

DESIGN OF STEEL STRUCTURES

PART-A

UNIT-1

INTRODUCTION: Advantages and Disadvantages of Steel structures, Loads and Load combinations, Design considerations, Limit State Method (LSM) of design, Failure criteria for steel, Codes, Specifications and section classification.

6 Hours

UNIT-2

BOLTED CONNECTIONS: Introduction, Behaviour of Bolted joints, Design strength of ordinary Black Bolts, Design strength of High Strength Friction Grip bolts (HSFG), Pin Connections, Simple Connections, Moment resistant connections, Beam to Beam connections, Beam and Column splices, Semi rigid connections

6 Hours

UNIT-3

WELDED CONNECTIONS: Introduction, Welding process, Welding electrodes, Advantages of Welding, Types and Properties of Welds, Types of joints, Weld symbols, Weld specifications, Effective areas of welds, Design of welds, Simple joints, Moment resistant connections, Continuous Beam to Column connections, Continuous Beam to Beam connections, Beam Column splices, Tubular connections

6 Hours

UNIT-4

Plastic Behaviour of Structural Steel: Introduction, Plastic theory, Plastic hinge concept, Plastic collapse load, conditions of plastic analysis, Theorem of Plastic collapse, Methods of Plastic analysis, Plastic analysis of continuous beams.

7 Hours

PART-B

UNIT-5

Design of Tension Members: Introduction, Types of tension members, Design of strands, Slenderness ratio, Behaviour of tension members, Modes of failure, Factors affecting the strength of tension members, Angles under tension, Other sections, Design of tension member, Lug angles, Splices, Gussets.

6 Hours

UNIT-6

Design of Compression Members: Introduction, Failure modes, Behaviour of compression members, Elastic buckling of slender compression members, Sections used for compression members, Effective length of compression members, Design of compression members, Built up compression members.

8 Hours

UNIT-7

Design of Column Bases:, Design of simple slab base and gusseted base

6 Hours

UNIT-8

Design of Beams: Introduction, Beam types, , Lateral stability of beams, factors affecting lateral stability, Behavior of simple and built-up beams in bending(without vertical stiffeners), Design strength of laterally supported beams in Bending, Design strength of laterally unsupported beams, Shear strength of steel beams, Maximum deflection, Design of beams and purlins

7 Hours

Note: Study of this course should be based on **IS: 800-2007**

Text book

Design of Steel Structures, N.Subramanian, Oxford, 2008

Reference Books

1. **Design of Steel structures**, Ramachandra Vol1, Standard Book House
2. **Comprehensive Design of Steel Structures**, Dr.B.C.Punmia, Ashok Kumar Jain, Arun Kumar Jain, Lakshmi Publications.
3. **Design of Steel structures**, Duggal
4. Bureau of Indian Standards, IS800-2007, IS875-1987
5. **Steel Tables**