ESOGU ELECTRICAL-ELECTRONICS ENGINEERING DEPARTMENT
COURSE INFORMATION FORM

Course Title	Course Code
LOGIC DESIGN	**151224559**

Semester in Program	Number of Course Hours per Week		ECTS Credit
	Theory	Practice	
4	4	0	7

Course ECTS Credit Distribution				
Basic Sciences	Engineering Sciences	Design	General Education	Social
	7			

Language of Instruction	Course Level	Course Type
English	Undergraduate	Required

Prerequisite	None
Objectives of the Course	Learning about information representation in digital form. Learning how to analyze, design, and implement the logical circuits in optimized combinational and sequential forms.
Brief Course Content	Introduction to digital systems, and information representation, Combinational Circuit Analysis and Design, Combinational Functional Blocks (Decoder, Encoder, Multiplexer, Arithmetic), Sequential Circuits Analysis and Design Sequential Functional Blocks (Registers, Counters, Shift Registers, Accumulators).

	Learning Outcomes of the Course	Contributed POs	Teaching Methods *	Assessment Methods **
1	Recognizing elements of digital systems	1c,1d,2	1,2	A,B,D
2	Getting knowledge on digital data representation	1b,1c	1,2	A,B,D
3	Being able to define combinational circuits (logic gates, decoders, encoders, etc.) and explain their functions	1,2,3	1,2	A,B,D
4	Being able to analyze and design combinational circuits	1,2,3,4,5	1,2	A,B,D
5	Being able to define storage elements (latches and flip-flops) and their functions	1b,1c,1d,3,4	1,2	A,B,D
6	Being able to analyze and design sequential circuits.	1,2,3,4,5	1,2	A,B,D
7	Having a background on sequential functional blocks and their usage in controller and datapath structures.	1,2,3,4,5	1,2	A,B,D
8	Having brief, and introductory level knowledge on programmable logic devices and HDL CAD tools.	1d,2,3,4	1,2,3,4,8	A,B,D

*Teaching Methods 1:Lecture, 2:Discussion, 3:Experiment, 4:Simulation, 5:Question-Answer, 6:Tutorial, 7:Observation, 8:Case Study, 9:Technical Visit, 10:Problem Solving, 11:Induvidual Work, 12:Team/Group Work, 13:Brain Storm, 14:Project Design / Management, 15:Report Preparation and/or Presentation
**Assessment Methods A:Exam, B:Quiz, C:Oral Exam, D:Homework, E:Report, F:Article Examination, G:Presentation, I:Experimental Skill, J:Project Observation, K:Class Attendance; L:Jury Exam

Main Textbook	Logic and Computer Design Fundamentals, M.Mano and R.Kime, Prentice Hall, 2004, 4th edition
Supplementary Resources	Digital Design Principles and Practice, J.F. Wakerly, Prentice Hall 2001. Digital Design, M. Mano, Prentice Hall 2002.
Necessary Course Material	Downloaded and pre-printed slides.

Course Weekly Schedule	
1	Digital Computers and Information representation
2	Logic Functions, Boolean Algebra and Karnough Maps
3	Logic IC Circuits and Combinational Logic Design
4	Combinational Logic Functions and Circuits
5	Combinational Logic Implementations
6	Arithmetic Functions and Circuits
7	Programmable Implementation Technologies.
8	Mid-Term Exams
9	Combinational Circuits and HDL
10	Sequential Circuits, Latches and Flip-Flops
11	Sequential Circuit Analysis
12	Sequential Circuit Design
13	Sequential Functional Blocks ,Cellular Design of General Purpose Registers incl.Counters
14	Sequential Datapath and Controller Structures
15	Programmable Sequential Circuit Structures
16,17	Final Exams

Calculation of Course Workload			
Activities	**Count**	**Time (Hour)**	**Total Workload (Hour)**
Weekly classroom time	14	4	56
Weekly study time (review, reinforcing, preparation)	14	8	84
Homework			
Taking a quiz	2	1	2
Studying for a quiz	2	12	24
Oral exam			
Studying for an oral exam			
Report writing (Preparation and presentation time included)			
Project (Preparation and presentation time included)			
Presentation (Preparation time included)			
Mid-Term Exam	1	2	2
Studying for Mid-Term Exam	1	20	20
Final Exam	1	2	2
Studying for Final Exam	1	20	20
Total workload			**210**
Total workload / 30			**7.0**
Course ECTS Credit			**7**

Assessment	
Activity Type	**%**
Mid-term	40
Quiz	20
Final Exam	40
Total	100

NO	PROGRAM OUTCOMES		Contribution
COURSE CONTRIBUTION TO THE PROGRAM OUTCOMES (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)			
1	a.	Sufficient knowledge of mathematics	1
	b.	Sufficient knowledge of basic sciences	1
	c.	Sufficient basic engineering and Electrical-Electronics engineering knowledge	4
	d.	Skill of applying all these knowledge and experience to complicated Electrical-Electronics engineering problems	4
2	Skill of defining, identifying, formulating and solving the complicated problems in Electrical-Electronics engineering and related areas by applying appropriate analysis and modelling methods.		4
3	Skill of designing a complicated process, system, equipment or product by applying modern design methods under realistic constraints and conditions.		4
4	To analyze and solve the complicated engineering problems: a. skill of developing, selecting and applying the required techniques and devices		4
	b.	skill of using information technologies effectively	1
5	To study the complicated Electrical-Electronics engineering problems and research subjects: a. skill of experimental design		1
	b.	skill of performing the experiments, collecting the data and analyzing and interpreting the results	4
6	a.	Skill of performing individual studies	
	b.	Skill of performing intra and interdisciplinary and multidisciplinary teamwork and studies	
7	a.	Skill of effective oral and writing communication in Turkish	
	b.	Skill of improving and using foreign language knowledge	
	c.	Skill of effective reporting, understanding the reports and preparing the design and production reports	
	d.	Skill of effective presentation and giving and getting clear and understandable instructions.	
8	Awareness of the necessity of life-long learning and skill of accessing to information and following the improvements in contemporary science and technology		
9	a.	Awareness of necessity of behaving in accordance with the ethical principles and awareness of the importance of having professional ethical responsibilities	
	b.	Knowledge about legal regulations and standards of engineering	
10	a.	Knowledge about project management, risk management and change management	
	b.	Awareness of the significance of entrepreneurship and innovation	
	c.	Knowledge about sustainable development	
11	Knowledge about the effects of engineering applications and practices on the global and social health, ecology and safety, knowledge about the current problems in relation to the working areas of Electrical-Electronics engineering; and awareness of the legal issues resulting from engineering solutions		
12	Knowledge about modern problems in local and universal scale		

INSTRUCTORS				
Prepared by	Gökhan DINDIŞ			

Date: 18.07.2024