



**BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY &  
SCIENCE(AUTONOMOUS)  
DEPARTMENT OF CIVIL ENGINEERING**

REGULATION	BR23				
III B. TECH II SEMESTER	Course Code: 23CE6T01	L	T	P	C
Course Title:	DESIGN AND DRAWING OF STEEL STRUCTURES	3	0	0	3

**Course Learning Objectives:**

The objective of this course is to:

1. Familiarize students with different types of connections and relevant IS codes
2. Equip student with the concepts of designing flexural members
3. Understand design concepts of tension and compression members in trusses
4. Familiarize students with different types of columns and column bases and their design
5. Familiarize students with Plate girder and Gantry Girder and their design

**Course Outcomes:**

At the end of this course the student will be able to

- a. Analyze and design steel structural members with relevant IS codes
- b. Carryout analysis and design of flexural members and detailing
- c. Design compression members of different types with connection detailing
- d. Design Plate Girder and Gantry Girder with connection detailing
- e. Produce the drawings pertaining to different components of steel structures

**SYLLABUS:**

**UNIT – I**

**Connections:** Riveted connections – definition, rivet strength and capacity, Welded connections: Introduction, Advantages and disadvantages of welding- Strength of welds-Butt and fillet welds: Permissible stresses – IS Code requirements. Design of fillet weld subjected to moment acting in the plane and at right angles to the plane of the joints.

**UNIT – II**

**Beams:** Allowable stresses, design requirements as per IS Code-Design of simple and compound beams-Curtailment of flange plates, Beam to beam connection, check for deflection, shear, buckling, check for bearing, laterally unsupported beams.

**UNIT –III**

**Tension Members and compression members:** Effective length of members, slenderness ratio-permissible stresses. Design compression members subjected to axial and eccentric loading. Design of members subjected to direct tension and bending. **Roof Trusses:** Different types of roof trusses – Design loads – Load combinations as per IS Code recommendations, structural details –Design of purlins, members and joints

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**UNIT – IV**

**Design of Columns:** Built up compression members – Design of lacings and battens. Design Principles of Eccentrically loaded columns, Splicing of columns.

**Design of Column Foundations:** Design of slab base and gusseted base. Column bases subjected to moment.

**UNIT – V**

**Design of Plate Girder:** Design consideration – IS Code Recommendations Design of plate girder- Welded – Curtailment of flange plates, stiffeners – splicing and connections.

**Design of Gantry Girder:** impact factors - longitudinal forces, Design of Gantry girders.

**NOTE:** Welding connections should be used in Units II – V. Drawing classes must be conducted every week, and the students should prepare the following plates.

Plate 1 Detailing of simple beams

Plate 2 Detailing of Compound beams including curtailment of flange plates.

Plate 3 Detailing of Column including lacing and battens.

Plate 4 Detailing of Column bases – slab base and gusseted base

Plate 5 Detailing of steel roof trusses including joint details.

Plate 6 Detailing of Plate girder including curtailment, splicing and stiffeners.

Plate 7 Detailing of gantry girder.

**FINAL EXAMINATION PATTERN:**

The end examination paper should consist of Part A and Part B. Part A consists of two questions in Design and Drawing, out of which one question is to be answered. Part B should consist of five questions and design out of which three are to be answered. Weightage for Part – A is 40% and Part-B is 60%.

**TEXTBOOKS**

1. 'Design of steel structures' by S.K. Duggal, Tata Mcgraw Hill, and New Delhi ,3rd Edition 1 July 2017.
2. 'Design of Steel Structures' by Ramachandra, Vol – 1, Universities Press, 18th Edition 1 January 2016.
3. Steel Structures Design and Practice' by N. Subramanian, Oxford University Press, 27 August 2010.

**REFERENCES**

1. 'Structural Design in Steel' by SarwarAlamRaz, New Age International Publishers, New Delhi, 3<sup>rd</sup> Edition 2020.
2. 'Design of Steel Structures' by P. Dayaratnam; S. Chand Publishers, 1<sup>st</sup> Edition 2012.
3. 'Design of Steel Structures' by M. Raghupathi, Tata Mc. Graw-Hill, 3<sup>rd</sup> Edition 2017.
4. 'Structural Design and Drawing' by N. Krishna Raju; University Press.

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