

Identification	Subject (code, title, credits)	MATH 225 Business Mathematics – 6 ECTS
	Department	Mathematics
	Program	Undergraduate
	Term	Fall, 2025
	Instructor	Yetar Ferhadova
	E-mail:	yeter.ferhadova2@gmail.com
	Classroom/hours	Friday 15:20-16:50, 17:00-18:30
	Office hours	
Prerequisites	-	
Language	English	
Compulsory/Elective	Compulsory	
Required textbooks and course materials	<p>[1] George B. Thomas', Calculus 13th edition. 2014, 536 p.</p> <p>[2] Linear Algebra and Its applications David C. Lay 6th Edition, Pearson, 2021</p> <p>Additional materials:</p> <ol style="list-style-type: none"> 1. James Stewart. Calculus (8th edition.). Brooks Cole, 2015, 1368 p. 2. Ron Larson and Bruce Edwards. Calculus (10th edition). Cengage Learning, 2013, 1280 p. 3. Introduction to Linear Algebra, 6th Edition. Gilbert Strang, 2021. 4. "Calculus: A Complete Course" by Robert Adams and Christopher Essex, 10th Edition, 2021. 	
Course outline	<p>This course explores the application of mathematical reasoning and quantitative techniques to business, management, and economic decision-making. Students will begin with the study of algebraic and transcendental functions, limits, and differentiation, followed by real-world applications such as marginal analysis, elasticity, and optimization. The second half of the course focuses on linear algebra, emphasizing systems of equations, matrices, determinants, and their use in business models, forecasting, and economic planning. Practical problem-solving, case-based examples, and business-oriented modeling are integrated throughout the semester to develop both theoretical understanding and applied skills. Numerous applications of mathematics are given throughout the course.</p>	
Course objectives	<p>This course aims to:</p> <ul style="list-style-type: none"> • Introduce students to fundamental concepts of calculus and linear algebra with a strong emphasis on business applications. • Equip students with analytical tools for understanding and solving real-world business and economic problems. • Build competence in using mathematical models to support decision-making in finance, management, and economics. 	

Learning outcomes	<p>Students successfully completing this course should be able to</p> <ul style="list-style-type: none"> Identify and represent business problems using mathematical models. Apply calculus concepts (limits, derivatives, optimization) to analyze costs, revenues, and demand functions. Use matrix methods and determinants to solve business-related systems of equations. Apply linear algebra techniques to input–output analysis and resource allocation problems. 		
Teaching methods	Lecture		x
	Group discussion		x
	Problem Solving		x
	Homework assignments		x
	Simulation		
	Course paper		
	Others		
Evaluation	Methods	Date/deadlines	Percentage (%)
	Midterm Exam		30
	Case studies		
	Class attendance		5
	Class activity		5
	Quizzes (2 quizzes with equal weight)		20 (4 quizzes)
	Final Exam		40
	Others		
	Total		100
Policy	<p>Attendance and activity The students are required to attend all classes as part of their studies and those having legitimate reasons for absence (illness, family bereavement etc.) are required to inform the instructor. However, this student is able to enter the second double hours without delaying. The attendance and participation will account for 5% of the total course grade, which depends on students' good class attendance and active participation in class discussions.</p> <p>Withdrawal (pass/fail) This course strictly follows grading policy of the School of Economics and Management. Thus, a student is normally expected to achieve a mark of at least 60% to pass. In case of failure, he/she will be referred or required to repeat the course the following term or year. For referral, the student will be required to take examination scheduled by instructor.</p> <p>Assignments/quizzes The overall course will consist of 4 quizzes, two of them before midterm exam and the two after midterm exam. Total score for all quizzes is 20% with 5% for each.</p> <p>Cheating/plagiarism Cheating or other plagiarism during the Quizzes, Mid-term and Final Examination will lead to paper cancellation. In this case, the student will automatically get zero (0), without any considerations.</p>		

		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.	
Tentative Schedule			
Week	Date/Day (tentative)	Topics	Textbook/Assignments
1	19.09.2025 19.09.2025	Functions and their graphs. Combining functions: Shifting and Scaling Graphs. Trigonometric functions. Exponential functions. Inverse functions and logarithms.	1.1-1.6 [1]
2	26.09.2025 26.09.2025	Limit of function and limit laws. One-Sided limits. Limits involving infinity; Asymptotes of graphs.	2.2-2.4, 2.6 [1]
3	03.10.2025 03.10.2025	Tangents and the derivative at a point. The derivative as a function. Differentiation rules.	3.1-3.3[1]
4	10.10.2025 10.10.2025	The derivative as a rate of change. Derivatives of trigonometric functions. The chain rule. QUIZ 1 (5pts.)	3.4-3.6 [1]
5	17.10.2025 17.10.2025	Implicit differentiation. Derivatives of Inverse functions and logarithms.	3.7-3.8 [1]
6	24.10.2025 24.10.2025	Inverse trigonometric functions. Related Rates. Linearization and differentials.	3.9-3.11 [1]
7	31.10.2025 31.10.2025	Applications of derivatives. Extreme values of functions. The mean value theorem.	4.1-4.2 [1]
8	07.11.2025 07.11.2025	Monotonic functions and the first derivative test. Concavity and curve sketching.	4.3-4.4 [1]
9	14.11.2025 14.11.2025	Indeterminate forms and L'Hopital's rule. Applied optimization. Newton's method. Antiderivatives. QUIZ 2 (5pts.)	4.5-4.8 [1]
10	21.11.2025 21.11.2025	Linear models in Economics. Systems of linear equations. Row reduction and echelon forms. Vector equations. Midterm exam	1.1-1.3 [2]
11	28.11.2025 28.11.2025	The matrix equation $Ax=b$. Solution sets of Linear systems. Applications of linear systems. Linear independence.	1.4-1.7[2]
12	05.12.2025 05.12.2025	Introduction to linear transformations. The matrix of a linear transformation. Linear models in business, science, and engineering. QUIZ 3 (5pts.)	1.8-1.10[2]
13	12.12.2025 12.12.2025	Computer models in aircraft design. Matrix operations. The inverse of a matrix.	2.1-2.2[2]
14	19.12.2025 19.12.2025	Characterizations of invertible matrices. Partitioned matrices. Matrix Factorizations. The Leontief input-output model.	2.3-2.6 [2]

15	26.12.2025 26.12.2025	Introduction to determinants. Properties of determinants. Cramer's rule, volume, and linear transformations QUIZ 4 (5pts.)	3.1-3.3 [2]
	TBA	Final exam	

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

