

Universitas Negeri Surabaya Faculty of Engineering , Electrical Engineering Education Undergraduate Study Program

Document Code

SEMESTER LEARNING PLAN

Courses			CODE		Course Fa	amily	Crec	lit We	ight	SEMESTER	Compilation Date	
Programmable Logic Control			8320102136	320102136			T=2	P=0	ECTS=3.18	0	July 18, 2024	
AUTHORIZATION			SP Developer		Course Cluster Coordinator		Study Program Coordinator					
										Dr. Nur Kholis, S.T., M.T.		
Learning model		Case Studies		· · · · · · · · · · · · · · · · · · ·								
Program		PLO study prog	gram t	hat is charg	ed to the cou	urse						
Learning		Program Objec	tives ((PO)								
(PLO)		PLO-PO Matrix										
					_							
				P.O								
		PO Matrix at th	e end	of each lear	ning stage (S	Sub-PO)						
			Р	O Week								
				1 2	3 4 5	567	8	9	10	11 12	13 14	15 16
Course codes and ladder diagra				nfiguration, PLC input/output, memory types and memory addressing, basic instructions, mnemonic ms, simple automation systems, On-Off delay program simulation, automatic simulation of fast precise ers and counters, CX programmer, simulation and practicum of timer and counter based control ncept, DIFUP-DIFD simulation and practicum, industrial control systems.								
References		Main :										
Si		 David W., Pessen. 1990. Industrial automation. circuit design and componen . John Wiley & Son. Rusimamto, Puput Wanarti. 2011. Penggunaan PLC untuk motor drive. Jurusan Teknik Elektro Fakultas Teknik Unesa Anonim, Omron. 1993. Beginner's C20K, C28K, C40K, C60K, training manual . Omron Singapore PTE LTD. Anonim, Omron. 1991. Mini H-type PCs C20H, C28H, C40H, training manual . Omron Singapore PTE LTD. 										
		Supporters:										
Support lecturer	ing	Dr. Puput Wanart Muhamad Syariff										
Week- ead		nal abilities of ich learning age		Evaluation			Help Learning, Learning methods, Student Assignments, [Estimated time]		Learning materials References	Assessment Weight (%)		
((Su	(Sub-PO)		ndicator	Criteria & F		line(line)	0	nline	(online)	1	
(1)		(2)		(3)	(4)	(5)			(6)	(7)	(8)

1	Students can explain the history of the development of control systems, PLC hardware, software, PLC configuration	 Explore examples of control systems Understand the definition and concept of open and closed loop systems. Identify PLC software 	Lectures, discussions and questions and answers 3 X 50		0%
2	Students can show and explain the function of the PLC I/O system	Identify PLC I/O and its functions	Lectures, discussions, exercises 3 X 50		0%
3	Students are able to understand and practice the basic instructions LD, AND, OR, OUT and END with mnemonic codes using Programming Cosole	1.Can use basic instructions in creating programs 2.Ladder- based program creation and mnemonic codes	Lectures, discussions, questions and answers, exercises and assignments 3 X 50		0%
4	Can run example programs and create simple programs using basic instructions via the console or ladder simulator	Create programs using the programming console	Lectures, discussions, questions and answers, and 3 X 50 exercises		0%
5	Can run example programs and create simple programs using basic instructions via the console or ladder simulator	Create programs using the programming console	Lectures, discussions, questions and answers, and 3 X 50 exercises		0%
6	Can run example programs and simplify series- parallel programs using basic instructions via the console.	1.Create a series ladder diagram 2.Create a parallel ladder diagram 3.Create a mixed ladder diagram	Lectures, discussions, questions and answers, and 3 X 50 exercises		0%
7	Can run example programs and simplify series- parallel programs using basic instructions via the console.	 Create a series ladder diagram Create a parallel ladder diagram Create a mixed ladder diagram 	Lectures, discussions, questions and answers, and 3 X 50 exercises		0%

