PRORAMMABLE LOGIC CONTROLLERS

1	Course Title:	PRORAMMABLE LOGIC CONTROLLERS	
2	Course Code:	EMEZ202	
3	Type of Course:	Compulsory	
4	Level of Course:	Short Cycle	
5	Year of Study:	2	
6	Semester:	4	
7	ECTS Credits Allocated:	4.00	
8	Theoretical (hour/week):	2.00	
9	Practice (hour/week):	0.00	
10	Laboratory (hour/week):	2	
11	Prerequisites:	None	
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Öğr. Gör. Dr. HASAN BAYAZİT	
15	Course Lecturers:	Öğr.Gör. Ömer Eriş Öğr.Gör. Özcan Temel Öğr.Gör. Hasan Bayazit	
16	Contact information of the Course Coordinator:	hashan@uludag.edu.tr Tel: 2942345 Adres: U.Ü Teknik Bilimler MYO Görükle	
17	Website:		
18	Objective of the Course:	To do PLC programming with ladder diagram and function blocks. To gain knowledge and skills in control applications.	
19	Contribution of the Course to Professional Development:	To teach essentials of pragrammable logic controllers and its applications.	
20	Learning Outcomes:		
		1	Ability to explain basic technology of PLC.
		2	Ability to do PLC input-output connection
		3	Ability to use PLC interface program.
		4	Ability to write PLC program using ladder diagram.
		5	Ability to write PLC program using other methods (FBD, STL).
		6	Ability to use and programming the Touch panel.
		7	Ability to control with PLC by setting up circuit
		8	Ability to use PLC on hydraulic and pneumatic systems and to make motor control with PLC.
		9	
		10	
21	Course Content:		

Course Content:

Week	Theoretical	Practice
1	Basic Technology of PLC 1. History of PLC 2. Structure of PLC 3. Difference between relay and PLC	1.Connecting input units to PLC 2.Connecting output units to PLC

2	PLC UNITS 1. Numerical data concept 1.1. Data system 1.2. 16 and 32-bit data management 2. Devices used with PLC 2.1. Word device 2.2. Bit device 2.3. Data transportation 2.4. Moving by changing of data codes 2.5. Increase / decrease 2.6. Comparison 2.7. Adding and removing 2.8. Multiplication and Division	1.Commisioning by connecting input units to PLC. 2. Commisioning by connecting output units to PLC.
3	PLC Interface program 1. Establishment of PLC interface program 1.1. Establishment of PLC interface program 1.2. Establishing a connection with PLC from interface program 2. Using of PLC interface program 2.1. Interface program toolbars 2.2. Interface program menus	1.Using PLC interface program
4	PLC Programming 1. Writing PLC program using ladder diagram 2.Time control commands 2.1. Timer operations 2.2. To determine pre value indirectly 2.3. Example of timer circuit 3. Counter function	1.To design PLC program using ladder diagram. 2.To make PLC program using time control commands. 3.To make PLC program using counter functions.
5	Sequential function blocks 1. Sequential function blocks (SFC) 1.2 Condition expressions.	. Using the function blocks 2. Connecting function blocks with conditions 1. To write single branched program with blocks. 2. To develop multi-branched program using sequential function blocks.
6	Touch Panels 1. What is the touch panel ? 3.1. Panel design 3.4. Layers in the panel	2. Connecting touch panels to computer. 2. To design touch panel 3. Sending program to the touch
8	Midterm Exam	
9	Panel Programming 1. Connection PLC with touch panel 1.1. PLC program for panel 1.2. Connection PLC with panel 1.3. Control of assistant relay on PLC program by panel 1.4. Monitoring and changing of PLC recorders on panel	1. Making PLC program suitable with touch panel 2. Working together PLC and touch panel

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	2.00	28.00
Practicals/Labs	14	2.00	28.00
Self study and preperation	14	2.00	28.00
Homeworks	0	0.00	0.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm Exams	1	16.00	16.00
Others	0	0.00	0.00
Final Exams	1	20.00	20.00
Total Work Load			120.00
Total work load / 30 hr			4.00
ECTS Credit of the Course			4.00

10	Panel Programming 1. Connection PLC with touch panel 1.1. PLC program for panel 1.2. Connection PLC with panel 1.3. Control of assistant relay on PLC program by panel 1.4. Monitoring and changing of PLC recorders on panel	1. Making PLC program suitable with touch panel 2. Working together PLC and touch panel
11	Pneumatic systems 1. Pneumatic circuit elements 1.1. Types 1.2. Operation principles 1.3. Areas of application 2.Peripheral units of PLC and pneumatic 2.1. Connection units 2.2. Operation features 2.3. Failure and maintenance operations	To control Pneumatic systems using PLC
12	Pneumatic systems 1. Pneumatic circuit elements 1.1. Types 1.2. Operation principles 1.3. Areas of application 2.Peripheral units of PLC and pneumatic 2.1. Connection units 2.2. Operation features 2.3. Failure and maintenance operations	To control Pneumatic systems using PLC
13	Electro-hydraulic circuits 1. Hydraulic circuit elements 1.1. Description 1.2. Types 1.3. Operation principles 1.4. Failure and maintenance operations 2. PLC-Hydraulic circuit relations 3. PC-PLC-Elektrohydraulic system relations	To control Pneumatic systems using PLC
14	PLC controlled electric motors 1. Step Motors 1.1. Driven by Plc 1.2. Areas of application 2. Servo motors 2.1. Driven by Plc 2.2. Areas of application 3. Lineer motors 3.1. Driven by Plc	1. Making motor control using PLC a. Step motor control b. Servo motor control c. Lineer motor control

22	Textbooks, References and/or Other Materials:	Practical PLC Programming and operator panel configuration; Hasan Bayazıt (Ankara, 2005) Advanced Control Technics and PLC; Recep ÇETİN (Ankara, 2005) S7-200 Turkish User Manual
23	Assesment	

TERM LEARNING ACTIVITIES	**NUMBER**	**WEIGHT**
Midterm Exam	1	20.00
Quiz	0	0.00
Home work-project	1	20.00
Final Exam	1	60.00
Total	3	100.00

Contribution of Term (Year) Learning Activities to Success Grade	40.00
Contribution of Final Exam to Success Grade	60.00
Total	100.00
Measurement and Evaluation Techniques Used in the Course	Measurement and evaluation is carried out according to the priciples of Bursa uludag University Associate and Undergraduate Education Regulation.

24 ECTS / WORK LOAD TABLE

25 CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS

	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PQ9	PQ10	PQ11	PQ12	PQ13	PQ14	PQ15	PQ16
ÖK1	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0
ÖK2	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0
ÖK3	0	0	0	3	5	0	0	0	0	0	0	0	0	0	0	0
ÖK4	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0
ÖK5	0	0	0	0	5	0	0	0	0	0	2	0	0	0	0	0
ÖK6	0	0	0	0	5	0	0	0	0	0	2	0	0	0	0	0
ÖK7	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0
ÖK8	0	0	0	0	5	0	0	4	0	0	0	0	0	0	0	0

LO: Learning Objectives PQ: Program Qualifications

Contribution Level:	**1 very low**	**2 low**	**3 Medium**	**4 High**	**5 Very High**