



SECOND SEMESTER 2021-2022

Course Handout Part II

Date: 15/01/2022

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. NITIN KOTKUNDE

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:

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. MSS, DE, DCM, BCM and MM criteria. 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 and Time	Nature of Component
Mid-semester Test	60	25	12/03 11.00am to 12.30pm	Closed Book
Tutorial	--	15		Open Book
Practicals	--	20		Open Book
Comprehensive Examination	120	40	11/05 AN	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)

