

Course Description					
Name	Code	Semester	T+A Hour	Credit	ECTS
MATHEMATICS II	MIS1224550	Spring Semester	3+0	3	4
Prerequisites Courses	MATEMATİK I				
Recommended Elective Courses					
Language of Instruction	English				
Course Level	First Cycle (Bachelor's Degree)				
Course Type	Required				
Course Coordinator	Assist.Prof. Tuğba ASLAN KHALİFA				
Name of Lecturer(s)	Assist.Prof. Tuğba ASLAN KHALİFA				
Assistant(s)					
Aim	The aim of this mathematics course is to equip students with the essential mathematical knowledge and skills necessary to excel in the world of business and economics. This course seeks to provide a solid foundation in mathematical concepts and techniques that are directly applicable to real-world business scenarios, enabling students to make informed decisions, solve practical problems, and enhance their quantitative reasoning abilities in a business context.				
Course Content	This course contains; The definition of limit, right and left limit, Infinite limit and limit at infinity, Continuity, Definition of limit, physical and geometric interpretation, tangent lines, rules of differentiation, Marginal analysis in business and economy, continuous compound interest, Derivative of logarithmic and exponential functions, product and quotient rules, chain rule, Implicit differentiation, related rates, elasticity of demand, Applications of differentiation: graphs and derivatives, optimization, Anti derivatives and rules of indefinite integral calculation, Definite integral and Riemann Sums, Fundamental theorem of analysis and calculation of definite integrals, Sequences and series: definitions and terminology, Arithmetic and geometric sequences and series, Difference equations and its applications.				
Course Learning Outcomes			Teaching Methods	Assessment Methods	
1. Will be able to evaluate limits of one variable functions numerically, graphically, and algebraically.			12, 14, 16, 9	A, E, G	
1.1 Understand the concept of limit and its existence, analyse the concept of limit both graphically and algebraically.					
1.2 Evaluate one-sided limits, limit at infinity, and infinite limits of various basic functions.					
2. Will be able to analyze the continuity of a function.			12, 14, 16, 9	A, E, G	
2.1 Determine continuity and points of discontinuity of functions with single variable both graphically and algebraically.					
2.2 Use the concept of continuity in applications.					
3. Will be able to comprehend basic theoretical and applicational aspects of differentiation.			12, 14, 16, 9	A, E, G	
3.1 Understand the concept of a derivative as the rate of change of a function at a given point, and be able to calculate it using the limit definition.					
3.2 Use differentiation rules to calculate derivatives of polynomial, rational, exponential and logarithmic functions.					
3.3 Sketch the graph of functions using differentiation.					
4. Will be able to use limit and derivative concepts in applications of the field of interest.			12, 14, 16, 9	A, E, G	
4.1 Comprehend the concept of continuous compound interest using limit.					
4.2 Solve optimization problems in the field of interest by using first and second derivative concepts.					
4.3 Explains the concept of demand elasticity.					
5. Will be able to comprehend basic theoretical and applicational aspects of integration.			12, 14, 16, 9	A, E, G	
5.1 Calculate indefinite integrals with algebraic techniques using the concept of anti-derivatives.					
5.2 Explain the concept of definite integral and its relation with areas under the curves using Riemann sums.					
5.3 Calculate definite integrals with algebraic techniques using the fundamental theorem of calculus.			12, 14, 16, 9	A, E, G	
6. Will be able to use the concepts of series and sequences in applications of the field of interest.					
6.1 Define the concepts of sequences and series.					
6.2 Comprehend the concepts of arithmetic and geometric series and sequences.					
6.3 Use the sequences and series in the applications of field of interest.					
7. Will be able to describe the phenomena related with the fields of study using difference equations.			12, 14, 16, 9	A, E, G	
7.1 Find the complementary function of a difference equation.					
7.2 Find the particular solution of a difference equation.					
7.3 Analyze the stability of economic systems.					
Teaching Methods	12: Problem Solving Method, 14: Self Study Method, 16: Question - Answer Technique, 9: Lecture Method				
Assessment Methods	A: Traditional Written Exam, E: Homework, G: Quiz				
Lecture Schedule					
Sequence	Topics	Preliminary Preparation			
1	The definition of limit, right and left limit				
2	Infinite limit and limit at infinity				
3	Continuity				
4	Definition of limit, physical and geometric interpretation, tangent lines, rules of differentiation				
5	Marginal analysis in business and economy, continuous compound interest				
6	Derivative of logarithmic and exponential functions, product and quotient rules, chain rule				
7	Implicit differentiation, related rates, elasticity of demand				
8	Applications of differentiation: graphs and derivatives, optimization				
9	Anti derivatives and rules of indefinite integral calculation				
10	Definite integral and Riemann Sums				
11	Fundamental theorem of analysis and calculation of definite integrals				

Lecture Schedule		
Sequence	Topics	Preliminary Preparation
12	Sequences and series: definitions and terminology	
13	Arithmetic and geometric sequences and series	
14	Difference equations and its applications	
Evaluation Methods		Weight(%)
(Midterm Exam) Homework		20
(Midterm Exam) Quiz		20
Midterm Exam		40
General Exam		60

Resources
Main sources: 1. Lecture Notes shared by instructor 2. Main text: Calculus for Business, Economics, Life Sciences, and Social Sciences, 14th edition Published by Pearson (2021), R. A. Barnett, M: R: Ziegler, K. E. Byleen. Other Recommended Sources: Introductory Mathematical Analysis for Business, Economics, and the Life and Social Sciences, 14th Edition by Ernest F. Haeussler, Jr., Richard S. Paul, and Richard J. Wood, published by Pearson Education 2019. Fundamental methods of mathematical economics, , Kevin Wainwright, 2005, McGraw Hill Education, 4th Edition İşletme Matematiği, Bülent Kobu, 2009, Beta Basım Yayım Dağıtım, 8. Edition