	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
Digital Circuit Practicum	2020101139	Compulsory Study Program Subjects	T=1	P=0	ECTS=1.59	4	July 17, 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 which is charged to the course

Program Objectives (PO)

PO - 1	Students have knowledge of the basic concepts of digital engineering
PO - 2	Students have knowledge of logic gates, Boolean algebra and combinational circuits
PO - 3	Students have knowledge of flip flops, counters, registers, and sequential circuits

PLO-PO Matrix

P.O
PO-1
PO-2
PO-3

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																
PO-2																
PO-3																

Short Course Description	Practicing basic digital techniques, logic gates, Flip-Flops, Boolean Algebra, designing combinatorial circuits, sequential circuits, counters and registers, as well as their applications in everyday life.

References

Main :

1. Barmawi, 1991. Rangkaian dan Sistem Analog dan Digital. Jakarta: Erlangga
2. Leach, Donald. 1997. Digital Principles and Applications . Fifth Edition. New York: McGraw-Hill
3. Nur, Mohamad. 1977. Sistem Digital: Prinsip dan Pemakaian . Surabaya: Unipress IKIP Surabaya

Supporters:

1. Tocci, Ronald J. & Widmer, Neal S. & Moss, Gregory L. 2011. Digital Systems: Principles and Application . New Jersey: Prentice-Hall.

Supporting lecturer	Dr. Meini Sondang Sumbawati, M.Pd. Miftahur Rohman, S.T., M.T. Sayyidul Aulia Alamsyah, S.T., M.T.

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	Analyze the properties of logic gates	1.Describe the properties of logic gates (logic gates) 2.Simplifying logic circuits with Boolean algebra 3.Assembling logic circuits	**Criteria:** Able to complete assigned tasks in a timely manner	Experiments, group discussions and reflections 2 X 50	Experiment, group discussion, and reflection 2x50		5%
2	Analyze the properties of logic gates	1.Describe the properties of logic gates (logic gates) 2.Simplifying logic circuits with Boolean algebra 3.Assembling logic circuits	**Criteria:** Able to complete assigned tasks in a timely manner **Form of Assessment** : Project Results Assessment / Product Assessment	Experiments, group discussions and reflections 2 X 50			5%
3	Analyze the properties of logic gates	1.Describe the properties of logic gates (logic gates) 2.Simplifying logic circuits with Boolean algebra 3.Assembling logic circuits	**Criteria:** Able to complete assigned tasks in a timely manner	Experiments, group discussions and reflections 2 X 50	Experimentation, group discussion, and reflection		5%
4	Simplifying digital circuits using KMAP	1.Describes KMAP 2.Simplify logic circuits with KMAP 3.Proving the results of KMAP simplification through practice	**Criteria:** Able to complete assigned tasks in a timely manner	Experiments, group discussions and reflections 2 X 50	Experimentation, group discussion, and reflection		5%
5	Simplifying digital circuits using KMAP	1.Describes KMAP 2.Simplify logic circuits with KMAP 3.Proving the results of KMAP simplification through practice	**Criteria:** Able to complete assigned tasks in a timely manner **Form of Assessment** : Project Results Assessment / Product Assessment	Experiments, group discussions and reflections 2 X 50	Experimentation, group discussion, and reflection		5%
6	Analyzing Encoders	1.Describe the Encoder 2.Assembling the encoder 3.Create a report about the encoder	**Criteria:** Able to complete assigned tasks in a timely manner	Experiments, group discussions and reflections 1 X 50	Experimentation, group discussion, and reflection		5%
7	Analyzing Encoders	1.Describe the Encoder 2.Assembling the encoder 3.Create a report about the encoder	**Criteria:** Able to complete assigned tasks in a timely manner	Experiments, group discussions and reflections 1 X 50	Experimentation, group discussion, and reflection		5%

8	UTS	Can solve problems given in evaluation questions	**Form of Assessment** : Test	- Problem Based Learning 1 X 50	- Problem Based Learning		5%
9	Analyzing Decoders	1. Describe Decoders 2. Assembling the Decoder 3. Create a report about Decoder	**Criteria:** Able to complete assigned tasks in a timely manner	Experiment, group discussion 1 X 50	Experiments, group discussions		5%
10	Analyzing Decoders	1. Describe Decoders 2. Assembling the Decoder 3. Create a report about Decoder	**Form of Assessment** : Project Results Assessment / Product Assessment	Experiment, group discussion 1 X 50	Experiments, group discussions		5%
11	Able to assemble and analyze Flip Flop	1. Describe Flip Flop 2. Assembling Flip Flop 3. Create a report about Flip Flop	**Criteria:** Able to complete assigned tasks in a timely manner	Practice, Experiment, group discussion, and reflection 1 X 50			5%
12	Able to assemble and analyze Flip Flop	1. Describe Flip Flop 2. Assembling Flip Flop 3. Create a report about Flip Flop	**Criteria:** Able to complete assigned tasks in a timely manner	Practice, Experiment, group discussion, and reflection 1 X 50	Practice, Experiment, group discussion, and reflection		5%
13	Able to assemble and analyze multiplexers	1. Describe multiplexers 2. Assembling multiplexer encoders 3. Create a report about the multiplexer	**Criteria:** Able to complete assigned tasks in a timely manner **Form of Assessment** : Participatory Activities	Experiments, group discussions and reflections 1 X 50			5%
14	Able to assemble and analyze counters	1. Describe counters 2. Assembling the counter 3. Make reports about counters	**Criteria:** Able to complete assigned tasks in a timely manner **Form of Assessment** : Participatory Activities	Experiments, group discussions and reflections 1 X 50	Experimentation, group discussion, and reflection		5%
15	Able to assemble and analyze registers	1. Describes registers 2. Assembling registers 3. Make reports about registers	**Criteria:** Able to complete assigned tasks in a timely manner **Form of Assessment** : Participatory Activities	Experiments, group discussions and reflections 1 X 50	Experimentation, group discussion, and reflection		5%
16	UAS	Can solve problems given in evaluation questions	**Criteria:** Can solve problems given in evaluation questions **Form of Assessment** : Project Results Assessment / Product Assessment	- Problem Based Learning	- Problem Based Learning		30%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	15%
2.	Project Results Assessment / Product Assessment	45%
3.	Test	5%
		65%

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.