

Design of Steel and Timber Structure

Year: III

Semester: V

Teaching Schedule Hours/Week					Examination Schedule					Total Marks	
					Final				Internal Assessment		
					Theory		Practical		Theory Marks		Practical Marks
Credit Hours	L	T	P	Total	Duration	Marks	Duration	Marks	40	-	100
3	3	3	-	6	3 Hrs.	60	-	-			

Note: L: Lecturer T: Tutorial P: Practical

Course Objective:

This course is aimed to make students capable to design ordinary steel structures and timber structures. Design of steel structures is based on the **Limit State Design Method**. The objective is to prepare students for advanced knowledge on design of complex steel and timber structure.

Course Content:

1.0 Introduction to Steel Structures (2 hrs)

- 1.1 Types, properties and use of structural steel
- 1.2 Advantages and disadvantages of steel structures.
- 1.3 Design methods (working, ultimate and limit state)

2.0 Joints in Steel Structures (8 hrs)

- 2.1 Types of bolted and welded joints
- 2.2 Design & details of bolted joints under axial and eccentric forces
- 2.3 Design & details of welded joints under axial and eccentric forces
- 2.4 Introduction to riveted joints

3.0 Tension Members (4 hrs)

- 3.1 Various forms of tension members
- 3.2 Design of L-, C-, I- & tubular sections
- 3.3 Concepts of tension splice & lug angles



- 4.0 Compression Member (7 hrs)**
- 4.1 Axial members
 - 4.1.1 Strength of an axial compression member
 - 4.1.2 Design of axial compression members (L-, C-, I-, built-up & tubular sections)
 - 4.1.3 Design of lacings and battens
 - 4.1.4 Column splices
 - 4.1.5 Design of column base, anchor bolts and stiffeners
 - 4.2 Eccentrically loaded Compression Members
 - 4.2.1 Stress calculation
 - 4.2.2 Design of members
- 5.0 Flexural Members (11 hrs)**
- 6.1 Simple Beams
 - 6.1.1 Laterally restrained and unrestrained beams
 - 6.1.2 Design criteria
 - 6.1.3 Design of Simple Beams
 - 6.1.4 Design of stiffeners
 - 6.2 Built-up Beams
 - 6.3 Plate Girders
 - 6.3.1 Elements of plate girder and economical depth
 - 6.3.2 Curtailment of Flange Plates
 - 6.3.3 Design of web plate, flange plate and stiffeners
 - 6.3.4 Design of web and flange splices
- 6.0 Roof Trusses (5 hrs)**
- 9.1 Types of trusses
 - 9.2 Loads on roof trusses
 - 9.3 Design of purlins
 - 9.4 Design and detailing of roof truss members and joints
- 7.0 Timber Structures (8 hrs)**
- 10.1 Types, uses and properties of structural timber
 - 10.2 Advantage and disadvantage of timber structures
 - 10.3 Codes and design methods
 - 10.4 Types of timber joints



- 10.5 Compression member
 - 10.5.1 Design criteria
 - 10.5.2 Design of compression member
 - 10.5.3 Concept of column base
- 10.6 Flexural member
 - 10.6.1 Design criteria
 - 10.6.2 Design of beams
 - 10.6.3 Design of Flitched beams

Project works:

- A course project on analysis and design of simple steel structure.

References:

- IS-800: 2007, general construction in steel- code of practice, Bureau of Indian Standard
- IS-808: 1989, dimensions for hot rolled steel beam, column, channel and angle sections, Bureau of Indian Standard
- IS-883: 1994, design of structural timber in building - code of practice, Bureau of Indian Standard
- L. S. Negi, Design of Steel Structures
- S.S. Bhavikatti, Design of Steel Structures
- S. Ramarutham, Design of Steel Structures

