20CE3601 – DESIGN OF STEEL STRUCTURES

Offering Branches	CE		
Course Category:	Professional Core	Credits:	3
Course Type:	Theory	Lecture-Tutorial-Practical:	3-0-0
Prerequisites:	20CE3404-Mechanics of Solids 20CE3503-Structural Analysis	Continuous Evaluation:	30
		Semester End Evaluation:	70
		Total Marks:	100

Course Outcomes

Upon successful completion of the course, the student will be able to:

CO1	**Demonstrate** the knowledge of steel design philosophies, by working and limit state methodology and design bolted connections by limit state method	K2
CO2	**Analyze** and **design** both concentric and eccentric welded connections by limit state method.	K6
CO3	**Analyze** and **design** tension members inclusive of lug angle by limit state method.	K6
CO4	**Analyze** and **design** both concentric and eccentrically loaded compression members by limit state method.	K6
CO5	**Analyze** and **design** both laterally supported & unsupported beams by limit state method.	K6

Contribution of Course Outcomes towards achievement of Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2		2		2			2		2	2	
CO2	2	2	2		2		3			3		3	2	
CO3	3	3	3		3		3			3		3	3	
CO4	2	2	2		2		3			3		3	2	
CO5	2	2	2		2		3			3		3	2	
Avg.	**2**	**2**	**2**		**2**		**3**			**3**		**3**	**2**	

1- Low **2-Medium** **3-High**

Course Content

UNIT-1	**General**: Fundamental concepts of design of structures, Types of structural steel – Mechanical properties of structural steel, Indian standard rolled steel sections, Design process, Steel Structural systems, Loads & load combinations, Concept of Working stress and limit state method of design. **Bolted Connections**: Types of fasteners, Bolts & Bolted Connection, Failure of a joint, strength and efficiency of a joint, Design of lap joint, butt joint and eccentric connections.	CO1
UNIT-2	**Welded Connections**: Types of welds, stresses in welds, design of butt welded and Fillet welded joints subjected to axial load, eccentric welded connections.	CO2
UNIT-3	**Tension Members**: Types of tension members and sections, behaviour of tension members, Modes of failures, net effective sectional area for plates and angle sections, design of tension members using plates, single angles and double angles, lug angles.	CO3
UNIT-4	**Compression Members**: Types of compression members and sections, Behavior and failures of Compression members, Effective length, radius of gyration and slenderness of compression members, design compressive stresses in compression, design of struts, design of axially loaded compression members, built up compression members (I section and two channels) laced and battened columns, design of eccentrically loaded columns.	CO4

UNIT-5	**Beams**: Introduction, Types of steel beam sections, Classifications of sections, lateral stability of beams, factors affecting lateral stability, behavior of simple beams in bending, design strength of laterally supported & unsupported beams, design of laterally supported and unsupported beams.	CO5

Learning Resources

Text Books	1. S.K. Duggal, Limit state Design of steel structures, 2/e, Tata McGraw Hill, 2017. 2. N. Subramanyam, Design of Steel Structures, 2/e, Oxford University Press, 2016.
Reference Books	1. V.L. Shah and Veena Gore, Limit State Design of steel structures IS:800-2007, Structures Publications, 3/e, 2012. 2. M.L. Gambhir, Fundamentals of Structural Steel Design, McGraw Hill Education, 2013. 3. Ramachandra and V. Gehlot, Design of Steel Structures, 2/e, Scientific Publishers, 2015. 4. Shiyekar M R, Limit State Design in Structural Steel, 3/e, Prentice Hall of India Pvt Ltd, 2017.
e- Resources & other digital material	1. https://nptel.ac.in/courses/105106112/3 2. https://lecturenotes.in/subject/161/design-of-steel-structure-dss 3. https://nptel.ac.in/courses/105/105/105105162/ 4. http://www.nptelvideos.in/2012/11/design-of-steel-structures.html 5. https://freevideolectures.com/course/2679/design-of-steel-structures