Identification	**Subject**	MATH 215, Linear algebra and mathematical analysis, 6 ECTS
	Department	Mathematics
	Program	Undergraduate
	Term	Fall, 2023
	Instructor	Qarayev Ramiz
	E-mail:	ramiz.garayev1@gmail.com
	Phone:	(+994 55) 574 08 70
	Classroom/hours	Saturday: 11.50-18.30
	Office hours	
Prerequisites	The prerequisites are high school algebra and trigonometry. Prior experience with calculus is helpful but not necessary.	
Language	English	
Compulsory/Elective	Compulsory	
Description	Linear algebra and analytic geometry is a major course at School of Economics and Management. This introductory course covers two content areas: Linear Algebra and Mathematical analysis. This introductory course covers differentiation, matrix operations, determinants and systems of linear equations.	
Required textbooks and course materials	1. George Thomas, et al, Thomas' Calculus: Early Transcendental, 12th edition, Addison-Wesley (2010), (http://libgen.org/) 2. V.V. Konev. Linear Algebra, Vector Algebra and Analytical Geometry,Textbook. Tomsk: TPU Press, 2009, 114 pp. 3. David C. Lay, Linear Algebra and its Applications. 4th edition, 2012 **Supplementary book** 1. James Stewart,Essential calculus. Early transcendentals, Second Edition, Brooks/Cole (2013)(http://libgen.org/) 2. Poole, D., Linear algebra: a modern introduction. 4th Edition, 2014.	
Course website		
Course outline	Linear algebra and analytic geometry is a major course at School of Economics and Management. This introductory course covers two content areas: Linear Algebra and Mathematical analysis. This introductory course covers differentiation, matrix operations, determinants and systems of linear equations.	
Course objectives	*Calculations of determinants, matrix operations, Systems of linear equations, Gaussian elimination, the concepts of limit; tangent to curve; differentiation; chain rule.*	
Learning outcomes	Upon successful completion of this course, students should be able: • To find limit of functions at points and infinity; to find asymptotes of graphs • To determine if a given function continuous or discontinuous at a point • To find derivative of function by using its' definition;	

<table>
<tr><td></td><td colspan="3">To know differentiation rules and be able to apply them to problems
To find derivative as a rate of change
To define derivative of trigonometric functions
To find derivative of compound functions by chain rule
To know implicit differentiation and be able to apply it to variety problems
To find derivative of inverse functions by using inverse function theorem
To solve operations on matrix
To calculate determinants
To find inverse matrix
To solve system of linear equations by using Cramer’s rule
To find rankof matrix
To solve system of linear equations by using Gaussian elimination.</td></tr>
<tr><td rowspan="3">Teaching methods</td><td colspan="2">Lecture</td><td>X</td></tr>
<tr><td colspan="2">Assisted work</td><td>X</td></tr>
<tr><td colspan="2">Assisted lab work</td><td>X</td></tr>
<tr><td rowspan="7">Evaluation</td><td>Methods</td><td>Date/deadlines</td><td>Percentage (%)</td></tr>
<tr><td>Midterm Exam</td><td></td><td>30</td></tr>
<tr><td>Class Participation</td><td></td><td>5</td></tr>
<tr><td>Quizzes (4-5)</td><td></td><td>20 (3 quizzes)</td></tr>
<tr><td>Activity</td><td></td><td>5</td></tr>
<tr><td>Final Exam</td><td></td><td>40</td></tr>
<tr><td>Total</td><td></td><td>100</td></tr>
<tr><td>Policy</td><td colspan="3">NO CELL PHONES are allowed during lecture and lab sessions. 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.</td></tr>
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	• BE ON TIME!

Week	Date/Day (Tentative)	Topics	Textbook/Assignments
1	16.09.23 16.09.23	• Matrices: Basic definitions, Matrix operations, Types of matrices, Kronecker Delta Symbol, Properties of Matrix Operations	**[2] p. 7-19**
2	23.09.23 23.09.23	• Determinants: Permutations and Transpositions, Determinant General Definition, Properties of Determinants	[2] p. 20-30
3	30.09.23 30.09.23	• Determinant Calculation • Practice	[2] p. 31-35
4	07.10.23 07.10.23	• Inverse matrices: Three Lemmas, Theorem of Inverse Matrix, Calculation of Inverse Matrices by ElementaryTransformations	[2] p. 36-42
5	14.10.23 14.10.23	• Matrix Rank • Problem solving	**Quiz-1 (7 pts)** [2] **p. 43-53**
6	21.10.23 21.10.23	• Systems of linear equations: Basic Concepts, Gaussian Elimination, Homogeneous Systems of Linear Equations • Cramer's Rule, Cramer's General Rule	**[2] p. 43-53** **[2] p.54-59**
7	28.10.23 28.10.23	• Eigenvalues, eigenvectors	**[2]**
8	04.11.23 04.11.23	• Rates of Change and Tangents to Curves • Limit of a Function and Limit Laws	[1] Ch.2.1, 2.2
9	11.11.23 11.11.23	• The Precise Definition of a Limit • Practice	**[1] Ch. 2.3**
10	18.11.23 18.11.23	• One-Sided Limits • Continuity	**[1] Ch. 2.4, 2.5**
11	25.11.23 25.11.23	• Limits Involving Infinity; Asymptotes of Graphs • Tangents and the Derivative at a Point	**Quiz-2 (6 pts)** **[1] Ch. 2.6, 3.1,**
12	02.12.23 02.12.23	• The Derivative as a Function • Differentiation Rules	**[1] Ch. 3.2, 3.3**
13	09.12.23 09.12.23	• The Derivative as a Rate of Change • Derivatives of Trigonometric Functions	**[1] Ch. 3.4, 3.5**
14	16.12.23 16.12.23	• The Chain Rule • Implicit Differentiation	**Quiz 3 (7 pts)** **[1] Ch. 3.6, 3.7**
15	23.12.23 23.12.23	• Derivatives of Inverse Functions and Logarithms	**[1] Ch. 3.8**
16	30.12.23 30.12.23	• Inverse Trigonometric Functions	**[1] Ch. 3.9**

	TBA	**Final Exam**	

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