

<b>Identification</b>	<b>Subject</b>	MATH 235, Applied linear algebra and analytic geometry, 6 ECTS	
	<b>Department</b>	Mathematics	
	<b>Program</b>	Undergraduate	
	<b>Term</b>	Fall, 2024	
	<b>Instructor</b>	Rza Mustafayev	
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	<b>Phone:</b>	(994) 50 634 26 16	
<b>Classroom/hours</b>	Monday: 17:00-18:30, 18:40-20:10		
<b>Prerequisites</b>	<i>Applied linear algebra and analytic geometry</i> is a second-year, first-semester course. The prerequisite is Calculus 2 course.		
<b>Language</b>	English		
<b>Compulsory/Elective</b>	Required		
<b>Required textbooks and course materials</b>	<b>Core Textbooks:</b> V.V. Konev. Linear Algebra, Vector Algebra and Analytical Geometry, Textbook. Tomsk: TPU Press, 2009, 114 pp.		
<b>Course website</b>			
<b>Course outline</b>	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.		
<b>Course objectives</b>	matrix operations, determinants and systems of linear equations, geometrical applications of vector operations, introduction to analytical geometry		
<b>Learning outcomes</b>	By the end of the course the students should be able: <ol style="list-style-type: none"> <li>1. To do matrix operations</li> <li>2. To compute determinants</li> <li>3. To solve systems of linear equations</li> <li>4. To solve problems about geometrical applications of vector operations</li> </ol>		
<b>Teaching methods</b>	<b>Lecture</b>		x
	<b>Group discussion</b>		x
	<b>Experiential exercise</b>		x
	<b>Course paper</b>		x
<b>Evaluation</b>	<b>Methods</b>	<b>Date/deadlines</b>	<b>Percentage (%)</b>
	<b>Midterm Exam</b>		30
	<b>Class Participation</b>		5
	<b>Quizzes</b>		20 (2 quizzes)
	<b>Activity</b>		5
	<b>Final Exam</b>		40
	<b>Total</b>		100
<b>Policy</b>	<ul style="list-style-type: none"> <li>▪ <b>Preparation for class</b></li> </ul> <p>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</p>		

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 violators will be reprimanded accordingly!

Students should not arrive in late to class!

### Tentative Schedule

Week	Date/Day (tentative)	Topics	Textbook/ Assignments
1	16.09.2024 16.09.2024	Matrices: Basic definitions, Matrix operations, Types of matrices, Kronecker Delta Symbol, Properties of Matrix Operations	p. 7-19
2	23.09.2024 23.09.2024	Determinants: Permutations and Transpositions, Determinant General Definition, Properties of Determinants	p. 20-30
3	30.09.2024 30.09.2024	Determinant Calculation	p. 31-35

4	07.10.2024 07.10.2024	Inverse matrices: Three Lemmas, Theorem of Inverse Matrix, Calculation of Inverse Matrices by Elementary Transformations	p. 36-42
5	14.10.2024 14.10.2024	Systems of linear equations: Matrix Rank, Basic Concepts, Gaussian Elimination, Homogeneous Systems of Linear Equations	p. 43-53
6	21.10.2024 21.10.2024	Cramer's Rule, Cramer's General Rule	p.54-59
7	28.10.2024 28.10.2024	Vectors: Basic Definitions, Geometrical Interpretation	<b>Quiz (10 pts)</b> p. 60-65
8	04.11.2024 04.11.2024	Resolution of Vectors into Components, Scalar Product of Vectors	p. 65-71
9	11.11.2024 11.11.2024	<b>Midterm Exam</b> Vector Product, The Scalar Triple Product,	p. 72-77
10	18.11.2024 18.11.2024	Transformation of Coordinates Under Rotation of the Coordinate System	p. 79-81
11	25.11.2024 25.11.2024	Straight lines: Equations of lines, Lines in a Plane, Angle Between Two Lines	p. 82-89
12	02.12.2024 02.12.2024	Distance From a Point to a Line, Relative Position of Lines	p. 89-90
13	09.12.2024 09.12.2024	Planes: General Equation of a Plane, Equation of a Plane Passing Through Three Points, Other Forms of Equations of a Plane	<b>Quiz (10 pts)</b> p. 91-95
14	16.12.2024 16.12.2024	Angle Between Two Planes, Distance Between a Point and a Plane	p. 95-97
15	23.12.2024 23.12.2024	Relative Position of Planes, Relative Position of a Plane and a Line, Angle Between a Plane and a Line	p. 97-98
	<b>TBA</b>	<b>FINAL EXAM</b>	

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