bolt, design of various bolted connections. Welded connections: Types of weld, design of welded connections, Introduction to lug angle.	04
4	Tension Members: Determination of Tension capacity, Shear lag effect. Design of plate, single angle and double angle connected through bolting and welding.	06
5	Compression Members: Classification of sections and buckling classes. Design of single angle, design of double angle members, design of axially loaded columns, design of built-up columns, design of lacing and battening.	08
6	Flexural Members: Design of laterally supported and laterally unsupported beams, Introduction to built-up beams, castellated beams, plate girders and gantry girders.	08
7	Members subjected to Combined Forces: Design of members subjected to axial force, uniaxial and biaxial bending.	05
8	Column Bases: Design of slab base footing, Introduction to design of gusseted base footing.	03
9	Framed Connections: Bolted and Welded framed connections for beam to beam and beam to column, Introduction to moment resisting connections.	05
Total		45

List of References:

1. N. Subramanian, "*Design of Steel Structures*", Oxford University Press, New Delhi.
2. S. K. Duggal, "*Limit State Design of Structures*" McGraw Hill Education Pvt. Ltd., New Delhi.
3. K. S. Sai Ram, "*Design of Steel Structures*" Pearson, New Delhi.
4. M. R. Shiyekar, "*Limit State Design in Structural Steel*" Prentice-Hall of India Pvt.Ltd.
5. M. L. Gambhir, "*Fundamentals of Structural Steel Design*" Tata McGraw-Hill Education.
6. IS: 800 - Code of Practice for General Construction in Steel
7. IS: 875 - (Part I to V) - Code of Practice for Structural Safety of Building Loading Standards
8. IS: 226 - Structural steel (Standard Quality)
9. SP: 6(1) - Structural Steel Section

Course Outcomes: Students will be able to

1. Estimate design loads on the structural steel components.
2. Design various steel structural components of structures.
3. Design various types of steel connections.