**17CE3105 – STEEL STRUCTURAL DESIGN**

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| **Course Category** | Professional Core | **Credits** | 3 |
| **Course Type** | Theory | **Lecture - Tutorial - Practical** | 2 - 2 - 0 |
| **Prerequisite** | Engineering Mechanics and Strength of Materials | **Sessional Evaluation** | 40 |
| **Semester End Exam Evaluation** | 60 |
| **Total Marks** | 100 |

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| **Course Objectives** | 1. To explain different types of connections for steel joists. 2. To understand the behavior and design of tension and compression members. 3. To understand the design of laterally supported beams. 4. To understand the design of laterally unsupported beams. 5. To understand the importance of column bases. 6. To understand the design of column bases under various loads. | |
| **Course Outcomes** | CO1 | Identify the failure modes in connections, analyse and design bolted and welded connections. |
| CO2 | Design different types of steel tension members. |
| CO3 | Design different types of steel laced and battened compression members. |
| CO4 | Design various laterally supported beams and their connections. |
| CO5 | Analyze and design laterally unsupported beams and gantry girders. |
| CO6 | Analyze and design slab and gusset bases and grillage foundation. |
| **Course**  **Content** | **UNIT – I**  **INTRODUCTION:** Properties of sections – Types of loads – Permissible stresses in tension, compression and shear as per IS code.  **BOLTED CONNECTIONS:** Types of bolted joints – Modes of failure of bolted joints – Strength and efficiency of bolted joints – Strength of lap and butt joints – Design of Bolted joints – Design of bracket connections (beam to column and beam to beam connections).  **WELDED CONNECTIONS:** Types of welded joints – Strength of fillet and butt welds – Design of welded joints – Design of bracket connections (beam to column and beam to beam connections).  **UNIT – II**  **DESIGN OF TENSION MEMBERS:** Design of tension members – Lug angles – Tension splice.  **UNIT – III**  **DESIGN OF COMPRESSION MEMBERS:** Design of compression members – Single and built-up columns – Design of lacing and battens – Design of eccentrically loaded columns.  **UNIT – IV**  **LATERALLY SUPPORTED BEAMS:** Design of simple beams – Design of built up beams- Curtailment of flange plates – Connection of flange plate with flange of beam.  **UNIT – V**  **LATERALLY UNSUPPORTED BEAMS:** Permissible bending compressive stress – Effective length of compression flange – Design of simple beams – Design of Gantry Girders.  **UNIT – VI**  **DESIGN OF COLUMN BASES:** Slab base – Gusseted base – Bases subjected to moment – Grillage foundation. | |
| **Textbooks**  **and**  **References** | **TEXTBOOKS:**   1. Design of Steel Structures by S.K. Duggal. 2. Design of Steel Structures by Dr. B C Punmia, Ashok Kumar Jain & Arun Kumar Jain. 3. Design of Steel Structures by S.S. Bhavikatti.   **REFERENCE BOOKS:**   1. Limit State Design in Structural steel by M.R. Shiyekar. 2. Design of Steel Structures by N. Subramanian. 3. Design of Steel Structures by P.Dayaratnam. | |