

Identification	Subject	MATH 235, Applied linear algebra and analytic geometry, 6 ECTS
	Department	Mathematics
	Program	Undergraduate
	Term	Fall, 2026
	Instructor	Rza Mustafayev
	E-mail:	rzamustafayev@gmail.com
	Phone:	(+994) 50 634 26 16
	Classroom/hours	Saturday: 17:00-18:30, 18:40-20:10
Prerequisites	<i>Applied linear algebra and analytic geometry</i> is a second-year, first-semester course. The prerequisite is Calculus 2 course.	
Language	English	
Compulsory/Elective	Required	
Required textbooks and course materials	Core Textbooks: V.V. Konev. Linear Algebra, Vector Algebra and Analytical Geometry, Textbook. Tomsk: TPU Press, 2009, 114 pp.	
Course website		
Course outline	Applied linear algebra and analytic geometry is a major course at School of Science and Engineering of Khazar University; it plays a role in the understanding of science, engineering, economics, and computer science, among other disciplines. This introductory course covers three content areas: Linear Algebra, Vector Algebra and Analytical Geometry. Each part contains basic mathematical conceptions and explains new mathematical terms. Many useful examples and exercises are presented in the textbook. explained and illustrated by examples and exercises.	
Course objectives	Understand and apply vector operations - Perform operations with vectors in two and three dimensions, including addition, scalar multiplication, dot product, and cross product. - Interpret geometric meaning of vector operations. Solve systems of linear equations using multiple methods - Apply Gaussian and Gauss-Jordan elimination techniques. - Use matrix methods, including row reduction and inverse matrices, to solve linear systems. Understand the theory and application of matrices - Perform basic matrix operations (addition, multiplication, transpose, inverse). - Apply concepts of matrix rank, determinants, and elementary matrices. - Understand special types of matrices (symmetric, orthogonal, diagonal, etc.). Apply geometric interpretations in analytic geometry - Analyze lines, planes, and surfaces in two and three dimensions. - Use vector and parametric equations to represent geometric objects. - Understand conic sections and quadric surfaces using algebraic and geometric techniques.	
Learning outcomes	By the end of the course the students should be able: - To do matrix operations - To compute determinants - To solve systems of linear equations - To solve problems about geometrical applications of vector operations	
Teaching methods	Lecture	x
	Group discussion	x

	Experiential exercise		x
	Simulation		
	Case analysis		
	Course paper		x
	Others		
Evaluation	Methods	Date/deadlines	Percentage (%)
	Midterm Exam		30
	Case studies		
	Class Participation		5
	Quizzes		20 (2 quizzes)
	Activity		5
	Project		
	Laboratory work		
	Final Exam		40
	Others		
	Total		100
Policy	▪ Use of Generative AI Tools The use of generative artificial intelligence (GAI) tools is strictly prohibited in this course. The primary aim of the course is to develop students' independent mathematical reasoning, problem-solving skills, and creative thinking. Students are therefore expected to complete all assignments and assessments independently without the use of GAI tools. If it is determined that a student has used generative artificial intelligence (GenAI) tools while completing assignments, one of the following measures may be applied: • Issuing an oral or written warning; • Requiring the resubmission of the assignment; • Reducing the grade for the assignment or assigning a zero (0). ▪ Preparation for class The structure of this course makes your individual study and preparation outside the class extremely important. The lecture material will focus on the major points introduced in the text. Reading the assigned chapters and having some familiarity with them before class will greatly assist your understanding of the lecture. After the lecture, you should study your notes and work relevant problems and cases from the end of the chapter and sample exam questions. Throughout the semester we will also have a large number of review sessions. These review sessions will take place during the regularly scheduled class periods. ▪ Attendance Students who do not attend more than 25 % of online classes will not be allowed to take the exam. Quizzes and examinations		

	Quizzes may be given unannounced throughout the term. There will be no make-up quizzes. ▪ Withdrawal (pass/fail) This course strictly follows grading policy of the School of Science and Engineering. Thus, a student is normally 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 during the Quizzes, Mid-term and Final Examinations will lead to paper cancellation. In this case, the student will automatically get zero (0), without any considerations. ▪ Professional behavior guidelines The students shall behave in the way to create favorable academic and professional environment during the class hours. Unauthorized discussions and unethical behavior are strictly prohibited. ▪ Ethic Use of any electronic devices is prohibited in the classroom. All devices should be turned off before entering class. This is a university policy and <u>violators will be reprimanded accordingly!</u> Students should not arrive in late to class!
--	--

Tentative Schedule

We ek	Date/Day (tentative)	Topics	Textbook/ Assignments
1	19.09.2026 19.09.2026	Matrices: Basic definitions, Matrix operations, Types of matrices, Kronecker Delta Symbol, Properties of Matrix Operations	p. 7 - 19
2	26.09.2026 26.09.2026	Determinants: Permutations and Transpositions, Determinant General Definition, Properties of Determinants	p. 20 - 30
3	03.10.2026 03.10.2026	Determinant Calculation	p. 31 - 35
4	10.10.2026 10.10.2026	Inverse matrices: Three Lemmas, Theorem of Inverse Matrix, Calculation of Inverse Matrices by Elementary Transformations	p. 36 - 42
5	17.10.2026 17.10.2026	Systems of linear equations: Matrix Rank, Basic Concepts, Gaussian Elimination, Homogeneous Systems of Linear Equations	p. 43 - 53
6	24.10.2026 24.10.2026	Cramer's Rule, Cramer's General Rule	p. 54 - 59
7	31.10.2026 31.10.2026	Vectors: Basic Definitions, Geometrical Interpretation	Quiz (10 pts) p. 60 - 65
8	07.11.2026 07.11.2026	Resolution of Vectors into Components, Scalar Product of Vectors	p. 65 - 71

9	14.11.2026 14.11.2026	Midterm Exam Vector Product, The Scalar Triple Product,	p. 72 - 77
10	21.11.2026 21.11.2026	Transformation of Coordinates Under Rotation of the Coordinate System	p. 79 - 81
11	28.11.2026 28.11.2026	Straight lines: Equations of lines, Lines in a Plane, Angle Between Two Lines	p. 82 - 89
12	05.12.2026 05.12.2026	Distance From a Point to a Line, Relative Position of Lines	p. 89 - 90
13	12.12.2026 12.12.2026	Planes: General Equation of a Plane, Equation of a Plane Passing Through Three Points, Other Forms of Equations of a Plane	Quiz (10 pts) p. 91 - 95
14	19.12.2026 19.12.2026	Angle Between Two Planes, Distance Between a Point and a Plane	p. 95 - 97
15	26.12.2026 26.12.2026	Relative Position of Planes, Relative Position of a Plane and a Line, Angle Between a Plane and a Line	p. 97 - 98
	TBA	FINAL EXAM	

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