

Th2. STRUCTURAL DESIGN– II

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	5th
Total Period:	60	Examination	3 hrs
Theory periods:	4P / week	Internal Assessment :	20
Maximum marks:	100	End Semester examination:	80

A. RATIONALE

The course aims at imparting skills to design structural members. This will enable the students to recognize the load conditions and possible failure locations so that student will be able to compute necessary dimensions to prevent failure.

B. COURSE OBJECTIVES

On completion of the course, a student will be able to-

1. Design simple steel structure such as tension members, compression members and simple beams.
2. Design timber structural elements
3. Design staircase, footings by limit method of design.
4. Draw the details of a steel roof truss.
5. Draw the reinforcement details of underground RCC water tank and RCC footings.
6. Use standards and design codes.

C. TOPIC WISE DISTRIBUTION OF PERIODS

Chapter	Name of topics	Hours
1	Introduction:	5
2	Structural Steel Fasteners and Connections.	10
3	Design of Steel tension Members	10
4	Design of Steel Compression members.	10
5	Design of Steel beams:	10
6	Design of Tubular Steel Structures	6
7	Design of Masonry Structures	9

D. COURSE CONTENT IN TERMS OF SPECIFIC OBJECTIVES

- 1 Introduction:**
 - 1.1 Common steel structures, Advantages & disadvantages of steel structures.
 - 1.2 Types of steel, properties of structural steel.
 - 1.3 Rolled steel sections, special considerations in steel design.
 - 1.4 Loads and load combinations.
 - 1.5 Structural analysis and design philosophy.
 - 1.6 Brief review of Principles of Limit State design.
- 2 Structural Steel Fasteners and Connections.**
 - 2.1 Bolted Connections
 - 2.1.1 Classification of bolts, advantages and disadvantages of bolted connections.

- 2.1.2 Different terminology, spacing and edge distance of bolt holes.
- 2.1.3 Types of bolted connections.
- 2.1.4 Types of action of fasteners, assumptions and principles of design.
- 2.1.5 Strength of plates in a joint, strength of bearing type bolts (shear capacity & bearing capacity), reduction factors, and shear capacity of HSFG bolts.
- 2.1.6 Analysis & design of Joints using bearing type and HSFG bolts (except eccentric load and prying forces)
- 2.1.7 Efficiency of a joint.
- 2.2 Welded Connections:
 - 2.2.1 Advantages and Disadvantages of welded connection
 - 2.2.2 Types of welded joints and specifications for welding
 - 2.2.3 Design stresses in welds.
 - 2.2.4 Strength of welded joints.

3 Design of Steel tension Members

- 3.1 Common shapes of tension members.
- 3.2 Maximum values of effective slenderness ratio.
- 3.4 Analysis and Design of tension members.(Considering strength only and concept of block shear failure.)

4 Design of Steel Compression members.

- 4.1 Common shapes of compression members.
- 4.2 Buckling class of cross sections, slenderness ratio
- 4.3 Design compressive stress and strength of compression members.
- 4.4 Analysis and Design of compression members (axial load only).

5 Design of Steel beams:

- 5.1 Common cross sections and their classification.
- 5.2 Deflection limits, web buckling and web crippling.
- 5.3 Design of laterally supported beams against bending and shear.

6 Design of Tubular Steel Structures:

- 6.1 Round Tubular Sections, Permissible Stresses
- 6.2 Tubular Compression & Tension Members
- 6.3 Joints in Tubular trusses

7 Design of Masonry Structures:

- 7.1 Design considerations for Masonry walls & Columns, Load Bearing & Non-Load Bearing walls, Permissible stresses, Slenderness Ratio, Effective Length, Height & Thickness.

E. SYLLABUS COVERGE UPTO INTERNAL ASSESSMENT Chapters 1,2,3,4

F. BOOKS RECOMMENDED

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	B.N.Duggal	Design of Steel Structures	McGraw Hill Education
2	Samal & Panigrahi	Elements of Steel ,Timber & Masonry Design	Kalyani Pbln
3	Samal & Panigrahi	Steel Tables	Kalyani Pbln
4	BIS.	1) I.S 800-Code of practice for General construction in steel	BIS

		<p>2) SP-20 Hand book on masonry design and construction- BIS Publication.</p> <p>3) IS 806: 1968 Code of practice for use of steel tubes in general building construction.</p> <p>4) IS 1161: 1998 Steel Tubes for Structural Purposes – Specification</p>	
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