School of Business and Management Sciences / Management Information Systems (English)

2023 - 2024 Academic Year

MATHEMATICS I

Syllabus

Course Description					
Name	**Code**	**Semester**	**T+A Hour**	**Credit**	**ECTS**
MATHEMATICS I	MIS1124480	Fall Semester	3+0	3	4

Prerequisites Courses	
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. Itır DOĞANGÜN
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; Number systems and algebraic expressions,Linear and quadratic equations,Linear inequalities,Applications of equations and inequalities,Definition of a function, domain, range, some special functions ,Graphs of basic functions in rectangular coordinates, symmetry, translations and reflections,Linear and quadratic functions and their applications: supply and demand lines, maximum revenue,Exponential and logarithmic functions and their applications: compound interest, continuous compound interest, exponential growth,Systems of equations,Matrix notation and matrix algebra,Operations with matrices and special matrices,Reduced matrix, solving linear systems using matrix reduction,Finding inverse of a matrix and solving linear systems using inverse matrix,Input–output analysis.

Course Learning Outcomes	**Teaching Methods**	**Assessment Methods**
1. Will be able to performs algebraic operations on the set of real numbers.	12, 14, 16, 9	A
1.1 Name, illustrate, and relate properties of the real numbers in terms of their operations.		
1.2 Perform addition, subtraction, multiplication and division on numerical fractions, exponential numbers, and radicals.		
2. Will be able to evaluate and simplify algebraic expressions.	12, 14, 16, 9	A
2.1 Perform calculations using order of operations on algebraic expressions.		
2.2 Knowledges about algebraic operations and simplification operations on both polynomial and rational expressions.		
3. Will be able to find solution sets of equations and inequalities.	12, 14, 16, 9	A
3.1 Illustrate equations and inequalities.		
3.2 Find solution sets of equations and inequalities.		
3.3 Set and solve word problems related to the field of interest using equations and inequalities.		
4. Will be able to defines illustrate and analyze functions.	12, 14, 16, 9	A
4.1 Analyzes the concept of a function and its graph, identify domain and range of a given function.		
4.2 Analyze linear, quadratic, logarithmic, and exponential functions both algebraically and graphically, and know applications in business and economic sciences that use such functions as models, such as supply-demand lines, maximum income, compound interest, and exponential growth.		
4.3 Obtains new function graphs by applying translation and reflection operations on basic function graphs.		
5. Will be able to solve systems of linear equations with two/three variables using various methods, such as substitution, elimination, and interpret solutions in a real-world context.	12, 14, 16, 9	A
5.1 Model the word problems in area of interest using system of equations.		
5.2 Solve systems of linear equations in two/three variables using elimination and back substitution.		
6. Will be able to explain the concept of matrices, perform operations defined on matrices, and set up matrix equations of linear system of equations.	12, 14, 16, 9	A
6.1 Analayzes matrix notation and terminology, and perform basic matrix operations, including addition, subtraction, scalar multiplication, and matrix multiplication, and understand the properties of these operations.		
6.2 Set up matrix equations for linear systems equations and find the coefficient and augmented matrix of a system.		
7. Will be able to analyzes systems of linear equations with the help of matrices.	12, 14, 16, 9	A
7.1 Use matrix reduction and inverse of a matrix to solve a linear system.		
7.2 Use input-output matrices to analyze the production of sectors of an economy.		

Teaching Methods	12: Problem Solving Method, 14: Self Study Method, 16: Question - Answer Technique, 9: Lecture Method
Assessment Methods	A: Traditional Written Exam

Lecture Schedule

Sequence	**Topics**	**Preliminary Preparation**
1	Number systems and algebraic expressions	
2	Linear and quadratic equations	
3	Linear inequalities	
4	Applications of equations and inequalities	
5	Definition of a function, domain, range, some special functions	
6	Graphs of basic functions in rectangular coordinates, symmetry, translations and reflections	
7	Linear and quadratic functions and their applications: supply and demand lines, maximum revenue	
8	Exponential and logarithmic functions and their applications: compound interest, continuous compound interest, exponential growth	
9	Systems of equations	
10	Matrix notation and matrix algebra	

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Lecture Schedule		
Sequence	**Topics**	**Preliminary Preparation**
11	Operations with matrices and special matrices	
12	Reduced matrix, solving linear systems using matrix reduction	
13	Finding inverse of a matrix and solving linear systems using inverse matrix	
14	Input–output analysis	

Evaluation Methods	**Weight(%)**
Midterm Exam	40
General Exam	60

Resources

Main sources:
1. Lecture Notes shared by instructor
2. Main text: 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.
Other Recommended Sources:
Calculus for Business, Economics, Life Sciences, and Social Sciences, 14th edition Published by Pearson (2021), R. A. Barnett, M: R: Ziegler, K. E. Byleen.
Fundamental methods of mathematical economics, Kevin Wainwright, 2005, McGraw Hill Education, 4th Edition
İşletme Matematiği, Bülent Kobu, 2009, Beta Basım Yayım Dağıtım, 8. Edition