ADVANCED STEEL DESIGN

II Semester: ST

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
BSTB13	Elective	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes: 45		

I. COURSE OVERVIEW:

This course is recommended for postgraduate students in the structural engineering program who are interested in learning the design of steel structures. This course provides relevant material properties of different types of steel material specifications and design considerations. It covers the behavior and design of structural steel components and helps to gain an educational and comprehensive experience in the design of simple steel structures. It also delivers students with a thorough understanding of the iterative nature of design and the fundamental principles on which the analyses are based. This course is mainly designed to introduce the behavior and design of tension members, compression members, laterally restrained and unrestrained beams, beam-columns and connections design. It deals with two types of connections namely welded and bolted connections. Students are expected to obtain basic knowledge about the design and failure mode of steel structural members after finishing this course.

II. COURSE OBJECTIVES:

The student will try to learn:

I. The Design of steel structural components by using different codal procedures.
II. Analysis and design of beam-columns for stability, strength and drift.
III. Design of welded and bolted joint connections for high rise and bridge structures.

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:		
CO 1	Learn the behavior and design of structural steel components like truss and frame structures	Understand
CO 2	Explain an educational and comprehensive experience in the design of simple steel structures	Understand
CO 3	Obtain basic knowledge about the design and failure mode of steel structural members after finished this course.	Analyze
CO 4	Analyze wind loads on buildings and design truss bridges.	Analyze
CO 5	Analyze and design of tower structures.	Analyze
CO 6	Analyze and design various welded and bolted connections	Analyze

IV. SYLLABUS

UNIT -I	PROPERTIES OF STEEL	Classes: 09

Mechanical Properties, Hysteresis, Ductility, Hot Rolled Sections: compactness and non-compactness, slenderness, residual stresses

UNIT -II	**DESIGN OFSTEEL STRUCTURES**	**Classes: 09**
Inelastic Bending Curvature, Plastic Moments, Design Criteria Stability, Strength, Drift. Stability of Beams: Local Buckling of Compression Flange &Web, Lateral Torsional Buckling		
UNIT -III	**STABILITY OF COLUMNS AND METHOD OF DESIGNS**	**Classes: 09**
Slenderness Ratio, Local Buckling of Flanges and Web, Bracing of Column about Weak Axis Allowable Stress Design, Plastic Design, Load and Resistance Factor Design		
UNIT -IV	**STRENGTH CRITERIA**	**Classes: 09**
Beams -Flexure, Shear, Torsion, Columns - Moment Magnification Factor, Effective Length, PM Interaction, Biaxial Bending, Joint Panel Zones.		
UNIT -V	**DRIFT CRITERIA AND CONNECTIONS**	**Classes: 09**
Drift Criteria: P Effect, Deformation Based Design Connections: Welded, Bolted, Location Beam Column, Column Foundation, Splices		

Text Books:

1. P. Dayaratnam, "Design of Steel Structures", S. Chand (2012).
2. Dr. Ramachandra & Vivendra, "Design Steel Structures" Volume – II, Gehlot Scientitic Publishes Journals Department.
3. S.K. Duggal, "Limit State Design of Steel Structures", McGraw Hill Education Private Ltd. New Delhi.

Reference Books:

1. Galyord & Gaylord, "Design of Steel Structures", Tata McGraw Hill, Education (2012).
2. Indian Standard Code – IS:800 (2007).
3. B.O. Kuzamanovic and N.Willems, "Steel Design for Structural Engineers", Prentice Hall (1997).

Web References:

1. http://nptel.ac.in/courses/105106113/

E-Text Books:

1. https://www.iare.ac.in/sites/default/files/lecture_notes/lec%20notes%20ASD.pdf