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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.** : ME F241

## **Course Title** : Machine Design & Drawing

## **Instructor in charge** : Dr. Sabareesh G R

**Scope and Objective of the Course:** Fundamentals and principles of mechanical design. Design and selection of machine elements such as shafts, screw fasteners, welded joints, springs, brakes & clutches, bearings & gears. Fundamentals of machine drawing; practices for orthographic drawing of machine parts, sectional view, assembly drawing & exploded view.

**Textbooks:**

TB1: Budynas R. G. and Nisbett J. K., “Shigley’s Mechanical Engineering Design" Tata–McGraw Hill, 9th SI Edition, New Delhi, 2011.

**Reference books**

RB1: Narayana K. L., Kannaiah P., Venkata Reddy K., “Machine Drawing”, 3rd Edition, New Age International Publishers, New Delhi.

**Course Plan:**

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| --- | --- | --- | --- |
| **Lecture No.** | **Learning objectives** | **Topics to be covered** | **Chapter in the Text Book** |
| 1-4 | Fundamentals and principles of Design | Design for static loading. Static failure criteria for design of machine components made of both ductile and brittle materials. Exemplification of all principles and methods through design of shafts. | CH5 & CH7 (TB1) |
| 4-8 | Design for fatigue loading. S-N curve and its mathematical model. Fatigue failure criteria, including Soderberg, Modified Goodman, Gerber and ASME-ellpitic, for design of machine components. Combined loading. Cumulative fatigue damage and Miner’s rule. Exemplification of all principles and methods through design of shafts | CH6 & CH7 (TB1) |
| 9-14 | Design of screw fasteners | Design of power screws. Design of bolted joints in tensile, torsion and bending type joints. Design riveted joints | CH8 (TB1) |
| 15 -19 | Design of welded joints | Standard welding symbols. Design of welded joints in butt, lap, direct shear, torsional, bending and combined loading cases. | CH9 (TB1) |
| 20 -27 | Design of bearings | Selection of ball and roller bearings with load-life-reliability trade-off models. | CH11 (TB1) |
| 28 - 31 | Design of journal bearings. | CH12 (TB1) |
| 32 - 37 | Design of gears | Fundamentals of gears. Design of spur gears. Lewis bending equation. Surface endurance model. | CH13-14 (TB1) |
| 38 - 41 | Design of brakes and clutches. | Design of drum brake with internally expanding shoes. | CH16 (TB1) |
| 42 - 43 | Design of mechanical springs | Fundamentals of helical springs. Design of compression, tension and torsional springs. | CH10 (TB1) |

**Evaluation Scheme:**

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| --- | --- | --- | --- | --- |
| **Component** | **Duration (Minutes)** | **Marks (%Weightage)** | **Date & Time** | **Nature of Component** |
| Mid-semester Test | 90 | 30 | 16/03 - 2.00 - 3.30PM | Closed Book |
| Tutorial | -- | 15 |  | Open Book |
| Practical | -- | 20 |  | Open Book |
| Comprehensive Examination | 180 | 35 | 18/05 FN | Closed Book |

**Chamber Consultation Hour:** To be announced.

**Notices:** All notices to be displayed only on CMS.

**Make-up Policy:** Only in genuine cases, with prior permission. No makeup for tutorials, practical and quizzes.

**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.

**INSTRUCTOR-IN-CHARGE**

**(**ME F241)