3/4 B.Tech. SIXTH SEMESTER

CE6T2 DESIGN AND DRAWING OF STEEL STRUCTURES Credits: 3

Lecture: 3 periods/week Internal assessment: 30 marks

Tutorial: 1 period /week Semester end examination: 70 marks

Pre-requisites: Structural Analysis – I, Structural Analysis – II

Learning objectives:

- To learn the design philosophies of limit state design.
- To develop knowledge in designing of structural elements in steel.

Course outcomes:

At the end of course the student will have:

1. Knowledge of the properties of steel and design basics with different types of connections
2. Capability to design steel members subjected to tension and compression.
3. Ability to design beams by limit state method.
4. Capability to design built up columns and column foundations.
5. Ability to design purlin and plate girder.

UNIT – I

PRINCIPLES OF LIMIT STATE DESIGN

Design requirements, Limit states, Loads

CONNECTIONS

Riveted and bolted connections –definition, rivet/ bolt strength and capacity, welded connections, Introduction, Advantages and disadvantages of welding- Strength of welds-Butt and fillet welds: Design of fillet welds.

UNIT – II

TENSION MEMBERS

General Design of members subjected to direct tension

COMPRESSION MEMBERS

Effective length of columns. Slenderness ratio – permissible stresses. Design of compression members, struts etc.

UNIT –III

BEAMS

Allowable stresses, design requirements as per IS Code-Design of simple and compound beams-Curtailment of flange plates, Beam to beam connections, check for deflection, shear, buckling, check for bearing, laterally unsupported beams.Design of purlins in roof trusses.

UNIT – IV

BUILTUP COLUMNS

Design of Built up compression members – Design of lacings and battens, splicing of columns.

COLUMN FOUNDATIONS

Design of slab base and gusseted bases.

UNIT – V

PLATE GIRDER

Design consideration – IS Code recommendations Design of plate girder-Welded – Curtailment of flange plates, stiffeners – splicing and connections.

Note: 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 4Detailing of Column bases – slab base and gusseted base
Plate 5 Detailing of purlins.
Plate 6 Detailing of Plate girder including curtailment, splicing and Stiffeners.

FINAL EXAMINATION PATTERN

The end examination paper should consist of Part A and Part B. Part A consists of two questions in Design and Drawing out of which one question is to be answered. Part B should consist of five questions and design out of which three are to be answered. Weightage for Part A is 40% and Part B is 60%.

Learning resources:

Text books:

1. Design of Steel Structures by limit state method as per IS 800-2007 by Bhavikatti, S.S., I.K. International Publishing House Pvt. Ltd, 2009.
2. Design of Steel Structures, (3^{rd} edition) by Duggal S.K., Tata Mcgraw-Hill, New Delhi, 2012.

Reference books:

1. Steel Structures Design and Practice by Subramanian N., Oxford University Press. 2009.
2. Design of Steel Structures, (3^{rd} edition) by Raghupathi M., Tata McGraw-Hill, 2006
3. Structural design in steel by Sarwar Alam Raz, New Age International Publishers, New Delhi, 2002.

IS CODES:

1. IS -800 – 2007
2. IS – 875 – Part III
3. Steel Tables.

These codes and steel tables are permitted in the examinations.

e-learning resources:

http://nptel.ac.in/courses.php
http://jntuk-coeerd.in/