Ek-2

COURSE RECORD

Code	**MSME612**
Name	**Tribology**
Hour per week	3 (3 + 0)
Credit	3
ECTS	7.5
Level/Year	Graduate
Semester	Fall, Spring
Type	Elective
Prerequisites	None
Description	Tribology is the science and technology of interacting surfaces in relative motion and deals with friction, lubrication and wear in all contacting parts. Practical applications are found in a wide range of industries, from the automotive, aerospace and energy sectors to metal forming and replacement human joints. Since the reduction of friction to increase the energy efficiency of machines and thereby reduce global energy use, and the reduction of wear to increase durability and reduce maintenance costs of mechanical systems are ongoing interests, this course will approach tribology in terms of both the science of basic mechanisms, and the technologies of design, manufacture and maintenance.
Objectives	Explaining the nature of engineering surfaces, their topography and surface characterization techniques, Applying the basic theories/laws of sliding and rolling friction for the prediction the frictional behavior of commonly encountered sliding interfaces, Discussing the principles of lubrication, lubrication regimes and the advanced lubrication techniques, Defining the wear mechanisms and theories to analyze and estimate wear rates on rubbing surfaces.
Learning Outcomes	*By the end of the course, the student will be able to* LO1. describe the friction, wear and lubrication mechanisms LO2. explain the tribological contact between two surfaces in sliding contact to control the mechanisms of friction and wear LO3. illustrate the different lubrication regimes in a lubricating contact to explain how these will influence the resulting friction and wear LO4. solve practical tribological problems encountered in the most common mechanical components.

CONTRIBUTION TO PROGRAMME OUTCOMES*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
LO1	4	3	5	3	4	1	4	0	4	2
LO2	5	5	5	4	5	3	5	3	5	4
LO3	4	5	4	4	5	4	4	3	4	5
LO4	5	4	5	5	5	4	5	4	5	5

* Contribution Level: 0: None, 1: Very Low, 2: Low, 3: Medium, 4: High, 5: Very High

COURSE CONTENT DETAILS

Topics	**Outcomes**
Chemical and Physical State of the Solid Surface	LO1, LO2
Friction at macroscale Sliding Contacts	LO1, LO2, LO4
Response of Materials to Surface Traction	LO1, LO2,
Wear Mechanisms	LO1, LO2, LO4
Boundary and Hydrodynamic Lubrication	LO1, LO2, LO3
Design of Low Friction Surfaces	LO1, LO2, LO3, LO4
Nano and Micro-tribology	LO1, LO2, LO4

DERS BİLGİLERİ

Kodu	**MSME612**
İsmi	**Triboloji**
Haftalık Saati	3 (3 + 0)
Kredi	3
AKTS	7.5
Seviye/Yıl	Lisansüstü
Dönem	Güz, Bahar
Dersin Dili	İngilizce
Tip	Seçmeli
Ön Şart	Yok
İçerik	Triboloji, izafi hareket halinde etkileşime giren yüzeylerin bilimi ve teknolojisidir ve temas eden tüm parçalarda sürtünme, yağlama ve aşınma ile ilgilenir. Otomotiv, havacılık ve enerji sektörlerinden metal şekillendirme ve protez insan eklemlerine kadar çok çeşitli endüstrilerde pratik uygulamaları bulunur. Makinelerin enerji verimliliğinin artırılması ve dolayısıyla küresel enerji kullanımının azaltılması için sürtünmenin azaltılması ve aşınmanın azaltılmasıyla mekanik sistemlerin dayanıklılığının artırılması ve bakım maliyetlerinin düşürülmesi, süregelen ilgi alanları arasında olduğundan, bu ders, tribolojiye hem temel mekanizma bilimi hem de tasarım, üretim ve bakım teknolojileri açısından yaklaşacaktır.