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

2022 - 2023 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)						
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; Week 1: Fundamentals of Logic,Week 2: Fundamentals of Logic (Ct'd),Week 3: Methods of Proof,Week 4: Methods of Proof (Ct'd),Week 5: Sets,Week 6: Structural Induction,Week 7: Corretness of Algorithms,Week 8: Functions,Week 9: Mathematical induction and recursion,Week 10: Recurrence Relation,Week 11: Basic Graph Theory,Week 12: Basic Cryptography ,Week 13: Basic Problems on Graphs and Tree representation,Week 14; Applications of Graph theory.					

Course Learning Outcomes	**Teaching Methods**	**Assessment Methods**
1. Students will be able to write an argument using logical notation and determine if the argument is or is not valid	1, 15, 2, 3	A, C
2. Students will be able to demonstrate the ability to write and evaluate a proof.	1, 15, 2, 3	A, C
3. Students will be able to nderstand the basic principles of sets and operations in sets and prove basic set equalities.	1, 15, 2, 3	A, C
4. They will be able to describe the properties of functions and show the relationships between them, gain an introductory knowledge of graph theory and cryptology.	1, 15, 2, 3	A, C

Teaching Methods	1: Lecture, 15: Problem solving, 2: Question - Answer, 3: Discussion
Assessment Methods	A: Written Exam, C: Homework

Lecture Schedule

Sequence	**Topics**	**Preliminary Preparation**
1	Week 1: Fundamentals of Logic	
2	Week 2: Fundamentals of Logic (Ct'd)	
3	Week 3: Methods of Proof	
4	Week 4: Methods of Proof (Ct'd)	
5	Week 5: Sets	
6	Week 6: Structural Induction	
7	Week 7: Corretness of Algorithms	
8	Week 8: Functions	
9	Week 9: Mathematical induction and recursion	
10	Week 10: Recurrence Relation	
11	Week 11: Basic Graph Theory	
12	Week 12: Basic Cryptography	
13	Week 13: Basic Problems on Graphs and Tree representation	
14	Week 14; Applications of Graph theory	

Evaluation Methods	**Weight(%)**
Midterm Exam	30
General Exam	70

Resources
Discrete Mathematics and Its Applications, Kenneth H. Rosen, 7th edition, McGraw-Hill, 2012