	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 Electronics Practicum	2020101404	Compulsory Study Program Subjects	T=0	P=1	ECTS=1.59	4	February 29, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
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Learning model	**Project Based Learning**	
Program Learning Outcomes (PLO)	**PLO study program that is charged to the course**	
	PLO-7	Able to design and carry out experiments in the laboratory/field as well as analyze and interpret data to strengthen technical assessments
	PLO-11	Able to plan, complete and evaluate tasks within the constraints that exist in the field of electrical engineering
	Program Objectives (PO)	
	PO - 1	Students are able to explain and analyze the basic concepts of digital engineering
	PLO-PO Matrix	

P.O	PLO-7	PLO-11
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 uses a learning model with a case study method that applies basic digital techniques, logic gates, Flip-Flops, Boolean Algebra, combinatorial circuit design, sequential circuits, counters and registers, as well as their applications in everyday life.
References	**Main :**
	1. Tocci, Ronald J. & Widmer, Neal S. & Moss, Gregory L. 2011. Digital Systems: Principles and Application . New Jersey: Prentice-Hall.
	Supporters:
	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
Supporting lecturer	Miftahur Rohman, 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	Students can explain and analyze basic logic gates	Ability to explain and analyze basic logic gates	**Criteria:** Full marks are obtained if you do all the questions correctly **Form of Assessment** : Participatory Activities	Problem-based learning, lectures and discussions 2 X 50 minutes	Problem-based learning, lectures and discussions 2 X 50 minutes	**Material:** basic logic gates **References:** *Tocci, Ronald J. & Widmer, Neal S. & Moss, Gregory L. 2011. Digital Systems: Principles and Application. New Jersey: Prentice Hall.*	3%
2	Students can explain and analyze counter circuits	Ability to explain and analyze flip flop circuits	**Criteria:** Full marks are obtained if you do all the questions correctly **Form of Assessment** : Participatory Activities	Problem-based learning, lectures and discussions 2 X 50 minutes	Problem-based learning, lectures and discussions 2 X 50 minutes	**Material:** flip flop **Reference:** *Tocci, Ronald J. & Widmer, Neal S. & Moss, Gregory L. 2011. Digital Systems: Principles and Application. New Jersey: Prentice Hall.*	3%
3	Students can explain and analyze counter circuits	Ability to explain and analyze counter circuits	**Criteria:** Full marks are obtained if you do all the questions correctly **Form of Assessment** : Participatory Activities	Problem-based learning, lectures and discussions 2 X 50 minutes	Problem-based learning, lectures and discussions 2 X 50 minutes	**Material:** counter circuit **Bibliography:** *Tocci, Ronald J. & Widmer, Neal S. & Moss, Gregory L. 2011. Digital Systems: Principles and Application. New Jersey: Prentice Hall.*	3%
4	Students can explain and analyze the shift register circuit	Ability to explain and analyze shift register circuits	**Criteria:** Full marks are obtained if you do all the questions correctly **Form of Assessment** : Participatory Activities	Problem-based learning, lectures and discussions 2 X 50 minutes	Problem-based learning, lectures and discussions 2 X 50 minutes	**Material:** shift register series **References:** *Tocci, Ronald J. & Widmer, Neal S. & Moss, Gregory L. 2011. Digital Systems: Principles and Application. New Jersey: Prentice Hall.*	3%
5	Students can explain and analyze encoder circuits	Ability to explain and analyze encoder circuits	**Criteria:** Full marks are obtained if you do all the questions correctly **Form of Assessment** : Participatory Activities	Problem-based learning, lectures and discussions 2 X 50 minutes	Problem-based learning, lectures and discussions 2 X 50 minutes	**Material:** encoder circuit **Bibliography:** *Tocci, Ronald J. & Widmer, Neal S. & Moss, Gregory L. 2011. Digital Systems: Principles and Application. New Jersey: Prentice Hall.*	3%

