Program	Level	First cycle		
	Name of the program	Theoretical Computer Science		
COURSE				
Course title	**Computer Systems**			
Course code	Semester	Course status	ECTS	Contact hours (L+AE+LE)
CS 120	I	Mandatory course	5	3+3+0
Lecturer				
Course Goals	The course aims to acquaint students with the basic terms and concepts of computer science and to introduce the basic concepts of digital technology that are necessary for understanding the operation of a computer as a programmable digital machine. In addition, students will be introduced to the structure of computer systems, the basic concepts of computer communications, the principles of algorithmic thinking, the methodology of solving problems using computers, and the basic concepts of advanced programming languages.			
Learning Outcomes	By the end of the course, the students will understand the work of all components of the computer system, the basic principles of computer operation as an information processing tool, the basic principles of digital data processing, the organization of data in the computer memory, the connection between logical algebra and digital techniques, advanced methods of Boolean algebra for the analysis and synthesis of more superficial digital structures, the relationship between hardware and software, the basic concepts related to high-level programming languages. Therefore, s a result, the student will be prepared to take any of the upper-level systems classes. Even more important, the student will have learned skills to help him throughout further education.			

COURSE CONTENT

- Hardware structure of modern computers. Organization of data in the computer memory. The basic concepts of BooleanAlgebra. Bits, data types, and operations.
- The transformation and minimization of Boolean functions using Karnaugh maps. Logical gates. Combinatorial logical circuits. The synthesis of combinatorial circuits.
- Coder. Decoder. Multiplexer (MUX). Demultiplexer (DMUX). The applications of muxes and demuxes. Synthesis with muxes and demuxes. Half Adder. Full Adder. The Programmable Logic Array(PLA).Logical Completeness.The equations for the finite automata and sequential networks.
- Basic storage elements. R-S Letch. D letch. The sequential logic circuits. Elementary automata (flip-flops). Memory organization. The Addressability of memory. Registers. Counters.
- The processing unit is a sequential circuit. Machine instructions and machine language. Machine programming. Assembly Language. Assembly programming.
- The processor types and addressing modes. Input-output connectors and external memory.
- Operating system and system software. The concept of the algorithm. Higher programming languages and their classification. Introduction to programming in C. Variables and operators. Control structures. Functions. Testing and Debugging. Pointers and arrays. Recursion. Input-Output in C.

LITERATURE

[1] S. Hutchinson: Using Information Technology - A Practical Introduction to Computers & Communications, (2000), McGraw-Hill Companies, New York.

[2] Randy H. Katz, Gaetano Borriello:Contemporary Logic Design, 2nd edition, (2004), Prentice Hall.

[3] Ž. Jurić: Logički principi funkcioniranja računarskih sistema", (2014), PMF Sarajevo.

[4] Željko Jurić, Novica Nosović: Logičke osnove digitalnih i računarskih sistema, (2012), Sarajevo.

[5] N. Nosović: "Osnove digitalnih računara", ETF Sarajevo, 2003.

[6] Dž. Hasanbegović: "Sinteza logičkih i sekvencijalnih struktura", ETF Sarajevo, 1979.

STUDENT WORKLOAD (hours in a semester)

Lectures	45	Exercises	45	Individual work	35	T o t a l	125

GRADING	**REMARKS**

Criterion	Maximum points	Minimum points
Midterm exams	45	25
Assignment	10	5
Final exam	45	25
T o t a l	100	55