Alanya Alaaddin Keykubat University | Rafet Kayış Faculty of Engineering
Mechanical Engineering Department

SYLLABUS

Code/Name	MCE 309 / Theory of Machines I
Type	Required
Credit/ECTS	3/4
Hour per Week	3 (3+0+0)
Level/Year	Undergraduate/3
Semester	Fall
Classroom	D204
Content	In the first part of the machine theory course, basic concepts of mechanisms are introduced. Kinematic chains, mechanisms, and machines. Degrees of freedom of mechanisms. Position, velocity, and acceleration analysis of mechanisms. Instant centre of rotation method. Mobility analysis. Static force analysis of mechanisms. Graphical and analytical methods for dynamic analysis of planar linkages. Four-bar linkage.
Prerequisites	MEC 203 Dynamics
Textbooks	***Primary*** JJ Uicker, GR Pennock, JE Shigley, Theory of Machines and Mechanisms, Oxford University Press, 4th Ed., 2010. ***Supplementary*** RS Khurmi, JK Gupta, Theory of Machines, Eurasia Publishing, 14th Ed., 2008. RL Norton, Design of Machinery, McGraw-Hill, 5th Ed., 2011. D Myszka, Machines and Mechanism, 4th Ed., Prentice Hall, 2012. E Söylemez, Mechanisms, METU Press, 6th Ed., 2018.
Objectives	• To analyse kinematics of planar mechanisms • To analyse applied and constraint forces acting on mechanisms • To assess the dynamic forces for systems that are not in equilibrium
Course Outcomes	In this course you will be able to: CO1 Identify basic concepts of mechanisms CO2 Interpret the kinematic chains and mechanisms CO3 Compute the position, velocity, and acceleration of mechanisms CO4 Solve the mobility of mechanisms CO5 Analyse four-bar linkage C06 Evaluate dynamics of planar linkages using analytical methods

Weekly Schedule of Topics

W	Topic
1	Kinematics; degree of freedom concept
2	Mechanism terminology; mobility; links and joints
3	Vector equations; commonly used mechanisms
4	Position analysis; position of a mechanism
5	Position analysis; closed-form position equations
6	Velocity analysis; velocity of a link
7	Velocity analysis; relative velocity method; locating instant centres
8	Acceleration analysis; acceleration of a link; relative acceleration method
9	Coriolis acceleration; acceleration polygon

10	Mechanism design; timing charts
11	Static equilibrium; static forces; Coulomb friction forces in machines
12	Force members; force polygons
13	Dynamic forces in machine members; inertial force and torque
14	Dynamic force analysis; inertial force; inertial torque

Professional Contribution	Ability to design, classify, and compare mechanisms

Contribution to Program Outcomes*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	4	3	0	4	0	4	2	2	0	3	2
CO2	5	5	1	4	1	4	2	2	0	3	3
CO3	5	5	0	4	0	4	3	0	0	4	1
CO4	4	5	2	4	0	3	1	0	0	2	0
CO5	5	5	1	5	0	5	4	2	0	5	0
CO6	4	5	0	4	0	5	2	3	0	5	4

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

Special Conditions	The consequence of violation of the attendance rule is to receive a grade of **DZ.**
Requirements	Basic knowledge of a dynamic analysis software
Course Policy	1. You must attend at least 70% of the sessions including add-drop period. 2. Be in the class on time. 3. English should always be used to communicate with one another. 4. Mobile phones should be switched off and put away during the class. 5. You cannot talk to your friends during class no matter what the subject is.
Cheating & Plagiarism	• Copying or letting someone copy your work on exams, assignments, or reports is cheating. • Cutting and pasting text, figures and tables from web sources or any other electronic source is plagiarism. • The consequence of academic dishonesty is to receive a grade of **FF** for the course.
Evaluation	Midterm Exam 40% Final Exam 60% Total 100%

Instructor

Name/Surname	Akın Oktav	Email	akin.oktav@alanya.edu.tr
Room	110	Office Hours	

Prepared by Akın Oktav