SARVAJANIK UNIVERSITY
SarvajanikCollege of Engineering and Technology
Bachelor of Technology
Civil Engineering

B.Tech. III Semester VI

Subject Name : Basic Steel Design **Subject Code:** BTCL13601

Type of course : PCC

Prerequisite : Engineering Mechanics BTCL12113

Rationale : To provide a coherent development to the students for the courses in sector of designing of the Steel Structures. It present the foundations of many basic Engineering concepts related Design of Steel Structures. To give an experience in the implementation of engineering concepts which are applied in field of Steel Structure and to involve the application of scientific and technological principles of planning, analysis, design of buildings.

Teaching and Examination Scheme:

TEACHING SCHEME				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	150
2	0	2	3	60	25	15	30	20	

CA1: Continuous Assessment (assignments/projects/open book tests/closed book tests **CA2:** Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems **TEE:** Term End Examination **TEP:** Term End Practical Exam (Performance and viva on practical skills learned in course) **CA3:** Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1.	**Structural Steel and Section:**Properties of structural steel, Designation and classification of structural steel sections as per IS handbook and IS: 800: 2007,Tubular Sections	6	14%
2	**Riveted Connections** Types of Rivet, Permissible stresses in rivets, types of riveted joints, specifications as per IS800, Failure of riveted joint, strength and efficiency of riveted joint, Design of Riveted Connection only axially loaded number (No staggered riveting)	6	14%
3.	**Bolted Connections:** Introduction, Behaviour of Bolted joints, Design strength of ordinary Black Bolts, Design strength of High Strength Friction Grip bolts (HSFG), Pin Connections, Simple Connections, Moment resistant connections, Beam to Beam connections, Beam and Column splices, Semi rigid connections	6	14%

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4.	**Welded Connections:** Types of welds and welded joints, advantages and disadvantages of welded joints design of fillet and butt weld for axially loaded members.	6	14%
5.	**Tension Members** Analysis and design of single and double section tension members and their riveted and welded connections with gusset plate as per IS:800-2007. Introduction to Lug Angle and Tension splice.	4	10%
6.	**Compression Members** Introduction, Failure modes, Behaviourof compression members, Elastic buckling of slender compression members,Sections used for compression members, Effective length of compressionmembers, Design of compression members, Built up compression members.	4	10%
7	**Column Base, Beam** Types of column bases i.e. slab base, gusseted base. Design of slab base and concrete block. Introduction to gusseted base (no numerical problems on gusseted base). Introduction to beam columns design of simple built up beams (Symmetrical I section with cover plates only)Analysis and design of single section simply supported laterally restrained steel beams. Introduction to plate girder and functions of various elements of a plate girder	6	14%
8	**Fabrication and erection of steel structures like trusses, columns and girders:**Fabrication and erection of steel structures like trusses, columns and girders	4	10%

Suggested Specification table with Marks (Theory/Practical):

% Distribution of Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
10%	**25%**	**25%**	**20%**	**15%**	**5%**

Legends: R: Remembrance, **U:** Understanding; **A:** Application, **N:** Analyze, **E:** Evaluate **C:** Create and above Levels **(Revised Bloom's Taxonomy)**

Note: This specification table shall be treated as a general guideline for students andteachers. The actual distribution of marks in the question paper may vary slightly from above table.

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Reference Text Books:

Sr. No.	Title of book /article	Author(s)	Publisher and details like ISBN	Year of publication	Publication Edition
1.	Design of Steel Structures	Duggal SK	Standard Publishers, Delhi. New	2011	Ninth
2.	Steel Structures Design and Drawing	Birinder Singh	Kaption Publishing House, Ludhiana	2007	fourth
3	Design of Steel Structures	Ram Chandra	Standard Publishers,Delhi	2007	Third
4	Design of Steel Structures	S Ramamurthan	Tata-McGraw Hill education (India) (0-07-041878)	2003	Fourth

Course Outcome:

Sr. No.	CO Statement After learning this subject, students will be able to	Marks % weightage
CO-1	Learn the basic elements of a steel structure	25%
CO-2	Learn the fundamentals of structural steel fasteners	25%
CO-3	Able to design basic elements of steel structure like tension members, compression members, beams and beam-columns •	15%
CO-4	Able to design column splices and bases.	20%
CO-5	Learn the behavior of steel structure under various load.	15%

Mapping with POs:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO-1	3	2	2	1	3	2	3	1	3	3	3	3	2	1	2
CO-2	2	3	2	3	3	2	1	2	2	2	2	1	1	3	3
CO-3	2	3	2	3	2	2	2	1	2	2	2	2	3	1	2
CO-4	1	2	2	3	2	3	1	3	1	3	2	2	3	2	2
CO-5	1	1	1	2	1	3	1	3	1	3	2	2	3	2	1
Rationale*	09	11	09	12	11	12	08	10	09	13	11	10	12	09	10

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Rationale*: The study of fundamental aspects for basics of steel structures, different types of joints, connections, tension and compression members will help to know the elements and behaviours of steel structures and justify the well-defined POs and PSOs.

LIST OF PRACTICALS:

1. The students will have to solve at least three examples and related theory from each topic as an assignment/tutorial given in list
2. Draw the layout of different types of connections.
3. Draw the neat sketch of staggered joints and show pitch, gauge and edge distance.
4. Draw the plan and elevation of Grillage foundation.
5. Draw the plan and elevation of slab base.
6. Draw the neat sketch of column made by channel section with necessary arrangement of lacing and battening.
7. Draw the neat sketch of column made by angle section with necessary arrangement of lacing and battening.

LIST OF TUTORIALS:

1. Axial force design
2. Flexure design for beam
3. Design of footing
4. Torsion design
5. Connections
6. Plastic design