



## ECTS COURSE INFORMATION FORM

<b>Faculty</b>	<b>Faculty of Engineering</b>		
<b>Program</b>	<b>B.Sc. in Civil Engineering</b>	<b>Elective</b>	
	<b>B.Sc. in Computer Engineering</b>	<b>Required</b>	
	<b>B.Sc. in Electrical-Electronics Engineering</b>	<b>Elective</b>	
	<b>B.Sc. in Industrial Engineering</b>	<b>Required</b>	
	<b>B.Sc. in Mechanical Engineering</b>	<b>Elective</b>	

<b>Course Code</b>	MATH 108			
<b>Course Title in English</b>	Discrete and Combinatorial Mathematics			
<b>Course Title in Turkish</b>	Ayrık ve Kombinatorik Matematik			
<b>Language of Instruction</b>	English			
<b>Type of Course</b>	Flipped Classroom			
<b>Level of Course</b>	Undergraduate, Introductory			
<b>Course Category (by % of Content)</b>	Basic Science	Basic Engineering	Engineering Design	General Education
	100	-	-	-
<b>Semester Offered</b>	Spring			
<b>Contact Hours per Week</b>	Lecture: 3 hours	Recitation: -	Lab: -	Other: -
<b>Estimated Student Workload</b>	130 hours			
<b>Number of Credits</b>	5 ECTS			
<b>Grading Mode</b>	Standard Letter Grade			
<b>Pre-requisites</b>	-			
<b>Expected Prior Knowledge</b>	-			
<b>Co-requisites</b>	-			
<b>Registration Restrictions</b>	Only Undergraduate Students			
<b>Overall Educational Objective</b>	To learn and understand the foundations of mathematics of computer science, develop analytical and critical thinking abilities and deduce mathematical and logical proofs.			
<b>Course Description</b>	Topics to be covered include set theory, mathematical induction, relations and functions, basic counting and probability, recursion and recurrence relations, graph theory and trees and related algorithms, algorithm complexity, and modular arithmetic.			
<b>Course Description in Turkish</b>	Dersin konuları, kümeler kuramı, tümevarım, bağıntı ve fonksiyonlar, temel olasılık ve sayma kuramı, özyineleme ve özyinelemeli bağıntılar, çizge ve ağaç yapıları ve ilgili algoritmalar, algoritma analizi ve modüler aritmetik içermektedir.			
<b>Course Learning Outcomes and Competences</b>	Upon successful completion of the course, the learner is expected to: 1. apply the basics of mathematical thinking, logic, sets, functions/relations, mathematical proofs and present simple proofs in a precise and formally correct way; 2. comprehend the basic concept of an algorithm and apply appropriate algorithms to solve problems in combinatorial mathematics; 3. demonstrate an understanding of the principle of recursion and recurrence relations and apply it to mathematical and algorithmic problems; 4. comprehend graph theory, trees and related algorithms; 5. apply counting and probability.			

Relationship of the Course with the Student Outcomes	Level	Learning Outcome(s)	Assessed by
<b>Student Outcomes</b>	N=None S=Supportive H=High		Exam, Project, HW, Experiment, Presentation , etc.
(1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	H	1,2,3,4,5	Midterm, Quiz
(2) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors			
(3) an ability to communicate effectively with a range of audiences			
(4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts			
(5) an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives			
(6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions			
(7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies			
<b>Prepared by and Date</b>	Asst. Prof. Dr. Şeniz Demir / January 2020		
<b>Semester</b>	Spring 2019-2020		
<b>Name of Instructor</b>	Asst. Prof. Dr. Şeniz Demir		
<b>Course Contents</b>	Week	Topic	
	1.	Foundations: Logic	
	2.	Foundations: Quantifiers, Arguments	
	3.	Introduction to Proofs	
	4.	Relations and Functions	
	5.	Sequences and Summations	
	6.	Algorithms: Basics	
	7.	Algorithm Analysis	
	8.	Number Theory: Modular Arithmetic, Prime Numbers	
	9.	Number Theory: Fundamental Algorithms	
	10.	Counting and Probability	
	11.	Advanced Counting	
	12.	Recursion and Induction	
	13.	Recurrence Relations	
	14.	Graph Theory and Trees	
	15.	Final Exam/Project/Presentation	
	16.	Final Exam/Project/Presentation	
<b>Required/Recommended Readings</b>	Discrete Mathematics and Its Applications, Kenneth Rosen, 7 <sup>th</sup> Edition, 2011 Supplementary Textbook: Discrete and Combinatorial Mathematics, R. P. Grimaldi, Addison-Wesley, 2004		
<b>Teaching Methods</b>	Lecturing. Independent study for students		
<b>Homework and Projects</b>	Quizzes		
<b>Laboratory Work</b>	No		
<b>Computer Use</b>	No		
<b>Other Activities</b>	Not required.		

<b>Assessment Methods</b>	2 midterms (40% each), quizzes (20%)
<b>Course Administration</b>	<p>Instructor's office: 5<sup>th</sup> floor,  <b>Exams:</b> Closed book and closed notes.  <b>Rules for attendance:</b> YÖK regulations.  <b>Missing a midterm:</b> You are expected to be present without exception and to plan any travel around these dates accordingly. Medical emergencies are of course excluded if accompanied by a doctor's note. A note indicating that you were seen at the health center on the day of the midterm/quiz is <u>not</u> a sufficient documentation of medically excused absence from the midterm/quiz. <u>The note must say that you were medically unable to take the midterm/quiz.</u> Provided that proper documents of excuse are presented, a make-up for the missing midterm/quiz will be given. If you fail to take the midterm/quiz on the assigned day and do not have a valid excuse, you will be given zero (0) on the midterm/quiz. Employment interviews, employer events, weddings, vacations, etc. are not excused absences.  <b>Eligibility to take the final exam:</b> No final exam.  <b>Missing a final:</b> No final exam.</p> <p>A reminder of proper classroom behavior, code of student conduct: YÖK Regulations  Statement on plagiarism: YÖK Regulations</p>

ECTS Student Workload Estimation	Activity	No/Weeks	Hours			Calculation	Explanation
		No/Weeks per Semester (A)	Preparing for the Activity (B)	Spent in the Activity Itself (C)	Completing the Activity Requirements (D)		
	Lecture/Flipped Classroom	14	1	3	1	70	A*(B+C+D)
	Quizzes	8	1	1	0	16	
	Midterm(s)	2	20	2	0	44	A*(B+C+D)
	Assignment, Project, Presentation						A*(B+C+D)
	Final Examination						A*(B+C+D)
	Total Workload					130	
	Total Workload/25					5.2	
	ECTS					<b>5</b>	