III Year-II Semester
(20CE6013) Design & Drawing of Steel Structures

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

Pre- Requisites: Fundamentals of strength of materials and structural analysis

Course Objectives:

- Familiarize Students with different types of Connections and relevant IS codes.
- Equip student with concepts of design of flexural members.
- Understand Design Concepts of tension and compression members in trusses.
- Familiarize students with different types of Columns and column bases and their Design.
- Familiarize students with Plate girder and Gantry Girder and their Design.

UNIT–I:

Connections: Introduction: (a) Riveted connections – Definition, rivet strength and capacity- Codal Provisions, (**b) Welded connections**: Introduction, Advantages and disadvantages of welding- Strength of welds-Butt and fillet welds: Permissible stresses – IS Code requirements. Design of fillet weld subjected to moment acting in the plane and at right angles to the plane of the joints.

All units i.e. from unit II to unit-V to be taught in Limit State Design and in Welded connections only.

UNIT–II:

Beams: Allowable stresses, design requirements as per IS Code-Design of simple and compound beams-Curtailment of flange plates, Beam to beam connection, check for deflection, shear, buckling, check for bearing, laterally unsupported beams.

UNIT–III:

Tension Members and compression members: General Design of members subjected to direct tension and bending –effective length of columns. Slenderness ratio – permissible stresses. Design of compression members, struts etc.

Roof Trusses: Different types of trusses – Design loads – Load combinations as per IS Code recommendations, structural details –Design of simple roof trusses involving the design of purlins, members and joints – tubular trusses.

UNIT–IV:

Design of Columns: Built up compression members – Design of lacings andbattens. Design Principles of Eccentrically loaded columns, Splicing of columns.

Design of Column Foundations: Design of slab base and gusseted base. Columnbases subjected moment

UNIT–V:

Design of Plate Girder: Design consideration – I S Code recommendations Design of plate girder-Welded – Curtailment of flange plates, stiffeners – splicing and connections.

Design of Gantry Girder: impact factors - longitudinal forces, Design of Gantry girders.

NOTE: Welding connections should be used in Units II – V.

Detailing of Steel Structures

The students should prepare the following plates.

Plate 1 Detailing of simple beams

Plate 2 Detailing of Compound beams including curtailment of flange plates.
Plate 3 Detailing of Column including lacing and battens.
Plate 4 Detailing of Column bases – slab base and gusseted base
Plate 5 Detailing of steel roof trusses including joint details.
Plate 6 Detailing of Plate girder including curtailment, splicing and stiffeners.

Course Outcomes:

S.No	Course Outcomes	BTL
1	Analyze and Design different connections	L4
2	Analyze and Design flexural members and detailing	L4
3	Analyze and Design tension members and compression members	L4
4	Analyze and Design column and column foundation	L4
5	Analyze and Design Plate Girder and Gantry Girder with connection detailing	L4

Correlation of Cos with POs & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	1	1	1	2	1	1	3	3	-	2
CO2	3	3	3	3	2	1	1	1	2	1	1	3	3	-	2
CO3	3	3	2	3	2	1	1	1	2	2	1	3	3	-	2
CO4	3	2	3	2	2	1	1	1	1	1	2	3	3	-	2
CO5	3	2	3	2	2	1	1	1	1	1	2	3	3	-	2

Text Books:

1. Steel Structures Design and Practice, N. Subramanian, Oxford University Press.
2. Design of steel structures, S. K. Duggal, Tata McGraw Hill, New Delhi
3. Design of Steel Structures S. S. Bhavikatti, I. K International Publishing House Pvt. Ltd.

Reference Books:

1. Structural Design in Steel, SarwarAlamRaz, New Age International Publishers, New Delhi
2. Design of Steel Structures, M. Raghupathi, Tata Mc. Graw-Hill
3. Structural Design and Drawing, N. Krishna Raju; University Press,

IS Codes:

1. Indian Standard Code for General Construction in Steel, 3rd revision, Indian Standards Institution, New Delhi,2008.
2. IS – 875, Code of practice for design loads (other than earth quake) for buildings and structures (Part-1-Part 5),Bureau of Indian standards.
3. Steel Tables
   These codes and steel tables are permitted to use in the examinations.