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## SECOND SEMESTER 2023-2024

**Course Handout Part II**

Date: 09/01/2024

In addition to part -I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

*Course No.* : **CE F343**

*Course Title* : **Design of Steel Structures**

*Instructor-in-charge* : **Chandu Parimi**

1. **Scope and Objective of the Course**

The course intends to impart design skills to common type of Civil Engineering Steel Structures as found in practice. An understanding of basic design concepts, loads and stresses to be used as per Indian standards for steel design work will be developed. The course deals with designing of steel structural elements subjected to axial tension, axial Compression and bending. The course will cover the following:

Introduction to Limit State Design and Plastic design; Limit state design of bolted and welded connections; Eccentric connection; Design of Tension Members; Design of Compression Members; Design of Beams; Design of plate girders ,Design of Beam-Columns, Column bases.

1. **Text Book**

L. Subramanian, “Steel Structures Design and Practice”, Oxford University Press. 1st Edn., 2018

**Reference Books**

1. S k Duggal, “Limit State Design of Steel Structures”, TMH, 2011
2. A S Arya and Ajmani "Design of Steel Structures” Nemi Chand & Bros.
3. P. Dayaratnam “Design of Steel Structures”, Wheeler Pub. 1992.
4. E H Gaylord and C N Gaylord "Design of steel structures" McGraw Hill
5. IS 800:2007 "Code of practice for General construction in steel "B.I.S.
6. IS 875 :1987 "Code of practice for design Loads"

**3. Course Plan:**

| Lecture Nos. | Learning Objectives | Topics to be covered | Reference to  Text Book |
| --- | --- | --- | --- |
| 1-5 | Structural steel, basis of design | Introduction, Chemical and mechanical properties of steel, resistance to corrosion and fatigue, types of steel structures, codes and specifications, design philosophies (working stress and Limit State). | TB. / Code Book |
| 6-9 | Design of Bolted Connections | Failure modes of bolts, codal provisions and designing bolted connections | TB. / Code Book |
| 10-12 | Design of Welded Connections | Theory and codal provisions and designing welded connections. Types of welds. | TB. / Code Book |
| 13-15 | Design of Tension Members | Types of tension members, modes of failure, Net area, Net sectional area, Design, Lug Angles, Tension Splices, gussets. | TB. / Code Book |
| 16-20 | Design of Compression Members | Behavior of compression members, possible failure modes, single angle struts, design, built-up compression members, column bases and caps. | TB. / Code Book |
| 21-24 | Design of Beams | Types and classification, Lateral stability of beams, shear strength, shear strength, web buckling and crippling, and purlins. | TB. / Code Book |
| 25-28 | Design of Plate Girders | Design of web, flanges, curtailment of flanges, stiffeners, web and flange splices, economic depth of plate girders, example problem. | TB. / Code Book |
| 29-32 | Design of beam-columns | Behavior, equivalent moment factor, eccentricity, beam-column subjected to tension and bending, design. | TB. / Code Book |
| 33-36 | Design of column bases. | Design of column bases, baseplates and anchor bolts. | TB. / Code Book |
| 37-42 | Introduction to plastic design | Plastic theory, theorems of plastic collapse, methods of plastic analysis, plastic designs of portal frames, behavior and ultimate strength of plates. | TB. / Code Book |

1. **Evaluation Scheme**

| EC No. | Evaluation Component | Duration | weightage | Date & Time | Remarks |
| --- | --- | --- | --- | --- | --- |
| 1 | Test | 1.5 hr | 25% | 14/03 - 9.30 - 11.00AM | CB |
| 2 | Classroom Interaction | - | 15% | In Class | OB |
| 3 | Class Project / Home assignments | - | 25% | In Class | OB |
| 4 | Comprehensive Exam | 3 hrs. | 35% | 13/05 FN | OB |

1. **Chamber Consultation Hour:** To be announced in the class.
2. **Notice: All notices will be on Google Classroom**.  **Students are not allowed without an original copy of the code book.**
3. **Academic Honesty and Integrity Policy:** Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.
4. **Make up Policy:** Prior permission for all make ups are a must.
5. **Academic Honesty and Integrity Policy**: Academic honesty and integrity are to be maintained by all the students throughout the semester, and any academic dishonesty is unacceptable.

**Instructor-in-charge  
 CE F343**