

Department Department of Mathematics			Academic Year 2022-2023	Date 01/12/2022	
Course Unit Code MATH3118	Course Unit Title Computational Mathematics		Semester/Year Spring/ 3	Number of ECTS Credits 5	
Language of Instruction	Turkish				
Type of Course Unit	Elective				
Prerequisites and co-requisites	-				
Address of course	-				
Local Credit	Theoretical	Practical	Laboratory	Presentation	Project
3	2	2	-	-	-
Name of Lecturers	Associated Professor Emrah YILMAZ				
Assistants	-				

Course content	Algorithms, polynomials, matrices and data structures, Pascal algorithm, iteration, analysis of algorithms, Euclidean algorithm, Evaluation of polynomials, multiplication in polynomials, Euclidean algorithm for polynomials, Fast Fourier transform and its applications, Prime number tests, Integer factorization algorithm, Gram-Schmidt dikeyselleme, LLL, dynamic programming, Greedy algorithms, geometry algorithms, Biggest bipartite mapping, stretching tree algorithms, shortest paths, Weighted graph algorithms, Algorithms in a directed graph.
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Weekly Detailed Course Contents	
Week	Topic
1	Algorithms, polynomials, matrices and data structures
2	Pascal algorithm, iteration, analysis of algorithms
3	Euclidean algorithm
4	Evaluation of polynomials, multiplication in polynomials, Euclidean algorithm for polynomials
5	Fast Fourier transform and its applications
6	Prime number tests
7	Integer factorization algorithm
8	Gram-Schmidt dikeyselleme, LLL
9	General application
10	dynamic programming
11	Greedy algorithms, geometry algorithms
12	Biggest bipartite mapping, stretching tree algorithms, shortest paths
13	Weighted graph algorithms, Algorithms in a directed graph
14	A brief evaluation of the course content and topics

Course Resources	1. R. Sedgewick "Algorithms", Addison-Wesley 2004 2. H. Cohen "A course in computational algebraic number theory", Springer
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Assessment Methods and Criteria	In-Term studies	Quantity	Percentage (%)
	Mid-Term Exams	1	40
	Quizzes	-	-
	Assignments	-	-
	Projects	-	-
	Term assignment	-	-
	Laboratory	-	-

	Other	-	-
	Final exam	1	60
On Assessment Methods and Criteria	A grade of success; the relative evaluation system or the discretion of the instructor. In order to be taken into consideration in the courses in which the relative evaluation system and teaching staff's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the letter grades of the success grades are determined by the consent of the instructor teaching the table by 100 points by the Senate using the distribution of the final grade of success. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course		

Percentage of Course Category (%)	Mathematics and Basic Sciences	100
	Computer Sciences	0
	Programming Design	0
	Social sciences	0

Course Outcome	Students who successfully complete this course will have the following qualifications: 1. Obtain the basic parameters of any code. 2. Theoretically acquires the ability of practicing what they have learned up to date.
Aims of the course	Apply Abstract Algebra knowledge to current life. Learn the basics of error correction codes and how error control systems can be implemented in design.
The way of processing course	Face to face

Relation of the course with program outcomes				
Learning outcomes		1	2	3
1	To have advanced theoretical and applied knowledge in a way to prioritize the scientific approach supported by textbooks containing up-to-date information in the field, application tools and other resources			
2	Adapting and transferring the knowledge gained in the field to secondary education			
3	Ability to independently carry out an advanced study in the field			
4	Be aware of the necessity of lifelong learning and continuously improve their professional knowledge and skills.		X	
5	Using a foreign language at least at the European Language Portfolio B1 General Level, following the information in the field and being able to communicate with colleagues			
6	To be able to use information and communication technologies together with computer software at minimum advanced level of European computer license required by the field.			
7	Have the ability to make oral and written presentation in native language			
8	Having the ability to understand spoken English and use English at reading level			
9	To have the ability to assimilate mathematical concepts and understand the relationships between them, to recognize different aspects of the same concepts and relationships		X	
10	To have the ability to define and formulate the relationships between items in non-mathematical disciplines in the language of mathematics.		X	
11	To have the ability to use mathematical knowledge in different problems			
12	Having the ability to develop computer programs using mathematical knowledge			
Contribution of the course: 1:No 2:Partially 3:Completely				

Preparer: Associated Professor Emrah YILMAZ

Preparation date: 01/12/2022