



# ESOGÜ Electrical-Electronics Engineering Department

**COURSE CODE:** 151228547-151248547 **COURSE TITLE:** PLC Automation Systems

Semester	Weekly Hours		COURSE				
	Theoretical	Practical	Credits	ECTS	Type	Language	
8	3	2	4	7	Compulsory ( ) Elective ( x )	Turkish ( ) English ( x )	
Write the credit (for non-credit courses weekly hours) below (If necessary distribute the credits.).							
<b>Math and Basic Science</b>		<b>Electrical Engineering</b> [mark (√) if there is high design content]		<b>General Education</b>	<b>Humanities</b>		
4		(√)					
<b>Assessment</b>		<b>THEORETICAL-PRACTICAL COURSES</b>			<b>LABORATORY COURSES</b>		
		<b>Type</b>	<b>Number</b>	<b>%</b>	<b>Activity Type</b>	<b>Number</b>	<b>%</b>
<b>Midterm</b>		Midterm	1	25	Quiz		
		Quiz	2	20	Lab performance		
		Homework			Report		
		Project	1	20	Oral exam		
		Other (.....)			Other (.....)		
<b>Final</b>			1	35			
<b>Makeup exam (Oral/Written)</b>		Written					
<b>Prerequisites</b>		none					
<b>Brief content of the course</b>		Introduction to PLC and PLC components. S7-1200 PLC and its features. Input-Output devices. Step-7 TIA Portal software development tool. Software development with LAD and STL. PLC instruction set and applications. Analog input and output. Open- and closed-loop control.					
<b>Objectives of the course</b>		The aim of the course is to introduce the architecture of PLCs that are used in various control applications and their fundamental components; and to teach the development of open/closed loop controls using S7-1200 PLCs.					
<b>Contribution of the course towards professional education</b>		Students learn the use of PLC and other devices in control systems. They also learn the input/output devices appeared in the PLC-based systems.					
<b>Outcomes of the course</b>		A student 1. Knows PLC architecture and its components. 2. Knows the features of sensors and actuators. 3. Can make a project development in LAD and STL. 4. Can develop a control application using S7-1200 PLC.					
<b>Textbook of the course</b>		“Automating Manufacturing Systems with PLCs”, Hugh Jack, version 5.1, March 21, 2008.					
<b>Other reference books</b>		“SIMATIC, S7-1200 Programmable controller, System Manual”, Siemens AG, 2012.					
<b>Required material for the course</b>		Siemens S7-1200 PLC Siemens HMI Panel					

WEEKLY PLAN OF THE COURSE	
Week	Topics
1	What is a PLC? PLC components.
2	Introduction to Siemens S7-1200 PLC.
3	Ladder Logic and Statement List, Scan Cycle.
4	S7-1200 Basic functions: Logic Stack, Boolean Contact instructions.
5	Jump and Subroutine instructions.
6	Timers and Counters.
7	Arithmetic and Data Move functions.
8	Midterm
9	Midterm
10	Special PLC instructions: Shift, Table, Find, and Conversion.
11	High Speed functions: Outputs and Counters.
12	Open Loop and Closed Loop control.
13	Advanced PLC functions.
14	PLC Applications.
15,16	Final

NO	OUTCOMES OF THE PROGRAMME	4	3	2	1
1	Adequate knowledge of mathematics, science and Electrical and Electronic Engineering; ability to practice theoretical and practical knowledge of these areas into modeling and solving complex problems of Electrical and Electronic Engineering				X
2	Ability to identify complex engineering problems in Electrical and Electronic Engineering and related fields, for this purpose having skills to formulate, select and apply appropriate methods.	X			
3	Having skills to apply modern design methods to design a complex system, process, equipment or product that should work under realistic conditions and constraints and satisfy specific requirements concerning the Electrical and Electronic Engineering.		X		
4	Having skills to develop, select and apply modern techniques and tools needed to analyze and solve complex applications in Electrical and Electronic Engineering, skills to use information technology effectively.				X
5	Skills to design and conduct tests, collect data, analyze results, and interpret data for the experimental investigation of complex problems in Electrical and Electronic Engineering				X
6	Ability to function effectively as an individual and as a member of teams within the discipline and in multidiscipline areas.				X
7	Communicating effectively in oral and written form both in Turkish and English. Effective report writing and understanding written reports, preparing design and manufacturing reports, making effective presentations, skills to give and receive clear and concise instructions.				X
8	Awareness of the necessity of lifelong learning, access to information, monitoring developments in science and technology and the ability to self-renewing				X
9	Understanding of professional and ethical responsibility				X
10	Information on project management, change management and risk management practices, awareness on entrepreneurship and innovation, knowledge on sustainable development.				X
11	Information about universal and societal effects of engineering applications on health, safety and environment; awareness of the legal consequences of engineering solutions.				X

Scale for assessing the contribution of the course to the program outcomes:

4: High                      3: Medium                      2: Low                      1:None

Name of Instructor(s):

Signature(s):

Date: 03/08/2016