

School of Engineering and Natural Sciences / Industrial Engineering (English)

2023 - 2024 Academic Year

DISCRETE MATHEMATICS

Syllabus

Course Description					
Name	Code	Semester	T+A Hour	Credit	ECTS
DISCRETE MATHEMATICS	IND2218970	Spring Semester	3+0	3	5
Prerequisites Courses	MATEMATİK I				
Recommended Elective Courses					
Language of Instruction	English				
Course Level	First Cycle (Bachelor's Degree)				
Course Type	Elective				
Course Coordinator	Assist.Prof. Cihan Bilge KAYASANDIK				
Name of Lecturer(s)	Assist.Prof. Cihan Bilge KAYASANDIK				
Assistant(s)	Slides, Lecture Notes and Textbook				
Aim	The course is aimed at equipping students with logical and mathematical thinking. The course is designed to accomplish five major themes: (i) Mathematical reasoning, (ii) combinatorial analysis,(iii) discrete structures,(iv) algorithmic thinking,(v) applications and modeling.				
Course Content	This course contains; Fundamentals,Fundamentals of Logic ,Logic, Conditional Statements,Logic of Quantified Statements,Introduction to Number Theory, Direct Proof and Counterexample,Sequences, Mathematical Induction,Strong Induction, Recursion and Structural Induction,Introduction to Set theory,Functions,Cardinality applications to computability,Relation,Equivalence Relation and Modular Arithmetic,Basic Cryptography ,Basic Problems on Graphs and Tree representation,Applications of Graph theory.				
Course Learning Outcomes			Teaching Methods	Assessment Methods	
Determine an argument using logical notation and whether the argument is or not valid			10, 12, 16, 9	A, E	
Execute proof writing and evaluation.			10, 12, 16, 9	A, E	
Comprehend set fundamentals, operations, and validation of elementary set equalities.			10, 12, 16, 9	A, E	
Comprehend the properties of functions, relationships between them, and introductory knowledge of graph theory and cryptology.			10, 12, 16, 9	A, E	
Teaching Methods	10: Discussion Method, 12: Problem Solving Method, 16: Question - Answer Technique, 9: Lecture Method				
Assessment Methods	A: Traditional Written Exam, E: Homework				
Lecture Schedule					
Sequence	Topics	Preliminary Preparation			
1	Fundamentals	Chapter			
2	Fundamentals of Logic	Chapter 2.1			
3	Logic, Conditional Statements	Chapter 2.2, 2.3			
4	Logic of Quantified Statements	Chapter 3			
5	Introduction to Number Theory, Direct Proof and Counterexample	Chapter 4			
6	Sequences, Mathematical Induction	Chapter 5.1, 5.2			
7	Strong Induction, Recursion and Structural Induction	Chapter 5			
8	Introduction to Set theory	Chapter 6.1			
8	Functions	Chapter 7.1-7.3			
9	Cardinality applications to computability	Chapter 7.4			
10	Relation	Chapter 8.1, 8.2			
11	Equivalence Relation and Modular Arithmetic	Chapter 8.3, 8.4			
12	Basic Cryptography	Chapter 8.4			
13	Basic Problems on Graphs and Tree representation	Chapter 10.1-10.5			
14	Applications of Graph theory	Chapter 10.5, 10.7			
Evaluation Methods		Weight(%)			
Midterm Exam		30			
General Exam		70			
Resources					
Discrete Mathematics and Its Applications, Kenneth H. Rosen, 7th edition, McGraw-Hill, 2012					