

**INDEX****UNIT I****Chapter 1 : Fundamental of Steel Structures****1-1 to 1-21****Syllabus :**

Steel as construction material.

Steel structures : Towers, Roof trusses, Water Tanks, Bridges, Gantry and Crane girders, Columns, Chimney, building frames etc.

Types, grades and strength of steel sections, Steel Table, IS 808-1989. Stress Strain graph for mild steel.

Loads acting on steel structures according to IS 875-1987 part I to IV.

Limit State Method of design : Meaning and types of limit states, loads, design criteria, limit states of strength, limit states of serviceability.

Factors of safety and load factors as per IS 800:2007.

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Type, use of bolts and joints : Black bolts and High strength bolts, modes of failure.

Specifications of bolt holes for bolted connections.

Strength of bolt in shear, tension, bearing and efficiency of joint.

Analysis and design of bolted joints for axially loaded plate, single and double angle members.

Welded connections : Butt and Fillet welds, size of weld, throat thickness.

Analysis and design of fillet welded joint for plate, single and double angle members subjected to axial load.

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#### Chapter 4 : Analysis and Design of Singly Reinforced Rectangular Sections 4-1 to 4-33

##### Syllabus :

Limit State of collapse (flexure) : assumptions, steel, strain diagram and stress-strain relationship for concrete and block diagram for singly reinforced section, design parameters and constants, ultimate moment of resistance.

Under- reinforced, over-reinforced and balanced sections.

IS specifications regarding spacing, cover, minimum reinforcement, effective span in beams.

Analysis and design : determination of design constants, ultimate moment of resistance, ultimate load carrying capacity, design of rectangular sections.

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##### Syllabus :

**Shear** : Meaning of shear in beams and slabs. IS code specifications. Various forms of shear reinforcement. Use of bent up bars. Zones of minimum shear reinforcement. Numerical problems on design of shear reinforcement in beam.

**Bond** : Meaning of bond as per IS code provisions. Meaning and calculation of development length in tension and compression.

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Slabs, support conditions, I.S. specifications regarding main steel, distribution steel, spacing and cover for reinforcement, effective span, minimum reinforcement.

Limit state of serviceability for slabs for deflection criteria only.

Design of one way and cantilever slab including development length check only.

Design of two – way slab with four edges discontinuous and provision of torsion reinforcement at corners (As per IS 456 : 2000, table no 26 case no 9 only.) Check for deflection only.

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Limit state of collapse in compression, assumptions, effective length, slenderness ratio, short and long columns, and minimum eccentricity.

IS specifications for reinforcement in column.

Load analysis for a column : load on an axially loaded column from beams at a different floor levels in building.

Design of axially loaded short square and rectangular column.

Various RC footings : Isolated and sloped footings, combined footings, piles.

IS specification for reinforcement in footing.

Design of isolated square sloped footing: Flexural design with checks for one-way, two way shear and bond. (Problems on design of footing for bending moment only in theory examination paper.)

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