

Identification	Subject	MATH 231, Applied Linear Algebra, 6 ECTS	
	Department	Mathematics	
	Program	Undergraduate	
	Term	Fall, 2026	
	Instructor	Rza Mustafayev	
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	Classroom/hours	Thursday 18:40-20:10, 20:20-21:00	
Prerequisites	MATH 102		
Language	English		
Compulsory/Elective	Compulsory		
Description	The course is an introduction to matrix theory and linear algebra and its applications in different engineering fields, such as Matrices in Engineering, Graphs and Networks, Markov Matrices, Linear Programming, Fourier Series, Matrices in Statistics and Probability and Computer Graphics..		
Required textbooks and course materials	David C. Lay, Linear Algebra and its Applications. 4 th edition, 2012 Poole, D., Linear algebra: a modern introduction. 4 th Edition, 2014.		
Course website			
Course outline	Vectors in n-space, systems of linear equations, Gaussian elimination, matrix algebra, determinants, subspaces of n-space, basis and dimension, eigenvalues and eigenvectors, diagonalization of a matrix, geometry of vectors, projections, orthogonal sets of vectors, symmetric matrices		
Course objectives	Upon successfully completing this course students will be able to: • Formulate and solve multi-variable systems of linear equations; • Matrices classification and computations; • Describing fundamental facts in vector spaces; • Calculation of eigenvectors and eigenvalues; • Implementing the mentioned concepts in engineering problems.		
Learning outcomes	○ Solving square systems by elimination ○ Complete solution of system of linear equation ○ Least squares solutions ○ Orthogonalization ○ Calculations of determinants ○ Calculation of Eigenvalues and eigenvectors ○ Symmetric matrices and positive definite matrices ○ Basis and dimensions for linear transformations and change of basis ○ Applications of linear algebra in engineering		
Teaching methods	Lecture		x
	Experiential exercise		
	Assisted work		x
	Assisted lab work		x
	Others		
Evaluation	Methods	Date/deadlines	Percentage (%)
	Midterm Exam		30
	Class Participation		5
	Quizzes		20 (4 quizzes)
	Activity		5
	Project (3 phases)		-
	Final Exam		40
	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). • NO CELL PHONES are allowed during lecture. PLEASE turn them off before lecture! (Not silent or vibrating mode). This is a university policy and violators will be reprimanded accordingly. • No late assignments will be accepted without prior arrangement with the instructor for acceptable excuses. Medical and family emergency will be considered on case-by-case basis. • No late homework will be accepted. Homework is to be completed on an individual basis. Students may discuss homework with classmates, but students are responsible for your own work. If students have consulted classmates, please note the individuals name on the top of students' assignment. • Quizzes may be given unannounced throughout the term and will count as one homework. There will be no make-up quizzes. • Students will be divided into groups of 3 individuals for study group sessions and will be assigned some problems to solve together in the class. • If students should miss class due to personal emergency or medical reasons, please notify the instructor by email immediately. A doctor's note will be required for make-up work. • Students are responsible for completing the reading assigned from the textbook related to the covered topics and for checking email regularly for important information and announcements related to the course. • University policy on academic honesty concerning exams and individual work will be strictly enforced. • BE ON TIME!
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Week	Date/Day (Tentative)	Topics	Textbook/Assignments
1	17.09.2026 17.09.2026	Systems of linear equations. Row reduction and Echelon forms.	1.1, 1.2
2	24.09.2026 24.09.2026	Vector equations. The matrix equation $Ax = b$.	1.3, 1.4
3	01.10.2026 01.10.2026	Solution sets of linear systems. Applications of linear systems.	1.5, 1.6 Quiz-1 (5 pts)
4	08.10.2026 08.10.2026	Linear independence. Introduction to linear transformations.	1.7, 1.8
5	15.10.2026 15.10.2026	The matrix of a linear transformations. Matrix operations.	1.9, 2.1
6	22.10.2026 22.10.2026	The inverse of a matrix. Characterizations of invertible matrices.	2.2, 2.3 Quiz-2 (5 pts)
7	29.10.2026 29.10.2026	Partitioned matrices. Matrix factorizations.	2.4, 2.5
8	05.11.2026 05.11.2026	Midterm Exam Subspaces of R^n	2.8
9	12.11.2026 12.11.2026	Characterizations of invertible matrices Introduction to determinants. Dimension and rank.	2.9 3.1, 3.2
10	19.11.2026 19.11.2026	Cramer's rule, volume and linear transformations. Vector spaces and subspaces.	3.3, 4.1 Quiz-3 (5 pts)
11	26.11.2026 26.11.2026	Null spaces, column spaces and linear transformations. Linearly independent sets; bases.	4.2, 4.3
12	03.12.2026 03.12.2026	Coordinate systems. The dimension of a vector space equations.	4.4, 4.5
13	10.12.2026 10.12.2026	Rank. Change of bases.	4.6, 4.7

14	17.12.2026 17.12.2026	Eigenvectors and eigenvalues. The characteristic equation.	5.1, 5.2 Quiz-4 (5 pts)
15	24.12.2026 24.12.2026	Diagonalization. Eigenvectors and liner transformations.	5.3, 5.4
	TBA	FINAL EXAM	

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