DE	NMED504	Design of Tribological Components	3	0	0	3

Course Objective
• The main objective of this course is to promote a better appreciation of the increasingly important role played by tribology at the design stage in engineering. • It will help in implementing algorithms developed from the basic principles of tribology to a wide range of practical applications.
Learning Outcomes
Upon successful completion of this course, students should be able to: • Implement the concept of tribology at the design stage of mechanical components such as rolling element bearings, gears, seals, clutches, brakes, and belt drive • solve industrial problems related to tribological components • Identify a suitable research topic to solve a realistic industrial problem

Unit No.	Topics	Lecture Hours	Learning Outcome
1	Introduction: Tribological consideration in design, Conceptual design, Classification of tribological components, Mechanisms of tribological failures in machines, Zero wear concept, Computational techniques in design	4	Concept of tribology at the design stage
2	Rolling Element Bearings: Selecting bearing types and size, Principles and operating limits, Friction and Elastohydrodynamic Lubrication	9	Ability to Select of rolling element bearing for a particular application
3	Dry and Starved Bearings: Dry and semi lubricated bearings, analysis of partially starved bearings, minimum oil supply and temperature of starved bearings	6	Ability to analyse the bearing under different operating situation
4	Gas Lubricated Bearings: Thrust Bearing, Journal bearings, porous bearing	6	Concept of gas lubricated bearing
5	Seal Fundamentals: Classification of seals, Clearance seals, Visco seals, Radial contact seals, Mechanical face seals	5	Ability to design a seal
6	Tribology of Gears: Spur gears, friction and wear of spur gears, contact stresses, lubrication of spur gears, surface failures	5	ability to design a gear for a particular application
7	Design of Dry Frictional Elements: Dry friction concepts, Brakes and Clutches, Friction belts and	7	Ability to analyse and design clutches brakes and belt drives

	Dry rubbing bearing		
Total		42	

Textbooks:

1. M MKhonsari and E R Booser,,Applied Tribology: Bearing Design and Lubrication, John Wiley & Sons, 3rd Ed.2017.
2. H Hirani, Fundamentals of Engineering Tribology with Applications, Cambridge University press, 1st Ed.2016.

Reference Books:

1. G W Stachowiak and A W Batchelor, Engineering Tribology, Butter Worth & Heinemann Publication, 3rd Ed.2005.
2. Ghosh ,Mazumdar, and Sarangi, Theory of Lubrication, Tata McGraw Hill Education, 1st Ed.2013.

Course Type	Course Code	Name of Course	L	T	P	Credit