

## ELEC1411 COURSE CATALOG INFO

Course Code : ELEC1411				Course Name : Logic Design			
Semester	Lecture (Le+T+L)	Local Credit	ECTS	Language	Category	Instructional Methods	Prerequisites
1	(3+1+0)	3	5	English	Core	Lecture	-
<b>Course Content</b>	Number systems. Boolean algebra. Logic circuits and simplification of the circuit. Logic design with gates. MSI and LSI technologies. Combinatorial circuits. Sequential circuits. Counters. Arithmetic logic, memory and control units.						
<b>Course Outcomes</b>	<b>CO1.</b> Describe numbers and perform arithmetic operations. <b>CO2.</b> Minimize the Boolean expressions using Boolean algebra and design it using logic gates. <b>CO3.</b> Analyze and design combinational circuit. <b>CO4.</b> Implement the given function using combinational circuit. <b>CO5.</b> Design and develop sequential circuits. <b>CO6.</b> Implement digital systems using programmable logic devices. <b>CO7.</b> Translate real world problems into digital logic formulations and design their logic circuits.						

### COURSE PLAN

W1	Basis of Scientific Thinking: Logic Calculus, First Order Logic, Axiomatic Systems
W2	Basis of Scientific Thinking: Logic Calculus, First Order Logic, Axiomatic Systems
W3	Boolean Algebra and Logic Gates
W4	Boolean Algebra and Logic Gates
W5	Minimization of Logic Functions with Quine – McCluskey algorithm and Karnaugh Maps
W6	Minimization of Logic Functions with Quine – McCluskey algorithm and Karnaugh Maps
W7	Design of Two-Level Circuits with Different Gates
W8	MSI / LSI / VLSI Level Implementation of Logic Functions (Binary Adder-Subtractor, Decimal Adder, Binary Multiplier)
W9	MSI / LSI / VLSI Level Implementation of Logic Functions (Binary Adder-Subtractor, Decimal Adder, Binary Multiplier)
W10	MSI / LSI / VLSI Level Implementation of Logic Functions (Cont.) (Multiplexers, Decoders, Encoders, ROM's, PLA's, and PAL's)
W11	MSI / LSI / VLSI Level Implementation of Logic Functions (Cont.) (Multiplexers, Decoders, Encoders, ROM's, PLA's, and PAL's)

W12	Sequential Logic Circuits
W13	Design of Synchronous Sequential Logic Circuits Registers and Counters
W14	Design of Synchronous Sequential Logic Circuits Registers and Counters

<b>COURSE ASSESMENT AND ECTS WORK LOAD</b>			
<b>Type of Work</b>	<b>Count</b>	<b>ECTS WORK LOAD</b>	
		<b>Time (Hour)(Including prep. time)</b>	<b>Work Load</b>
Attendance	14	3	42
Final Exam	1	15	15
Quizzes			0
Term project			0
Reports			0
Final Project			0
Seminar			0
Assignments	3	1	3
Presentation			0
Midterms	3	10	30
Project			0
Laboratory		0	0
Tutorial	14	1	14
Other(Self study, Paper reviews)	14	1.5	21
		<b>Total work load</b>	125
		<b>Total work load/25</b>	5
		<b>ECTS Credit</b>	5

## COURSE ASSESMENT AND ECTS WORK LOAD

PO	Program Outcomes	CO
1	1.1. Adequate knowledge in fundamentals of mathematics (algebra, differential equations, integrals, probability etc), science (physics, chemistry, biology etc.) and computer science (programming and simulation);	1
	1.2. ability to use theoretical and applied knowledge in these areas in complex engineering problems.	4
2	2.1. Ability to identify, formulate, and solve complex engineering problems;	2,7
	2.2. ability to select and apply proper analysis and modeling methods for this purpose.	7
3	3.1. Ability to design and integrate components of a complex system or process, as they relate to Electrical and Electronics Engineering discipline, under realistic constraints and conditions, in such a way as to meet desired requirements;	3,5,6,7
	3.2. ability to apply modern design methods.	
4	4.1. Ability to devise, select, and use techniques and tools needed for analyzing and solving complex problems encountered in engineering practice;	
	4.2. ability to employ information technologies effectively.	
5	5.1. Ability to design experiments,	
	5.2. ability to conduct experiments, gather, analyze and interpret data.	
6	6.1. Ability to work in intra-disciplinary teams;	
	6.2. ability to work in multi-disciplinary teams;	
	6.3. ability to take individual responsibilities.	
7	7.1. Ability to effectively communicate via written and oral means;	
	7.2. knowledge of at least one foreign language;	
	7.3. ability to write effective reports and comprehend written reports;	
	7.4. ability to write design and manufacturing reports	
	7.5. ability to present effectively,	
	7.6. ability to give and follow clear instructions.	
8	8.1. Recognition of the need for lifelong learning;	

	<b>8.2.</b> ability to access information, to follow developments in science and technology, and to continue to educate him/herself.	
<b>9</b>	<b>9.1.</b> Consciousness to behave according to ethical principles, and about professional and ethical responsibility;	
	<b>9.2.</b> knowledge on standards used in engineering practice.	
<b>10</b>	<b>10.1.</b> Knowledge about business life practices such as project management, risk management, and change management;	
	<b>10.2.</b> awareness in entrepreneurship, innovation;	
	<b>10.3.</b> knowledge about sustainable development.	
<b>11</b>	<b>11.1.</b> Knowledge about the global and social effects of engineering practices on health, environment, and safety, and contemporary issues of the century reflected into the field of engineering;	
	<b>11.2.</b> awareness of the legal consequences of engineering solutions.	

<b>Revision Date</b>	<b>Prepared by</b>	<b>Approved by</b>
1.9.2019, 1.6.2021	Dr.Ebru Gürsu Çimen	Prof.Dr. Ahmet Aksen