	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
Semiconductors and Integrated Circuits	2020102176		**T=2**	**P=0**	**ECTS=3.18**	5	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	Understand the different types of sensors and their measurements. Understand about actuators, especially DC motors. Able to condition signals that will be used in sensor and actuator applications. Understand and be able to apply/design sensors and actuators in a device. This course will be presented in theory and simulation.
References	**Main :**
	1. Andrzej M. Pawlak. 2006. Sensors and Actuators in Mechatronics, Design and Applications. US: Talyor and Francis Group 2. Nathan Ida. 2014 Sensors, Actuators, and Their Interfaces. UK: Scitech publishing.
	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	Can classify sensors and actuators.	Explain the types of sensors and actuators.		Model: Cooperative learning Method: Discussion Scientific Approach: - Observing Listening to the lecturer‘s explanation regarding types of sensors and actuators - Asking questions Discussing solutions to problems - Exploring Making observation reports regarding types of sensors and actuators - Associating Analyzing observation results - Communicating Discussing observation results. 2 X 50			0%
2	Can classify and understand temperature sensors and temperature actuators	Explain and understand the types of temperature sensors and temperature actuators		Model: Cooperative learning Method: Discussion Scientific Approach: - Observing Listening to the lecturer‘s explanation regarding types of temperature sensors and temperature actuators - Asking questions Discussing solutions to problems - Exploring Making observation reports regarding types of temperature sensors and temperature actuators - Associating Analyzing observation results - Communicating Discuss the results of the 2 X 50 observations			0%

3	Can classify and understand temperature sensors and temperature actuators	Explain and understand the types of temperature sensors and temperature actuators		Model: Cooperative learning Method: Discussion Scientific Approach: - Observing Listening to the lecturer's explanation regarding types of temperature sensors and temperature actuators - Asking questions Discussing solutions to problems - Exploring Making observation reports regarding types of temperature sensors and temperature actuators - Associating Analyzing observation results - Communicating Discuss the results of the 2 X 50 observations			0%
4	Can explain the 13 types of optical sensors	Explain the types of optical sensors		Model: Cooperative learning Method: Discussion Scientific Approach: - Observing Listening to the lecturer's explanation regarding types of optical sensors - Asking questions Discussing solutions to problems - Exploring Making observation reports regarding types of optical sensors - Associating Analyzing observation results - Communicating Discussing observation results 2 X 50			0%

5	Can explain the 13 types of optical sensors	Explain the types of optical sensors		Model: Cooperative learning Method: Discussion Scientific Approach: - Observing Listening to the lecturer's explanation regarding types of optical sensors - Asking questions Discussing solutions to problems - Exploring Making observation reports regarding types of optical sensors - Associating Analyzing observation results - Communicating Discussing observation results 2 X 50			0%
6				2 X 50			0%
7				2 X 50			0%
8				2 X 50			0%
9				2 X 50			0%
10				2 X 50			0%
11				2 X 50			0%
12				2 X 50			0%
13				2 X 50			0%
14				2 X 50			0%
15				2 X 50			0%
16				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.