8	Understand basic	 Explain the 	Lectures,		0%
	instructions, ladder diagrams, and	basic	discussions,		
	mnemonic codes,	instructions	questions		
	as well as create	LD, AND,	and		
	programs with the	AND NOT,	answers,		
	programming	OR, OR	exercises		
	console	NOT, TIM,	and		
		CNT, AND	assignments		
		LD, OR LD,	3 X 50		
		and OUT			
		using Ladder			
		Diagrams			
		and			
		Mnemonic			
		Code as the			
		basis for PLC			
		programming.			
		2.Assembling			
		PLC with PC.			
		3.Open			
		password			
		input on PC.			
		4.Clearing			
		memory on			
		PC.			
		5.Create and			
		insert			
		programs on			
		a PC.			
		6.Make a PLC			
		program to			
		turn on the			
		lights with a			
		switch in a			
		simulated			
		manner.			
<u>م</u>	I Inderstand basic	1 Eveloie the	Lectures		0%
9	Understand basic instructions, ladder	1.Explain the	Lectures,		0%
9	instructions, ladder diagrams, and	basic	discussions,		0%
9	instructions, ladder diagrams, and mnemonic codes,	basic instructions	discussions, questions		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create	basic instructions LD, AND,	discussions, questions and		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the	basic instructions LD, AND, AND NOT,	 discussions, questions and answers,		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR	 discussions, questions and answers, exercises		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM,	discussions, questions and answers, exercises and		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD,	discussions, questions and answers, exercises and		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD,	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT using Ladder	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT using Ladder Diagrams	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT using Ladder Diagrams and Mnemonic Code as the	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT using Ladder Diagrams and Mnemonic	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT using Ladder Diagrams and Mnemonic Code as the	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT using Ladder Diagrams and Mnemonic Code as the basis for PLC programming.	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT using Ladder Diagrams and Mnemonic Code as the basis for PLC programming. 2.Assembling	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT using Ladder Diagrams and Mnemonic Code as the basis for PLC programming. 2.Assembling PLC with PC.	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT using Ladder Diagrams and Mnemonic Code as the basis for PLC programming. 2.Assembling PLC with PC. 3.Open	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT using Ladder Diagrams and Mnemonic Code as the basis for PLC programming. 2.Assembling PLC with PC. 3.Open password	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT using Ladder Diagrams and Mnemonic Code as the basis for PLC programming. 2.Assembling PLC with PC. 3.Open password input on PC.	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT using Ladder Diagrams and Mnemonic Code as the basis for PLC programming. 2.Assembling PLC with PC. 3.Open password input on PC. 4.Clearing	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT using Ladder Diagrams and Mnemonic Code as the basis for PLC programming. 2.Assembling PLC with PC. 3.Open password input on PC. 4.Clearing memory on	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT using Ladder Diagrams and Mnemonic Code as the basis for PLC programming. 2.Assembling PLC with PC. 3.Open password input on PC. 4.Clearing memory on PC.	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT using Ladder Diagrams and Mnemonic Code as the basis for PLC programming. 2.Assembling PLC with PC. 3.Open password input on PC. 4.Clearing memory on PC. 5.Create and	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT using Ladder Diagrams and Mnemonic Code as the basis for PLC programming. 2.Assembling PLC with PC. 3.Open password input on PC. 4.Clearing memory on PC. 5.Create and insert	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT using Ladder Diagrams and Mnemonic Code as the basis for PLC programming. 2.Assembling PLC with PC. 3.Open password input on PC. 4.Clearing memory on PC. 5.Create and insert programs on	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT using Ladder Diagrams and Mnemonic Code as the basis for PLC programming. 2.Assembling PLC with PC. 3.Open password input on PC. 4.Clearing memory on PC. 5.Create and insert programs on a PC.	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT using Ladder Diagrams and Mnemonic Code as the basis for PLC programming. 2.Assembling PLC with PC. 3.Open password input on PC. 4.Clearing memory on PC. 5.Create and insert programs on a PC. 6.Make a PLC	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT using Ladder Diagrams and Mnemonic Code as the basis for PLC programming. 2.Assembling PLC with PC. 3.Open password input on PC. 4.Clearing memory on PC. 5.Create and insert programs on a PC. 6.Make a PLC program to	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT using Ladder Diagrams and Mnemonic Code as the basis for PLC programming. 2.Assembling PLC with PC. 3.Open password input on PC. 4.Clearing memory on PC. 5.Create and insert programs on a PC. 6.Make a PLC program to turn on the	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT using Ladder Diagrams and Mnemonic Code as the basis for PLC programming. 2.Assembling PLC with PC. 3.Open password input on PC. 4.Clearing memory on PC. 5.Create and insert programs on a PC. 6.Make a PLC program to turn on the lights with a	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT using Ladder Diagrams and Mnemonic Code as the basis for PLC programming. 2.Assembling PLC with PC. 3.Open password input on PC. 4.Clearing memory on PC. 5.Create and insert programs on a PC. 6.Make a PLC program to turn on the lights with a switch in a	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT using Ladder Diagrams and Mnemonic Code as the basis for PLC programming. 2.Assembling PLC with PC. 3.Open password input on PC. 4.Clearing memory on PC. 5.Create and insert programs on a PC. 6.Make a PLC program to turn on the lights with a	discussions, questions and answers, exercises and assignments		0%
9	instructions, ladder diagrams, and mnemonic codes, as well as create programs with the programming	basic instructions LD, AND, AND NOT, OR, OR NOT, TIM, CNT, AND LD, OR LD, and OUT using Ladder Diagrams and Mnemonic Code as the basis for PLC programming. 2.Assembling PLC with PC. 3.Open password input on PC. 4.Clearing memory on PC. 5.Create and insert programs on a PC. 6.Make a PLC program to turn on the lights with a switch in a	discussions, questions and answers, exercises and assignments		0%

