**17CE31E2 – INDUSTRIAL STEEL STRUCTURES**

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| **Course Category** | Professional Elective | **Credits** | 3 |
| **Course Type** | Theory | **Lecture - Tutorial - Practical** | 3 - 0 - 0 |
| **Prerequisite** | Steel Structural Design | **Sessional Evaluation** | 40 |
| **Semester End Exam Evaluation** | 60 |
| **Total Marks** | 100 |

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| **Course Objectives** | 1. To provide coherent understanding to the students in the sector of advanced steel structural design. 2. To explain the design of liquid retaining structures using steel members. 3. To understand the analysis and design of transmission towers. 4. To give an experience to the students in design of framed steel structures. 5. To understand the analysis and design of chimneys and shells. 6. To understand the importance and behavior of light gauge steel structures. | |
| **Course Outcomes** | CO1 | Analyze and design steel water tanks. |
| CO2 | Analyze and design transmission and communication towers. |
| CO3 | Analyze and design roof trusses. |
| CO4 | Analyze and design plate girders. |
| CO5 | Understand the basic concepts of light gauge structures. |
| CO6 | Understand the basic concept of plastic analysis and analyze fixed, continuous beams and portal frames. |
| **Course**  **Content** | **UNIT – I**  **DESIGN OF WATER TANKS:** Design of cylindrical steel tanks – Pressed steel tanks and rectangular steel tanks including staging.  **UNIT – II**  **TRANSMISSION AND COMMUNICATION TOWERS**: Types and configuration of towers – Analysis and design of transmission and communication towers.  **UNIT – III**  **DESIGN OF ROOF TRUSSES:** Loading on roof trusses – Design of purlins – Design of members of roof truss – Angular and tubular members – Design of connection of members.  **UNIT – IV**  **DESIGN OF PLATE GIRDERS:** Plate Girder: Design consideration – IS code recommendations – Design of plate girder – Welded - Curtailment of flange plates stiffeners – Splicing and connections.  **UNIT – V**  **LIGHT GAUGE STEEL STRUCTURES:** Light gauge steel types of sections – Specifications – Basic allowable design stresses – Compression members – Local buckling of elements, stiffened and unstiffened compression elements – Computation of permissible stresses – Design of columns – Flexural members – Bending – Deflection – Local bucking of compression elements – Laterally supported and unsupported beams- Computation of permissible stresses – Design of beams.  **UNIT – VI**  **PLASTIC ANALYSIS:** Idealized stress – Strain diagram – Shape factors – Moment-Curvature relationships – Plastic hinges – Collapse mechanism – Analysis of fixed, continuous beams and portal frames. | |
| **Textbooks**  **and**  **References** | **TEXTBOOKS:**   1. Design of Steel Structures by Ramchandra Vol. I&II. 2. Design of Steel Structures by S.K. Duggal. 3. Design of Steel Structures by S.S. Bhavikatti.   **REFERENCE BOOKS:**   1. Design of Steel Structures by E.H. Gaylord, C.H Gaylord and J.E Stallmeyer. 2. Structural Design & Drawing Vol. III (Steel Structures) by Krishnamurthy. D. 3. Steel Structures: Design & Behaviour by Salmon. C. G & Johnson. J. E. | |