

AMCE16 DESIGN OF STEEL STRUCTURES

UNIT-1 GENERAL CONSTRUCTION

- 1.1 Introduction, Advantages of steel as a structural material, Disadvantages of steel as a structural material, Structural steel,
- 1.2 Stress-strain curve for mild steel, Rolled steel sections, Loads, Permissible stresses, Working stresses,
- 1.3 Factor of safety, Minimum thickness of structural members, Design methods.

UNIT-2 STRUCTURAL FASTENERS RIVETING, BOLTED JOINTS

- 2.3 Types of riveted and bolted joints, Definition, Failure of a riveted joint, Strength of riveted/bolted joint, Assumptions in the theory of riveted joints,
- 2.4 Efficiency of a joint, Design of riveted joints for axially loaded members,
- 2.5 Welded joints, Advantages of welded joints, Disadvantages of welded joints, Types of welds and their symbols,
- 2.6 Design of fillet welds, Design of butt weld, Design of plug and slot welds.

UNIT-3 COMPRESSION MEMBERS

- 3.1 Effective length, Slenderness ratio, Column design formula, Types of sections, Assumptions,
- 3.2 Design of axially loaded compression members, Built-up columns (latticed columns), Lacing, Batten,
- 3.3 Compression members composed of two components back-to-back, Encased column, eccentrically loaded columns, and solved examples.
- 3.4 Tension Members Introduction, Net sectional area, Permissible stress, Design of axially loaded tension member, Lug angle, Tension splice.

UNIT-4 COLUMN BASES & FOOTINGS & BEAMS

- 3.1 Types of column bases, Slab base, Gusset base, Welded column bases, Design of hold-down angles and base plates, Grillage footing, solved examples.
- 3.2 Design procedure, Built-up beams, Plate thickness, and Simple beam end connections.

UNIT-5 INDUSTRIAL BUILDINGS & BEAMS & COLUMN

- 5.1 Introduction, Planning, Structural framing, Types, Roof and side coverings,
- 5.2 Elements of an industrial building, Design steps of industrial building, Solved examples.
- 5.3 Introduction, Eccentricity of load, eccentrically loaded base plates.

UNIT-6 ELEMENTARY PLASTIC ANALYSIS & DESIGN

- 6.1 Idealized stress-strain curve for mild steel, Scope of plastic analysis, Ultimate load carrying capacity of tension members,
- 6.2 Ultimate load carrying capacity of compression members, Flexural members, Shape factor, Load factor, Mechanism, Plastic collapse, Conditions in plastic analysis,
- 6.3 Principle of virtual work, Theorems of plastic analysis, Methods of analysis, Cancellation of hinge in the combined mechanism [beam + panel),

6.4 Design, Limitations of plastic analysis, Plastic design vs elastic design, Solved examples.

UNIT-7 PLATE GIRDER

7.1 Economical depth and self-weight of plate girder, Design of web,

7.2 Design of flanges, Curtailment of flange plates, Riveted connections,

7.3 Web stiffeners, Web splice, Flange splice.

Reference Books:

1. Design of Steel Structures by Duggal
2. Design of Steel Structures: By Limit State Method as Per IS: 800-2007 by S S Bhavikatti
3. Steel Structures: Design and Practice by N Subramanian

