

Identification	Subject	ME402, Machine Elements II, 6 ECTS
	Department	Mechanical Engineering
	Program	Undergraduate
	Term	Spring, 2026
	Instructor	Dr. Mehdi Kiyasatfar
	E-mail:	mkiyasatfar@khazar.org
	Classroom/hours	
	Office hours	
Prerequisites	Machine Element I	
Language	English	
Compulsory/Elective	Compulsory	
Required textbooks and course materials	<ol style="list-style-type: none"> 1. Shigley's Mechanical Engineering Design 11th edition in SI units- R. G. Budynas, J. K. Nisbett. 2021 2. Mott, R. L., Vavrek, E. M., & Wang, J. (2018). Machine Elements in Mechanical Design (6th ed.). Pearson. 	
Course website		
Course outline	<p>This course is a continuation of ME 361 and focuses on the analysis and design of fundamental machine elements used in mechanical engineering applications. Topics covered include power screws, brakes, clutches, belt and chain drives, gears and gear trains, bearings, and other essential mechanical components. Emphasis is placed on understanding the functional behavior, design principles, and practical applications of these elements in engineering systems.</p>	
Course objectives	<p>This course is designed to equip students with the fundamental principles of machine design and to develop the necessary skills for preparing complete, concise, and accurate design calculations for machine elements. The course provides advanced coverage of the modeling, design, and integration of machine elements, as well as best practices for their application in engineering systems.</p>	
Learning outcomes	<p>Upon successful completion of this course, students will be able to:</p> <ul style="list-style-type: none"> • Perform three-dimensional stress analysis of mechanical components. • Design screws, fasteners, and non-permanent joints. • Analyze stresses and design permanent joints, including welded and bonded joints. • Design rolling-contact bearings. • Evaluate lubrication conditions and design journal bearings. • Analyze stresses in gears. • Design clutches, brakes, couplings, and flywheels. • Design belt and chain drive systems. 	
Teaching methods	Lecture	X
	Group discussion	-
	Experiential exercise	-
	Tutorials once a month on weekends	-

	Case analysis and assignments		x
	Course paper		-
	Others		---
Evaluation	Methods	Date/deadlines	Percentage (%)
	Midterm Exam		30
	Attendance & Activity	At each lesson	5
	Quiz (2 quizzes)	During the semester	10
	Assignment	During the semester	5
	Project	During the semester	10
	Final Exam		40
	Total		100
Policy	<ul style="list-style-type: none"> ▪ Ethics Copying other students' work is highly discouraged. All assignments must be handled by the student himself. This is a university policy and violators will be reprimanded accordingly. ▪ Preparation for class The structure of this course demands your individual effort outside the classroom for extra practice of many problems within the textbook. After each session, every student needs to put sufficient time to practice and finish the assignments by the predetermined date. • Withdrawal (pass/fail) This course strictly follows the grading policy of the School of Engineering. Thus, a student is expected to achieve a mark of at least 60% to pass. In case of failure, he/she will be required to repeat the course the following term or year. ▪ Cheating/plagiarism Cheating or other plagiarism in handling the assignments, Mid-term and Final Examinations will lead to course failure. In this case, the student will automatically get zero (0), without any considerations. ▪ Professional behavior guidelines The students shall behave in a way to create a favorable academic and professional environment during the class hours. ▪ Attendance & Activity Attendance and in-class activity constitute 5 marks out of the total 100 marks for this course. Students who attend and actively participate in class activities will receive these marks. For each unexcused absence, 1 mark will be deducted from the attendance and activity score. ▪ Quiz Quizzes constitute 10 marks out of the total 100 marks for this course. Two quizzes will be conducted throughout the semester: one before the midterm examination and one before the end of the semester. Quiz questions will primarily focus on problem-solving related to the analysis and design of machine elements. Full credit will be awarded only for complete, step-by-step design calculations, supported by clear 		

	<p>explanations, appropriate assumptions, and properly justified final results.</p> <ul style="list-style-type: none"> ▪ Assignment Assignments constitute 5 marks out of the total 100 marks for this course. Students are required to submit assigned homework problems by the specified deadlines. Full credit will be awarded only for complete, well-structured solutions with clear explanations and properly supported final results. ▪ Project This course is one of the core courses in the mechanical engineering program. To familiarize students with the fundamentals of mechanical component design, students are required to complete an individual course project related to one of the topics covered in the course. Prior to the oral presentation, students must submit a complete project report in the format specified during the course. The project will culminate in a 10-minute oral presentation, to be delivered approximately one week before the final examination, during which students will present their design methodology, key calculations, and final results. The project constitutes 10 marks out of the total 100 marks for this course. Evaluation will be based on technical accuracy, design approach, clarity of presentation, adherence to the specified format, and justification of results. ▪ Exam The midterm and final examinations will evaluate students' understanding of machine element analysis and design concepts covered in the course, with an emphasis on engineering problem-solving and design calculations.
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Tentative Schedule

Week	Date/Day (tentative)	Topics	Textbook/ Assignments
1		Syllabus. Overview of Machine Elements I.	Chap 1-10 -Ref 1
2		Rolling.	Chap 11-Ref 1
3		Contact Bearings	Chap 11-Ref 1
4		Lubrication.	Chap 12-Ref 1
5		Journal Bearings.	Chap 12-Ref 1
6		Quiz-1 Gears: General I.	Chap 13-Ref 1
7		Spur Gears.	Chap 14-Ref 1

8		Review. Midterm exam	
9		Helical Gears.	Chap 14-Ref 1
10		Bevel Gears.	Chap 15-Ref 1
11		Worm Gears.	Chap 15-Ref 1
12		Clutches, Brakes.	Chap 16-Ref 1
13		Quiz-2 Couplings, and Flywheels.	Chap 16-Ref 1
14		Flexible Mechanical Elements. Belts and Chains.	Chap 17-Ref 1
15		Project Presentations	
16		Final Exam	

This syllabus is a guide for the course and any modifications to it will be announced in advance.