

(CE503) PLASTICITY AND LIMIT STATE DESIGN OF STEEL STRUCTURES

Objective of the Course:

The objectives are to provide students with advanced knowledge of steel structural design and confidence to apply the underlying principles to solve a wide range of structural steel problems. This subject will provide students the basic principles of reliability based design on steel structures and an understanding of the relationship between structural analysis and design provisions.

UNIT-I:

Plastic Analysis of Structures

Introduction, Shape factor, Moment redistribution, Combined mechanisms, Analysis of portal frames, Effect of axial force - Effect of shear force on plastic moment, Connections -Requirement – Moment resisting connections. Design of Straight Corner Connections – Haunched Connections – Design of continuous beams.

UNIT-II:

Design Of Connections

Types of connections – Welded and riveted – Throat and Root Stresses in Fillet Welds – Seated Connections – Unstiffened and Stiffened seated Connections – Moment Resistant Connections – Clip angle Connections – Split beam Connections– Framed Connections.

UNIT-III:

Analysis and Design of Steel Towers

Analysis and Design of Microwave / Transmission Line Towers - Types of bracing patterns -Sag and Tension calculations. Design of Self supporting Chimney – Design of Base Plates, Foundations and Anchor bolts and Guyed Steel Chimney - Guy ropes - Stresses due to wind. Along with load calculation - Gust Factor Method.

UNIT-IV:

Design of Industrial Structures

Design of members subjected to lateral loads and axial loads, Analysis and design of Industrial Buildings and bents, Sway and non-sway frames, Design of Purlins, Louver rails, Gable column and Gable wind girder - Design of Moment Resisting Base Plates – Analysis of Gable Frames.

UNIT-V:

Design of Light Gauge Steel Structures

Behaviour of Compression Elements - Effective width for load and deflection determination – Behaviour of Unstiffened and Stiffened Elements – Design of webs of beams – Flexural members – Lateral buckling of beams – Shear Lag – Flange Curling – Design of Compression Members – Wall Studs.

TEXT BOOKS:

1. Subramanian.N, “Design of Steel Structures”, Oxford University Press, 2008.
2. Dayaratnam.P, “Design of Steel Structures”, A.H.Wheeler, India, 2007.
- 3 Linton E. Grinter, “Design of Modern Steel Structures”, Eurasia Publishing House, New Delhi, 1996.