

MACHINE THEORY

1	Course Title:	MACHINE THEORY
2	Course Code:	OTO3011
3	Type of Course:	Compulsory
4	Level of Course:	First Cycle
5	Year of Study:	3
6	Semester:	5
7	ECTS Credits Allocated:	5.00
8	Theoretical (hour/week):	4.00
9	Practice (hour/week):	0.00
10	Laboratory (hour/week):	0
11	Prerequisites:	None
12	Language:	Turkish
13	Mode of Delivery:	Face to face
14	Course Coordinator:	Prof. Dr. MURAT YAZICI
15	Course Lecturers:	PROF. DR. MURAT YAZICI DOÇ. DR. ZELİHA KAMIŞ KOCABIÇAK
16	Contact information of the Course Coordinator:	Bursa Uludag Üniversitesi, Mühendislik Fakültesi, Otomotiv Mühendisliği Bölümü 16059 Görükle/BURSA myazici@uludag.edu.tr 0224 2942347
17	Website:	NONE
18	Objective of the Course:	To teach methods of obtaining, converting and transmitting various types of motion, to introduce and examine different types of mechanisms and the principles of their kinematic analysis and design, to show how to apply the basic laws and principles of dynamics to mechanisms and machines.
19	Contribution of the Course to Professional Development:	The machine theory course offers many important professional development opportunities for engineering students and professionals. Here are some of the contributions of this course to professional development: Dynamic Performance Analysis: Students can analyse, discuss and improve the overall dynamic performance of existing mechanisms. Application of Fundamental Principles: Students gain the ability to apply the basic principles of dynamics to mechanisms and machines. Equations of Motion: Gain the ability to establish equations of motion in machines and mechanisms. Energy and Mass Balance: Learn basic information about energy and mass balancing in machines. Vibration Problems: Investigate, model and solve vibration problems in machines. This course helps students and professionals to be more successful in their careers with an analytical approach by providing a deeper understanding and practical skills in the field of engineering.
20	Learning Outcomes:	
	1	Students taking this course will be able to analyse, examine and improve the overall performance of an existing mechanism or machine.
	2	Design mechanisms that fulfil certain kinematic and/or kinetic conditions.

		3	Apply the principles of dynamics to mechanisms and machines.		
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21	Course Content:				
	Course Content:				
Week	Theoretical		Practice		
1	Introduction to machine and mechanism theory, basic definitions and concepts.				
2	Joints, kinematic chains and mechanisms.				
3	Degree of freedom formulae for volumetric, planar and spherical mechanisms, interpretation of analysis results, exceptional cases, ways of obtaining different mechanisms.				
4	Compulsory moving mechanisms, Grübler-Cebisev criterion and some results.				
5	Lever mechanisms. four-rod mechanism.				
Activites			Number	Duration (hour)	Total Work Load (hour)
Theoretical					
6	Static and quasi-static equilibrium problems in		14	4.00	56.00
Practicals/Labs			0	0.00	0.00
Self study and preparation					
7	The principle of virtual work and its		14	2.00	28.00
Homeworks			2	11.00	22.00
Projects					
	equilibrium, application to dynamics problems		0	0.00	0.00
Field Studies			0	0.00	0.00
Midterm Exams					
	Static and dynamic problems.		1	15.00	15.00
Others			1	20.00	20.00
10	First (direct) and second (inverse) fundamental problems of dynamics. Stübler's		1	15.00	15.00
Total Work Load					156.00
11	Equation of motion of the machine, force field				5.20
ECTS Credit of the Course					5.00
12	Flywheel calculation, Radinger method, applications				
13	Balancing, imbalance, rigid and flexible rotor concepts.				
14	Static imbalance, moment imbalance and dynamic imbalance, dynamic balancing in rigid rotors. 2. mini-exam.				
22	Textbooks, References and/or Other Materials:		MAK3007-11 Machine Theory Lecture Notes O. Kopmaz-S. Telli Machine Theory I and II, Eres Söylemez MACHINE THEORY - Mechanism Technique and Machine Dynamics Gabil Abdulla, Raşit Arsoy		
23	Assesment				

TERM LEARNING ACTIVITIES	NUMBER	WEIGHT
Midterm Exam	1	25.00
Quiz	1	15.00
Home work-project	2	10.00
Final Exam	1	50.00
Total	5	100.00
Contribution of Term (Year) Learning Activities to Success Grade		50.00
Contribution of Final Exam to Success Grade		50.00
Total		100.00
Measurement and Evaluation Techniques Used in the Course	Students are evaluated in the form of test and/or written exams.	
24	ECTS / WORK LOAD TABLE	

25	CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS															
	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PQ9	PQ10	PQ11	PQ12	PQ13	PQ14	PQ15	PQ16
ÖK1	4	4	4	0	0	0	4	0	0	0	0	0	0	0	0	0
ÖK2	4	4	4	0	0	0	4	0	0	0	0	0	0	0	0	0
ÖK3	4	4	4	0	0	0	4	0	0	0	0	0	0	0	0	0
LO: Learning Objectives PQ: Program Qualifications																
Contribution Level:	1 very low		2 low		3 Medium		4 High		5 Very High							