



Subject Code	Subject Title	Lec	Tut	Prac	Cre	Hours
BME3102	Design of Machine Elements-II	3	1	0	4	4
Prerequisite	Design of Machine Elements-I					

<p>Course Objective:</p> <ul style="list-style-type: none"> ● Identify and describe the fundamental principles of transmission drives, demonstrating knowledge and comprehension. ● Analyze gear drive systems to evaluate gear tooth strength and failure modes, applying analysis skills at the level of synthesis. ● Evaluate flywheel design considerations by applying stress analysis techniques, demonstrating the ability to analyze and assess designs at the level of evaluation. ● Apply knowledge of bearing types and selection guidelines to solve practical engineering problems, demonstrating application skills at the level of application. ● Create designs for clutches and brakes based on given specifications, demonstrating synthesis skills in the application of engineering principles to solve design problems. 	
Modules	Lect.
<p>Module-I: Transmission Drives</p> <p>Belt and rope drives: Basics, Characteristics of belt drives, selection of flat belt, Design of Flat belt, V-belt, Gear drives: Standard system of gear tooth and gear module, gear tooth failure, terminology of spur, helical, Design of spur and helical gear.</p>	12
<p>Module II : Design of Flywheel and Bearing</p> <p>Flywheel: Introduction, Energy stored in a flywheel, stresses in a rim, design considerations.</p> <p>Roller: Types, selection guidelines, static and dynamic load carrying capacity, equivalent bearing load, load life relationship, selection of bearing.</p>	10
<p>Module-III: Springs</p> <p>Types; end styles of helical compression spring; stress and deflection equation; surge in spring; nipping of leaf spring; Design of close-coil helical spring and multi leaf spring.</p>	09



Module-IV: Design of Clutch Design of contact clutches i.e. single-plate, multi-plate and Centrifugal Clutch.	07
Module-V: Brakes Design of band, disc, block with shoe and internal expanding brakes.	07
Total Hours	45

COURSE OUTCOMES: On completion of the course the student should be able to;

CO1	Understand transmission drive principles and selection criteria.
CO2	Analyze gear drive systems for strength and failure modes.
CO3	Design flywheels with stress analysis for optimal performance.
CO4	Apply bearing selection knowledge to solve engineering problems.
CO5	Synthesize clutch and brake designs considering various factors.

CORRELATION OF COS WITH POS

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1
CO1	3	1	2	2	3	1	2	3	1	2	3	2	2
CO2	1	3	2	1	2	3	2	1	2	3	1	3	3
CO3	2	2	3	3	1	2	1	3	2	1	3	2	3
CO4	2	1	1	2	3	3	2	3	1	2	1	3	2
CO5	1	2	3	3	1	2	3	1	2	3	2	1	1

Text book:

- Richard G. Budynas and Keith J. Nisbett, “Shigley's Mechanical Engineering Design”, McGraw-Hill.
- V.B. Bhandari, “Design of Machine Elements”, 3rd Edition, Tata McGraw-Hill.

Reference book:

- Robert L Norton, "Design of Machinery: An Introduction to the Synthesis and Analysis of Mechanisms and Machines", 2nd Edition, Tata McGraw-Hill.
- J. K. Gupta and R S Khurmi, "A Text Book of Machine Design", 25th Edition, S Chand.

Evaluation scheme

Internal Assessment	MID Semester Exam	End Semester Exam
30%	20%	50%
Assignment, MCQ, Report Submission, Quiz, Class Test, Presentation	MCQ or Theory Paper	Theory Paper