

COURSE INFORMATION					
Course Title	Code	Semester	L+P Hour	Credits	ECTS
<b>ALGORITHMS AND PROGRAMMING</b>	<b>ES112</b>	<b>1 &amp; 2</b>	<b>3 + 2</b>	<b>4</b>	<b>6</b>

<b>Prerequisites</b>	none
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<b>Language of Instruction</b>	English
<b>Course Level</b>	Bachelor's Degree (First Cycle Programmes)
<b>Course Type</b>	Compulsory
<b>Course Coordinator</b>	Mustafa Bülent Mutluoğlu
<b>Instructors</b>	
<b>Assistants</b>	
<b>Goals</b>	There are two aims of this course: to teach computer programming using C programming language and Algorithm design and development. The course adopts a disciplined approach of problem solving methodologies and software engineering methods to design program solutions. It introduces the principles of procedural programming, data types, control structures, data structures and functions, data representation.
<b>Content</b>	Overview of computers and programming, overview of C, Algorithm representation, Basics Elements in C, Control Structures & Program Design (Sequence, Decision & Repetition Structures), Arrays, Functions, pointers, Formatting, File I/O, strings

Course Learning Outcomes	Program Learning Outcomes	Teaching Methods	Assessment Methods
1) Ability to define and identify what a computer hardware, computer software is, and describe and apply the Software Development Methodology.	1,2,3,4	1,2,3	A,B,C
2) Ability to construct and prepare problem solving strategies (algorithms) before writing computer programs and solve the problems.	1,2,3,4,5	1,2,3	A,B,C
3) Ability to explain, use and compare and contrast the different programming constructs (sequence, selection, repetition) of C Programming Language.	1,5,6	1,2,3	A,B,C
4) Ability to analyze, design, document and test computer programs.	1,2,3,5,7	1,2,3	A,B,C
5) Ability to explain, use, compare and write interactive and batch mode programs.	1,2,3,4	1,2,3	A,B,C
6) Ability to use mathematics and be Able to formulate computer solutions to mathematical problems.	1,5	1,2,3	A,B,C

7) Ability to explain, differentiate, compare and use different data types (integer, floating-point, character, string, array, pointer).	1,2,3,4,5	1,2,3	A,B,C
8) Ability to operate computer programs using Integrated Development Environment (IDE) tools (editor, compiler, linker, debugger).	1,3,4,6,7	1,2,3	A,B,C

<b>Teaching Methods:</b>	1: Lecture, 2: Question-Answer, 3: Lab, 4: Case-study
<b>Assessment Methods:</b>	A: Testing, B: Experiment, C: Homework, D: Project

<b>COURSE CONTENT</b>		
<b>Week</b>	<b>Topics</b>	<b>Study Materials</b>
1	INTRODUCTION TO COMPUTER SYSTEMS & PROGRAMMING	
2	OVERVIEW OF C PROGRAMMING LANGUAGE	
3	INTRODUCTION TO PROBLEM SOLVING AND THE CONCEPT OF ALGORITHM	
4	CONTROL STRUCTURES - SEQUENCE	
5	CONTROL STRUCTURES - SELECTION	
6	CONTROL STRUCTURES - ITERATION	
7	FUNCTIONS - BUILT-IN AND SIMPLE FUNCTIONS	
8	FUNCTIONS - RECURSIVE FUNCTIONS, RANDOM NUMBER GENERATION	
9	ARRAYS - 1D, 2D, MULTIDIMENTIONAL ARRAYS	
10	ARRAYS - SEARCH, SORTING ALGORITHMS	
11	POINTERS - POINTER ARITHMETIC, CALL-BY-REFERENCE	
12	CHARACTER OPERATIONS AND FUNCTIONS	
13	STRING OPERATIONS AND FUNCTIONS	
14	FILE I/O (TEXT FILES, REDIRECTION)	

<b>RECOMMENDED SOURCES</b>	
<b>Textbook</b>	Jeri R. Hanly and Elliot B. Koffman (2012). Problem Solving and Program Design in C, Pearson Education, Inc., edition 7, ISBN: 978-0132936491
<b>Additional Resources</b>	P.J. Deitel & H. M. Deitel (2013).C How to Program,7th Edition, Prentice-Hall., ISBN: 978-0132990448

<b>MATERIAL SHARING</b>	
<b>Documents</b>	
<b>Assignments</b>	
<b>Exams</b>	

<b>ASSESSMENT</b>		
<b>IN-TERM STUDIES</b>	<b>NUMBER</b>	<b>PERCENTAGE</b>
Mid-term exam	1	25
Lab-midterm exam (practical)	1	20
Lab Work (homework)	14	20
Final exam	1	35
<b>Total</b>		<b>100</b>
<b>CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE</b>		35
<b>CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE</b>		65
<b>Total</b>		<b>100</b>

<b>COURSE CATEGORY</b>	Expertise/Field Courses
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<b>COURSE'S CONTRIBUTION TO PROGRAM</b>						
No	Program Learning Outcomes	Contribution				
		1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline; ability to use theoretical and applied information in these areas to model and solve engineering problems.					x
2	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.				x	
3	Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply modern design methods for this purpose.				x	
4	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.			x		
5	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.				x	
6	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams; ability to work individually.			x		

7	Ability to communicate effectively both orally and in writing; knowledge of a minimum of one foreign language.		x		
8	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.		x		
9	Awareness of professional and ethical responsibility.	x			
10	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.				
11	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions.	x			

<b>ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION</b>			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Excluding the exam weeks: 12x Total course hours)	14	5	70
Hours for off-the-classroom study (Pre-study, practice)	14	2	28
Midterm examination(Theoretic + Lab)	2	8	16
Homework	13	2	26
Final examination	1	10	10
<b>Total Work Load</b>			150
<b>Total Work Load / 25 (h)</b>			6
<b>ECTS Credit of the Course</b>			6