10	Create a PLC	1.Create	Lectures,		0%
	program with timers and counters	programs using timers and counters. 2.Make a PLC program to turn on 2 lights with a pushbutton in a simulated manner.	discussions, questions and answers, exercises and assignments 3 X 50		
11	Implementation of a ladder diagram program into CX- Programmer	1.Can use and operate CX- Programmer 2.Can apply basic instructions to CX- Programmer	lectures, discussions and simulations 3 X 50		0%
12	Create an application circuit using a PLC to turn on the lights	Can assemble a PLC with a plant in the form of a lamp. Can create a program to turn on the lights using a timer and counter. Apply the program using the Programming Console and Cx- Programmer	Discussion and practicum 3 X 50		0%
13	Create an application circuit using a PLC to turn on the lights	Can assemble a PLC with a plant in the form of a lamp. Can create a program to turn on the lights using a timer and counter. Apply the program using the Programming Console and Cx- Programmer	Discussion and practicum 3 X 50		0%
14	Can apply DIFU and DIFD instructions	Simulating DIFU and DIFD in Cx- Programmer	Discussion and simulation 3 X 50		0%
15	Automatic bell and conveyor simulation using CX-programmer	 Able to create an automatic bell program in a simulation using Cx- programmer Able to create conveyor programs in simulation using Cx- programmer 	Discussion and simulation 3 X 50		0%
16			 		0%

Evaluation Percentage Recap: Case Study

 No
 Evaluation
 Percentage

 0%
 0%

Notes

1. Learning Outcomes of Study Program Graduates (PLO - Study Program) are the abilities possessed by each Study Program graduate which are the internalization of attitudes, mastery of knowledge and skills according to the level of their study program obtained through the learning process.

2. The PLO imposed on courses are several learning outcomes of study program graduates (CPL-Study Program) which are used for the formation/development of a course consisting of aspects of attitude, general skills, special

skills and knowledge.

- 3. **Program Objectives (PO)** are abilities that are specifically described from the PLO assigned to a course, and are specific to the study material or learning materials for that course.
- 4. **Subject Sub-PO (Sub-PO)** is a capability that is specifically described from the PO that can be measured or observed and is the final ability that is planned at each learning stage, and is specific to the learning material of the course.
- 5. **Indicators for assessing** ability in the process and student learning outcomes are specific and measurable statements that identify the ability or performance of student learning outcomes accompanied by evidence.
- 6. Assessment Criteria are benchmarks used as a measure or measure of learning achievement in assessments based on predetermined indicators. Assessment criteria are guidelines for assessors so that assessments are consistent and unbiased. Criteria can be quantitative or qualitative.
- 7. Forms of assessment: test and non-test.
- 8. Forms of learning: Lecture, Response, Tutorial, Seminar or equivalent, Practicum, Studio Practice, Workshop Practice, Field Practice, Research, Community Service and/or other equivalent forms of learning.
- 9. Learning Methods: Small Group Discussion, Role-Play & Simulation, Discovery Learning, Self-Directed Learning, Cooperative Learning, Contextual Learning, Project Based Learning, and other equivalent methods.
- 10. Learning materials are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
- 11. The assessment weight is the percentage of assessment of each sub-PO achievement whose size is proportional to the level of difficulty of achieving that sub-PO, and the total is 100%.
- 12. TM=Face to face, PT=Structured assignments, BM=Independent study.