	Universitas Negeri Surabaya Faculty of Engineering, Electrical Engineering Undergraduate Study Program	Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Industrial Electronics and Automation	2020102034		T=2	P=0	ECTS=3.18	6	July 18, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	Dr. Lusia Rakhmawati, S.T., M.T.

Learning model	**Project Based Learning**
Program Learning Outcomes (PLO)	**PLO study program that is charged to the course**
	Program Objectives (PO)
	PLO-PO Matrix

	P.O

PO Matrix at the end of each learning stage (Sub-PO)

P.O	Week															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Short Course Description	Able to master theoretical concepts, science and engineering principles to gain a thorough understanding of the basic principles of control through logical, critical, systematic and innovative thinking by internalizing academic values, norms and ethics.
References	**Main :**

1. Bolton, W. 2006. Programmable Logic Controllers 4th edition. Boston: Elsevier Newnes
2. Duning, G. 2002. Introduction to Programmable Logic Controllers 2nd edition. Newyork: Delmar Thomson Learning
3. Hackworth, J, et al., 2004. Programmable Logic Controllers: Programming Methods and Applications 1st edition. New Jersey: Prentice Hall, Inc.
4. Jack, H. 2005. Automating Manufacturing System with PLCs. GNU/GPL
5. Jack, H. 2007. Automating Manufacturing System with PLC. GNU Free Documentation License Version 1.2
6. Love, J. 2007. Process Automation Handbook: A Guide to Theory and Practice. London: Springer-Verlag London Limited
7. Rehg, J., et al. 2007. Programmable Logic Controllers 1st edition. New Jersey: Prentice Hall, Inc

Supporters:

Supporting lecturer	Dr. Nur Kholis, S.T., M.T. L. Endah Cahya Ningrum, S.Pd., M.Pd.

Week-	Final abilities of each learning stage (Sub-PO)	Evaluation		Help Learning, Learning methods, Student Assignments, [Estimated time]		Learning materials [References]	Assessment Weight (%)
		Indicator	Criteria & Form	Offline (*offline*)	Online (*online*)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Students understand the various automation tools used in industry	Students can describe the various automation tools used in industry	**Criteria:** The correct answer has the maximum score	Approach: ContextualMethod: Direct learningStrategy: Expository 2 X 50			0%

2	Students understand about Programmable Logic Controller (PLC)	Students can explain about Programmable Logic Controller (PLC)	**Criteria:** The correct answer has the maximum score	Approach: Constructivism Method: Interactive learning Strategy: Inquiry 2 X 50			0%
3	Students can analyze the characteristics of PLC types CPM1A and CPM2A	Students can analyze the characteristics of PLC types CPM1A and CPM2A	**Criteria:** The correct answer has the maximum score	Approach: Constructivism Method: Interactive learning Strategy: Inquiry 2 X 50			0%
4	Students can analyze the characteristics of PLC types CP1E and CP1L	Students can analyze the characteristics of PLC types CP1E and CP1L	**Criteria:** The correct answer has the maximum score	Approach: Constructivism Method: Interactive learning Strategy: Inquiry 2 X 50			0%
5	Students can carry out an analysis of the characteristics of the CP1H type PLC	Students can analyze the characteristics of the CP1H type PLC	**Criteria:** The correct answer has the maximum score	Approach: Constructivism Method: Interactive learning Strategy: Inquiry 2 X 50			0%
6	Students can create a CP1L input/output addressing table in the Start-Stop Lamp with Lock application using CX Programmer	Students can determine the CP1L input/output address in the Start-Stop Lamp with Lock application using CX Programmer	**Criteria:** The correct answer has the maximum score	Approach: Inductive Method: Interactive learning Strategy: Inquiry 2 X 50			0%
7	Students understand about CX Programmer	Students can explain about CX Programmer	**Criteria:** The correct answer has the maximum score	Approach: ConstructivismMethod: Interactive learningStrategy: Inquiry(Online) 2 X 50			0%
8	UTS			2 X 50			0%
9	Students can apply Ladder Diagrams using CX Programmer	Students can determine the logic in a Ladder Diagram using CX Programmer	**Criteria:** The correct answer has the maximum score	Approach: Inductive Method: Interactive learning Strategy: Inquiry (Online) 2 X 50			0%
10	Students can apply the instructions on the CX Programmer	Students can apply the instructions on the CX Programmer	**Criteria:** The correct answer has the maximum score	Approach: Inductive Method: Interactive learning Strategy: Inquiry (Online) 2 X 50			0%
11	Students can apply the instructions on the CX Programmer	Students can apply the instructions on the CX Programmer	**Criteria:** The correct answer has the maximum score	Approach: Inductive Method: Interactive learning Strategy: Inquiry (Online) 2 X 50			0%
12	Students are able to analyze and develop Quiz Bell and Running Light applications on the CX Programmer.	Students can analyze and develop Quiz Bell and Running Light applications on CX Programmer	**Criteria:** The correct answer has the maximum score	Approach: ConstructivismMethod: Interactive learningStrategy: Inquiry(Online) 2 X 50			0%
13	Students are able to analyze and develop Safety Crane and Automatic Garage Door applications on CX Programmer.	Students can analyze and develop Safety Crane and Automatic Garage Door applications on CX Programmer	**Criteria:** The correct answer has the maximum score	Approach: ConstructivismMethod: Interactive learningStrategy: Inquiry(Online) 2 X 50			0%
14	Students are able to analyze and develop Conveyor applications on CX Programmer.	Students can analyze and develop Conveyor applications on CX Programmer	**Criteria:** The correct answer has the maximum score	Approach: ConstructivismMethod: Interactive learningStrategy: Inquiry(Online) 2 X 50			0%

15	Students are able to analyze and develop traffic light applications on CX Programmer.	Students can analyze and develop traffic light applications on CX Programmer	**Criteria:** The correct answer has the maximum score	Approach: ConstructivismMethod: Interactive learningStrategy: Inquiry(Online) 2 X 50			0%
16	UAS			2 X 50			0%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
		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, Collaborative 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.