



**T.C. ESKİŞEHİR OSMANGAZI UNIVERSITY  
ENGINEERING AND ARCHITECTURE FACULTY  
MECHANICAL ENGINEERING DEPARTMENT**

**COURSE INFORMATION FORM**

SEMESTER | Fall

<b>COURSE CODE</b>	151815360	<b>COURSE NAME</b>	MECHANISM DESIGN
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SEMESTER	WEEKLY COURSE PERIOD			COURSE OF			
	Theory	Practice	Laboratory	Credit	ECTS	TYPE	LANGUAGE
7	3	0	0	3	5	COMPULSORY (X) ELECTIVE ( )	Turkish

**COURSE CATAGORY**

Basic Science	Basic Engineering	Mechanical Engineering [if it contains considerable design, mark with (√)]	Social Science
	√	√	

**ASSESSMENT CRITERIA**

MID-TERM	Evaluation Type	Quantity	%
		Mid-Term	1
	Quiz		
	Homework		
	Project		
	Report		
FINAL EXAM		1	50

<b>PREREQUIEITE(S)</b>	
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<b>COURSE DESCRIPTION</b>	Basic kinematic approaches to mechanisms, common problems faced in design and analysis of mechanisms, position-velocity and acceleration analyses of linkages, gear and cam mechanisms.
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<b>COURSE OBJECTIVES</b>	To prepare students for the machine dynamics course, to teach students the design and synthesis techniques of mechanisms in a kinematical view
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<b>ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUCATION</b>	To provide the base for design and synthesis of mechanisms and machines
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<b>COURSE OUTCOMES</b>	By completing this class, the students will be able to: 1) Learn about the types of mechanism (linkage, gear, cam etc.), application areas, 2) Gain knowledge on power transmission and conversion methods and their selective characteristics, 3) Calculate mechanical advantage and efficiency of a mechanism or machine, 4) Analyze the kinematics of a linkage, gear trains and cam mechanisms, 5) Determine position, velocity and acceleration variation throughout the range of mechanism motion, 6) Design a mechanism producing the desired motion, 7) Knowledge on synthesizing a mechanism.
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<b>TEXTBOOK</b>	Kinematics and Dynamics of Machinery, R.L. Norton, McGraw-Hill
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<b>OTHER REFERENCES</b>	1) Mechanism Design: Analysis and Synthesis, Arthur G. Erdman, George N. Sandor 2) Mekanizma Tekniği, Eres Söylemez, Birsen Yayınevi
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<b>TOOLS AND EQUIPMENTS REQUIRED</b>	Ruler, protractor, pencil compass and standart (non- programmable) calculator are devices allowed for use during the exams.
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COURSE SYLLABUS	
WEEK	TOPICS
1	Introduction: definitions, various types of mechanisms; principles of design and synthesis
2	Mechanism terminology; kinematic diagrams; inversion; Grashof law; Power & losses
3	Mechanical efficiency and advantage, transmission angle; Cam-follower and gear types; degree of freedom (joints and mechanisms, Kutzbach-Gruebler's equation)
4	Questions & answers; function, path and motion generation, Freudenstein equation
5	Instant center of rotation; Arnold-Kennedy theorem; differential kinematics for mechanisms
6	Position, velocity, and acceleration analysis of linkage mechanisms
7	Applications; instant center of rotation method
8	Midterm exam
9	Midterm exam evaluation; common gear types & kinematics; friction drives
10	Planetary gear mechanisms; kinematic analysis
11	Planetary gear mechanisms; alternative approaches
12	Questions & answers
13	Cam-follower mechanisms (classification, basic terms, inversion principle)
14	SVAJ diagrams
15	Questions & answers
16,17	Final Exam

NO	PROGRAM OUTCOMES	3	2	1
1	Sufficient knowledge of engineering subjects related with mathematics, science, and Mechanical Engineering; an ability to apply theoretical and practical knowledge on solving and modeling of Mechanical Engineering problems.	X		
2	Ability to determine, define, formulate, and solve complex Mechanical Engineering problems; for that purpose, an ability to select and use convenient analytical and experimental methods.			X
3	Ability to design a complex system, a component and/or an engineering process under real life constraints or conditions, defined by environmental, economic, and political problems; for that purpose, an ability to apply modern design methods.	X		
4	Ability to develop, select and use modern methods and tools required for Mechanical Engineering applications; ability to effective use of information technologies.			X
5	To investigate Mechanical Engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results.			X
6	Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence.			X
7	Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language.		X	
8	Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement.		X	
9	Understanding of professional and ethical issues and taking responsibility			X
10	Awareness of project, risk, and change management; awareness of entrepreneurship, innovativeness and sustainable development.		X	
11	Knowledge of actual problems and effects of engineering applications on health, environment, and security in global and social scale; an awareness of juridical results of engineering solutions.			X

1: None. 2: Partial contribution. 3: Complete contribution.

Prepared by: Prof. Dr. Naci Zafer, Dr.Öğr. Üyesi Sezcan YILMAZ

Date: 14.06.2021

Signature(s):