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

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Control/Control System	2120102137		T=2	P=0	ECTS=3.18	4	July 16, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	Agung Prijo Budijono, S.T., M.T.	Ir. Priyo Heru Adiwibowo, S.T., M.T.

Learning model	**Case Studies**	
Program Learning Outcomes (PLO)	**PLO study program that is charged to the course**	
	PLO-5	Work independently and in groups
	PLO-7	Problem analysis
	PLO-11	Design and development of solutions that take into account the environment and sustainability
	PLO-14	Science and engineering knowledge
	Program Objectives (PO)	
	PO - 1	Design and implement control/control systems in industrial equipment to support production processes
	PLO-PO Matrix	

P.O	PLO-5	PLO-7	PLO-11	PLO-14
PO-1				

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
PO-1																

Short Course Description	This course provides an understanding of the design and implementation of open/closed loop control systems, the function and application of various types of sensors, basic logic gates, relay control theory and practice.
References	**Main :**

1. [1] Bolton, W. 2006. Sistem Instrumentasi dan Sistem Kontrol. Penerbit Erlangga: Jakarta

Supporters:

1. [2] Dunn, William C. 2005. Fundamentals of Industrial Istrumentation and Process Control. USA: Mc Graw-Hill Companies, Inc.
2. [3] Groover, Mikell P., 2001. Automation, Production Systems dan Computer Integrated Manufacturing, Second Edition, Prentice-Hall Inc., New Jersey USA.
3. [4] Johnson, C.D. 2003. Process Control Instrumentation Technology, Seventh Edition. USA: Prentice Hall Inc., New Jersey.

Supporting lecturer	Agung Prijo Budijono, S.T., M.T. Ir. Wahyu Dwi Kurniawan, 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	AStudents are able to understand open loop and close loop control systems;	Designing a block diagram of a control system	**Criteria:** 1.Read documents about instrumentation and control concepts 2.Designing a control system block diagram 3.Explore examples of open and closed loop control systems.	Lectures, discussions, questions and answers, exercises and assignments 6 X 50			0%
2	Students are able to describe control systems through case study examples						0%
3	Students are able to identify various types of sensors and their applications	Describe the functions and applications of 5 types of sensors	**Criteria:** 1.Read various documents about types of sensors. 2.Discuss to identify the applications of different types of sensors. 3.Have a discussion to determine the type of sensor needed	Lectures, discussions, questions and answers, exercises and assignments 6 X 50			0%
4							0%
5							0%
6	Students are able to understand relay control and its applications	understand relay control and its applications	**Criteria:** 1.Compliance with the answer key 2.Activeness during PBM	Lectures, discussions, questions and answers, exercises and assignments 4 X 50			0%
7							0%
8	Sub summative exam	Sub summative exam	**Criteria:** 1.Compliance with the answer key 2.Activeness during PBM	Sub summative exam 2 X 50			0%
9	Students are able to describe basic logic gates	Describe the different working principles of basic logic gates	**Criteria:** 1.Compliance with the answer key 2.Activeness during PBM	Lectures, discussions, questions and answers, exercises and assignments 2 X 50			0%
10	Students are able to apply Boolean algebra	Formulate logical equations according to Boolean algebra	**Criteria:** 1.Compliance with the answer key 2.Activeness during PBM	Lectures, discussions, questions and answers, exercises and assignments 2 X 50			0%
11	Students are able to design and demonstrate DOL circuits	Design and demonstrate DOL circuits	**Criteria:** 1.Compliance with the answer key 2.Activeness during PBM	Practice 2 X 50			0%

12	Students are able to design and demonstrate a 2-place control circuit	Students are able to design and demonstrate a 2-place control circuit	**Criteria:** Compliance with SOP and Answer Key	Practice PBM 3 X 50			0%
13	Students are able to design and demonstrate interlock, alternating, automatic sequential control circuits, automatic garage doors and automatic saw machines	Able to design and demonstrate interlock, alternating, automatic sequential control circuits, automatic garage doors and automatic saw machines	**Criteria:** 1.Compliance with the answer key 2.Compliance with SOP	PBMPracticum Assignment 9 X 50			0%
14	Students are able to design and demonstrate interlock, alternating, automatic sequential control circuits, automatic garage doors and automatic saw machines	Able to design and demonstrate interlock, alternating, automatic sequential control circuits, automatic garage doors and automatic saw machines	**Criteria:** 1.Compliance with the answer key 2.Compliance with SOP	PBMPracticum Assignment 9 X 50			0%
15	Students are able to design and demonstrate interlock, alternating, automatic sequential control circuits, automatic garage doors and automatic saw machines	Able to design and demonstrate interlock, alternating, automatic sequential control circuits, automatic garage doors and automatic saw machines	**Criteria:** 1.Compliance with the answer key 2.Compliance with SOP	PBMPracticum Assignment 9 X 50			0%
16							0%

Evaluation Percentage Recap: Case Study

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.