

Identification	Subject	Strength of Materials II– 3credits
	Department	Mechanical Engineering
	Program (Undergraduate, Graduate)	Undergraduate
	Term	Autumn2026
	Instructor	Aynura Aliyeva
	Email:	Aynura.aliyeva@khazar.org
	Classroom/hours	
Prerequisites	Strength of Materials I	
Language	English	
Compulsory/Elective	Elective	
Textbooks and course materials	Sadiqov, I.R. <i>Strength of Materials, Part II</i> . Baku: Təhsil, 2013. Mechanics of Materials, <i>F.P. Bear, E.R. Johnston, J.T. DeWolf, D.F. Mazurek, 8th Edition-McGraw -2020</i>	
Course description	Strength of Materials II is a continuation of Strength of Materials I and focuses on the analysis and design of structural and mechanical elements subjected to different types of loading. The course covers deformation and displacement, stress analysis, beam bending, shear stresses, beam deflection, stability of compressed members, thin-walled members, dynamic loading, and curved-axis members. Particular attention is given to strength, stiffness and stability requirements of engineering structures.	
Course objectives	The main objectives of the course are: 1. To develop students' understanding of advanced concepts of strength of materials. 2. To analyze stresses and deformations in structural and mechanical elements. 3. To determine normal and shear stresses in beams and other structural members. 4. To calculate beam deflections and displacements. 5. To analyze the stability of compressed members. 6. To introduce students to thin-walled members and dynamic loading. 7. To analyze curved-axis members. 8. To develop students' ability to solve practical engineering problems related to strength, stiffness and stability.	
Learning Outcomes	Upon successful completion of the course, students will be able to: 1. Analyze stresses and deformations in structural and mechanical elements. 2. Determine normal and shear stresses in beams. 3. Calculate beam deflections and displacements. 4. Evaluate the strength and stiffness of structural elements. 5. Analyze compressed members for stability. 6. Apply appropriate engineering formulas and methods to solve strength-of-materials problems. 7. Analyze thin-walled structural members. 8. Evaluate the effects of dynamic loading on structural elements. 9. Analyze curved-axis members. 10. Solve practical engineering problems using analytical methods.	
Teaching methods	Case analysis	X

Evaluation Criteria	Group discussion		x
	Lecture		x
	Simulation		x
	Methods	Date/deadlines	Percentage (%)
	Midterm Exam	TBA	30
	Quizzes		15
	Practical Assignments		5
	Activity		5
	Attendance		5
Class Policy	Final Exam	TBA	40
	Total		100
Students are expected to attend classes regularly and participate actively in lectures, discussions and practical activities. Students should come to class prepared, complete assigned problems and submit practical assignments by the specified deadlines. Academic integrity must be maintained in all examinations and assignments. Students are expected to follow university rules and demonstrate respectful and professional behavior throughout the course. GAI tools are limited to assisting with conceptual understanding and proofreading report text. Using AI to perform stress-strain analyses, calculate internal forces, or draft engineering conclusions is strictly prohibited. AI-assisted content must remain below 25% and be fully cited according to university policies.			
Tentative Schedule			
Week	Date/Day (tentative)	Topics	Textbook/Assignments
1		Introduction to Strength of Materials II. Deformation and displacement of structural elements	Sadiqov, I.R. <i>Strength of Materials, Part II</i> . Baku: Təhsil, 2013.
2		Stress and deformation analysis. General concepts of stress and strain	Sadiqov, I.R. <i>Strength of Materials, Part II</i> . Baku: Təhsil, 2013.
3		Geometrical characteristics of cross-sections. Moments of inertia	Sadiqov, I.R. <i>Strength of Materials, Part II</i> . Baku: Təhsil, 2013.
4		Bending of beams. Determination of normal stresses	Materials, <i>F.P. Bear, E.R. Johnston, J.T. DeWolf, D.F. Mazurek, 8th Edition-McGraw -2020</i>
5		Shear stresses in beams. Strength analysis of beams	Sadiqov, I.R. <i>Strength of Materials, Part II</i> . Baku: Təhsil, 2013.
6		Beam deflection and determination of displacements	Sadiqov, I.R. <i>Strength of Materials, Part II</i> . Baku: Təhsil, 2013.
7		Combined loading and complex resistance of structural elements	Materials, <i>F.P. Bear, E.R. Johnston, J.T. DeWolf, D.F. Mazurek, 8th Edition-McGraw -2020</i>
		Midterm exam	
8		Stability of compressed members. Critical load and critical stress	Sadiqov, I.R. <i>Strength of Materials, Part II</i> . Baku: Təhsil, 2013.

9		Calculation of compressed members for stability. Buckling of members	Sadiqov, I.R. <i>Strength of Materials, Part II</i> . Baku: Təhsil, 2013.
10		Thin-walled members. Stress analysis of thin-walled sections	Sadiqov, I.R. <i>Strength of Materials, Part II</i> . Baku: Təhsil, 2013.
11		Strength analysis under dynamic and impact loading	Materials, <i>F.P. Bear, E.R. Johnston, J.T. DeWolf, D.F. Mazurek, 8th Edition-McGraw -2020</i>
12		Curved-axis members (curved-axis beams)	Sadiqov, I.R. <i>Strength of Materials, Part II</i> . Baku: Təhsil, 2013.
13		Stress and strength analysis of curved-axis members	Materials, <i>F.P. Bear, E.R. Johnston, J.T. DeWolf, D.F. Mazurek, 8th Edition-McGraw -2020</i>
14		Comprehensive review. Engineering problem solving and revision	Sadiqov, I.R. <i>Strength of Materials, Part II</i> . Baku: Təhsil, 2013.
15		Dynamic loading of structural elements	Sadiqov, I.R. <i>Strength of Materials, Part II</i> . Baku: Təhsil, 2013.
		Final exam	