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

SYLLABUS

Code/Name	MCE 305 / Machine Elements I
Type	Required
Credit/ECTS	3/5
Hour per Week	3 (3+0+0)
Level/Year	Undergraduate/3
Semester	Fall
Classroom	TBA
Content	Load, stress, strain, and deformation analysis of solid elements. Design to prevent static and fatigue failures. Design of mechanical elements including power screws, threaded fasteners, bolted and welded joints, riveted joints, shafts, axles, shaft-hub-connections, power screw mechanisms, pins, knuckles, and springs.
Prerequisites	MEC 201 Strength of Materials I
Textbooks	***Primary*** Ansel C. Ugural, Mechanical Design of Machine Components, CRC Press, 2nd Ed., 2014. ***Supplementary*** R. G. Budynas, J. K. Nisbett, Shigley´s Mechanical. Engineering Design, McGraw Hill 9th SI Edition, 2014.
Objectives	• To teach the basics of machine design, including the design process, failure prevention under static and variable loadings.
Course Outcomes	In this course you will be able to: CO1 Knows machine design process and its steps. CO2 Applies factor of safety and Knows safety philosophy and applies it in design. CO3 Determines the stresses and deflections on machine members subjected to single, 3D or combined loading. CO4 Knows static and fatigue failure theories and applies these to design machine members. CO5 Designs shafts and shaft components considering both deflection and stresses. CO6 Selects suitable fasteners and connections.

Weekly Schedule of Topics

W	Topic
1	Introduction to Mechanical Engineering Design
2	Materials, Material Strength and Stiffness, Materials Selection
3	Load and Stress Analysis; Bending, Torsion, Thick-Walled Cylinders
4	Press Fits, Temperature Effects
5	Curved Beams, Contact Stresses
6	Deflection and Stiffness; Beam deflection methods
7	Failure Theories
8	Fatigue Failure in Analysis and Design
9	The endurance limit, fatigue strength, endurance limit mod.
10	Shafts and Shaft Components
11	Screws, Fasteners
12	Welding, Bonding
13	The Design of Nonpermanent Joints

Professional Contribution	Ability to analyze and design machine parts; prevent failure

Contribution to Program Outcomes*

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

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

Special Conditions	• Students work in groups for presentation and assignment. • The consequence of violation of the attendance rule is to receive a grade of **NA.**
Requirements	Basic knowledge of statics
Evaluation	Midterm Exam 30% Assignment 10% Presentation 20% Final Exam 50% Total 100%
Rubric	A rubric will be announced prior to presentation sessions. The rubric has 2 main parts for the grading: technical assessment (50%) and writing or presentation performance (50%)
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 phone 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 to copy your work on exams, assignments, or reports is cheating. • Cutting and pasting text, figures and tables from the web sources or any other electronic source is plagiarism. • The consequence of academic dishonesty is to receive a grade of **F** for the course.

Instructor

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Room	233	Office Hours	

Prepared by Sefa Yıldırım