

Branch Name:	Civil Engineering
Program Code:	ET106
Course Name:	Design of Steel structure
Course Code:	2ET1060701T
Pre-requisite Course:	Mechanics of Solids, Structural Analysis-I & II,

Course Objective:

- To understand properties and behavior of structural steel and design philosophies.
- To learn analysis and design of tension and compression members.
- To develop skills for design of beams and beam-columns.
- To understand design of bolted and welded connections.
- To apply IS 800 provisions for safe and economical steel structures.

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								Total (Marks)
					Theory (Marks)				Practical (Marks)				
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
3	3	1	-	4	24	60	16	40	-	-	-	-	100

Subject Contents:

Sr. No	Topic	Total Hours	Weightage (%)
1	Unit 1: Properties of Steel and Design Philosophy - Types of structural steel, mechanical properties - Stress-strain behavior, factor of safety - Working Stress Method (WSM), Limit State Method (LSM) - Loads and load combinations as per IS codes	6	15
2	Unit 2: Design of Connections - Bolted connections: types, strength, design - Welded connections: fillet and butt welds - Design of joints (tension & beam connections)	6	15
3	Unit 3: Design of Tension Members - Types of tension members - Net area, gross area, shear lag - Failure modes: yielding, rupture, block shear - Design of angles, channels, rods	9	20
4	Unit 4: Design of Compression Members - Buckling of columns (Euler's theory) - Slenderness ratio - Design of axially loaded columns (IS 800) - Built-up columns and lacing/battening	9	20
5	Unit 5: Design of Beams Laterally supported beams	6	15

	• Laterally unsupported beams • Bending strength, shear strength, deflection • Web buckling and web crippling		
6	Unit 6: Design of Structural Components • Plate girders: elements and design concepts • Gantry girders (basic concept) • Introduction to roof trusses and purlins	6	15

Course Learning Outcome:

CO1: Understand steel properties and design philosophy.

CO2: Design tension members.

CO3: Analyze and design compression members .

CO4: Design beams and connections.

CO5: Apply IS codes for overall steel structure design.

Reference Books:

1. Duggal, S. K. – Limit State Design of Steel Structures
2. Bansal, R. K. – Design of Steel Structures
3. Ramchandra – Design of Steel Structures
4. IS 800:2007 – General Construction in Steel Code
5. Subramanian, N. – Design of Steel Structures
6. Salmon & Johnson – Steel Structures Design and Behavior

List of Open-Source Software/learning website:

- NPTEL – Steel Structure Courses
- SWAYAM – Structural Engineering Modules
- BIS Website – IS 800 Code
- IIT Lectures (YouTube/NPTEL)
- Structural Guide Websites

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Understand steel properties and design philosophy.	L-2
CLO2	: Design tension members..	L-3
CLO3	Analyze and design compression members.	L-4
CLO4	Design beams and connections.	L-6
CLO5	Apply IS codes for overall steel structure design.	L-3 & L-6

L1- Remember, L2- Understand, L3- Apply, L4- Analyze, L5- Evaluate, L6- Create

Mapping of CLOs with POs & PSOs

	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
Course Learning Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CLO1	M				M								M	M	
CLO2	M		M		M								M	M	
CLO3	M	M	M					L					M	M	M
CLO4	M	M	M										M	M	
CLO5	M		M										M	M	

H: High, M: Medium, L: Low