GAU, Faculty of Engineering

Course Unit Title	Discrete Mathematics
Course Unit Code	MT106
Type of Course Unit	Compulsory for SE, AIE
Level of Course Unit	1st year BSc
National Credits	3
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	3
Practice (hour/week)	0
Laboratory (hour/week)	0
Year of Study	1
Semester when the course unit is delivered	2
Mode of Delivery	Face to face
Language of Instruction	English
Prerequisites	
Corequisites	
Recommended Optional Programme Components	

Objectives of the Course:

- to explain fundamental discrete mathematical structures used in computer, software, and AI engineering
- to demonstrate understanding of mathematical reasoning and proof techniques,
- to apply propositional and predicate logic to model and analyze computational problems
- weerdddff

Learning Outcomes

When this course has been completed the student should be able to		Assess.
1	Understand mathematical reasoning in order to read, comprehend, and construct mathematical arguments.	1,3
2	Solve counting problems and analyse algorithms	1
3	work with discrete structures, such as sets, permutations, relations, graphs, trees, and finite-state machines	1
4	Prove mathematıcal theorems usıng mathematıcal ınductıon	1
5	Describe simple algorithms in English and pseudocode, explain their functionality, and estimate the time and memory required to execute them.	1

Assessment Methods: 1. Written Exam, 2. Oral Exam, 3. Assignment, 4. Project/Report, 5. Presentation, 6. Lab Work

Course's Contribution to Program

		CL
1	Ability to understand and apply knowledge of mathematics, science, and engineering	3
2	Ability to design and conduct experiments as well as to analyze and interpret	1
3	Ability to work in multidisciplinary teams while exhibiting professional responsibility and ethical conduct	2
4	Ability to apply systems thinking in problem solving	2
5	Knowledge of contemporary issues while continuing to engage in lifelong learning	2
6	Ability to use the techniques, skills and modern engineering tools necessary for engineering practice	3
7	Ability to express their ideas and findings, in written and oral form	3

8	Ability to design and integrate systems, components or processes to meet desired needs within realistic constraints	2
9	Ability to approach engineering problems and effects of their possible solutions within a well structured, ethically responsible and professional manner	2

CL: Contribution Level (1: Low, 2: Medium, 3: High)

Course Contents

Week	Chapter	Subject	Exams
1	1	Introduction to Discrete Mathematics for Computing	
2	1.1	Propositional Logic	
3	1.4	Predicate Logic & Quantifiers	
4	1.6	Rules of Inference & Proof Techniques	
5	2.2	Sets	
6	2.5	Relations	
7	2.4	Functions	
8			Midterm
9	5.1	Mathematical Induction & Recursion	
10	6.1	Counting & Combinatorics	
11	7.1	Discrete Probability	
12	3.2	Algorithms & Complexity	
13	10.1	Graph Theory Fundamentals	
14		Applications	
15			Final

Recommended Sources

- Rosen, K. H., Discrete Mathematics and Its Applications, 8th Edition, 2019 McGraw-Hill.
- Lipschutz, S., Schaum's Outline of Discrete Mathematics, 3rd Edıtıon, 2007, McGraw-Hill

Assessment

Midterm	25 %
Final exam	40 %
Quız 1	10 %
Quız 2	20 %
Attendance	5 %

ECTS Allocated Based on the Student Workload

Activities	Number	Duration (hour)	Total Workload (hour)
In-class lecture (including exam weeks)	15	3	45
Midterm exam	1	1.5	1.5
Midterm exam preparation	1	20	20
Final exam	1	1.5	1.5
Final exam preparation	1	20	20
Quiz	2	3	6
Assignment	10	3	30
Project/presentation/report writing	0	0	0
Lab and tutorial	0	0	0
Self-study	15	3	45
Total Workload			169.00

Total Workload / 30 (h)	5.63
ECTS Credit of the Course	6