



**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, 9<sup>th</sup> SI Edition, New Delhi, 2011.

**Reference books**

RB1: Narayana K. L., Kannaiah P., Venkata Reddy K., "Machine Drawing", 3<sup>rd</sup> Edition, New Age International Publishers, New Delhi.

**Course Plan:**

| 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-elliptic, 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:

| 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)

