Course Name : Logical circuits

Course Code	Course Type	Regular Semester	Lecture (hours/week)	Seminar (hours/week)	Lab. (hours/week)	Credits	ECTS
CMP 212	B	Spring	2.00	0.00	2.00	3.00	6.00

Lecturer	Artur Koci, PhD
Assistant	
Course language	Albanian
Course level	Bachelor
Description	Basic knowledge of logical circuits and their functionality. Numerical systems including binary, octal and hexadecimal systems, Weight codes. Analyze and build the logical circuit for encoders, decoders, multiplexer, and demultiplexer. Introduction to Boolean algebra and how this theory is used for simplifying logical functions. Concept of combinational circuits, bistable, sequential circuits
Objectives	This course aims to provide knowledge on digital systems and their uses. During this course the student is given knowledge about the different ways in which information can be digitized, processed and obtained. The course begins with a complete analysis of numerical systems and their representation in binary form, to continue with the introduction of Boolean algebra, logic gates and their analysis. We introduce the combinational circuits, design and operation, sequential circuits their function and usage.
Core Concepts	The student will learn the different numerical bases and the transformation between them. The student will know Boolean algebra and applications in logical circuits. The student will understand, design and analyze combinatorial circuits The student will understand, design and analyze sequential circuits

Course Outline

Week	Topic
1	Numerical systems. Decimal - binary transformation and vice versa.
2	Octal and hexadecimal system. Binary-octal transformations, binary-hexadecimal transformation and vice versa
3	Arithmetic operations with binary numbers
4	Codes
5	Boolean algebra
6	Logic Circuits. Introduction to combinational circuits
7	Mid-term
8	Combinatorial circuits: Logical gates and their use and the truth tables. Application of logic gates in the design of Combinatorial circuits
9	Encoders and Decoders and their applications. Code converters
10	Multiplexer and its application
11	Introduction to sequential circuits
12	Flip-flops and their design. SR Flip-flop, JK and D flip-flop . Truth tables
13	Registers: Design and their applications
14	Registers: Design and their applications

15	Sequential synchronous circuits, their analysis.
16	Final Exam

Prerequisites	The student must attend the course at a minimum rate of 75%.
Literature	• Elektronika Digjitale dhe Mikroprocesorët -Jani Servini Zhaneta Servini
References	• Digital design :An introduction to the verilog hdl / M. Morris Mano, Michael D. Ciletti

Course Outcome

1	The student will demonstrate an understanding theory, logic, switching circuits, and Boolean algebra
2	The student will demonstrate an understanding of graph theory
3	The student will demonstrate an understanding of combinational circuits
4	The student will demonstrate an understanding of Sequential circuits

Course Evaluation

In-term Studies	Quantity	Percentage
Midterms	1	20
Quizzes	0	0
Projects	1	10
Term Projects	0	0
Laboratory	0	0
Class Participation	1	10
Total in-term evaluation percent		**40**
Final exam percent		**60**
Total		**100**

ECTS Workload (Based on Student Workload)

Activities	Quantity	Duration (hours)	Total (hours)
Course duration (Including the exam week: 16x Total hours of the course)	16	4	64
Study hours outside the classroom (Preparation, Practice, etc.)	14	4	56
Duties	1	0	0
Midterms	1	8	8
Final Exam	1	10	10
Other	1	10	10
Total Work Load			**148**
Total Work Load / 25 (hours)			**5.92**
ECTS			**6.00**