6	Students can explain and analyze decoder circuits	Ability to explain and analyze decoder circuits	**Criteria:** Full marks are obtained if you do all the questions correctly **Form of Assessment** : Participatory Activities	Problem-based learning, lectures and discussions 2 X 50 minutes	Problem-based learning, lectures and discussions 2 X 50 minutes	**Material:** decoder circuit **Bibliography:** *Tocci, Ronald J. & Widmer, Neal S. & Moss, Gregory L. 2011. Digital Systems: Principles and Application. New Jersey: Prentice Hall.*	2%
7	Students can explain and analyze multiplexer circuits	Ability to explain and analyze multiplexer circuits	**Criteria:** Full marks are obtained if you do all the questions correctly **Form of Assessment** : Participatory Activities	Problem-based learning, lectures and discussions 2 X 50 minutes	Problem-based learning, lectures and discussions 2 X 50 minutes	**Material:** multiplexer circuit **Bibliography:** *Tocci, Ronald J. & Widmer, Neal S. & Moss, Gregory L. 2011. Digital Systems: Principles and Application. New Jersey: Prentice Hall.*	1%
8	Mid-term exam with material from Meeting 1 to Meeting 7	Full marks are obtained if you do all the questions correctly	**Criteria:** Full marks are obtained if you do all the questions correctly **Form of Assessment** : Test	written exam 2 X 50 minutes	written exam 2 X 50 minutes		20%
9	Students can explain and analyze the demultiplexer circuit	Ability to explain and analyze demultiplexer circuits	**Criteria:** Full marks are obtained if you do all the questions correctly **Form of Assessment** : Participatory Activities	Problem-based learning, lectures and discussions 2 X 50 minutes	Problem-based learning, lectures and discussions 2 X 50 minutes	**Material:** demultiplexer circuit **Bibliography:** *Tocci, Ronald J. & Widmer, Neal S. & Moss, Gregory L. 2011. Digital Systems: Principles and Application. New Jersey: Prentice Hall.*	2%
10	Students can apply basic logic gate circuits	Ability to implement basic logic gate circuits	**Criteria:** Full marks are obtained if you apply the circuit correctly **Form of Assessment** : Practical Assessment	Problem-based learning, lectures, practices and discussions 2 X 50 minutes	Problem-based learning, lectures, practices and discussions 2 X 50 minutes	**Material:** basic logic gate circuits **References:** *Tocci, Ronald J. & Widmer, Neal S. & Moss, Gregory L. 2011. Digital Systems: Principles and Application. New Jersey: Prentice Hall.*	5%
11	Students can apply the flip flop circuit	Ability to implement flip flop circuits	**Criteria:** Full marks are obtained if you apply the circuit correctly **Form of Assessment** : Practical Assessment	Problem-based learning, lectures, practices and discussions 2 X 50 minutes	Problem-based learning, lectures, practices and discussions 2 X 50 minutes	**Material:** flip flop circuit **Reference:** *Tocci, Ronald J. & Widmer, Neal S. & Moss, Gregory L. 2011. Digital Systems: Principles and Application. New Jersey: Prentice Hall.*	5%

12	Students can apply counter circuits	Ability to apply counter circuits	**Criteria:** Full marks are obtained if you apply the circuit correctly **Form of Assessment** : Practical Assessment	Problem-based learning, lectures, practices and discussions 2 X 50 minutes	Problem-based learning, lectures, practices and discussions 2 X 50 minutes	**Material:** counter circuit **Bibliography:** *Tocci, Ronald J. & Widmer, Neal S. & Moss, Gregory L. 2011. Digital Systems: Principles and Application. New Jersey: Prentice Hall.*	5%
13	Students can apply a series of shift registers	Ability to implement shift register circuits	**Criteria:** Full marks are obtained if you apply the circuit correctly **Form of Assessment** : Practical Assessment	Problem-based learning, lectures, practices and discussions 2 X 50 minutes	Problem-based learning, lectures, practices and discussions 2 X 50 minutes	**Material:** shift register series **References:** *Tocci, Ronald J. & Widmer, Neal S. & Moss, Gregory L. 2011. Digital Systems: Principles and Application. New Jersey: Prentice Hall.*	5%
14	Students can apply encoder and decoder circuits	Ability to implement encoder and decoder circuits	**Criteria:** Full marks are obtained if you apply the circuit correctly **Form of Assessment** : Practical Assessment	Problem-based learning, lectures, practices and discussions 2 X 50 minutes	Problem-based learning, lectures, practices and discussions 2 X 50 minutes	**Material:** encoder and decoder circuits **References:** *Tocci, Ronald J. & Widmer, Neal S. & Moss, Gregory L. 2011. Digital Systems: Principles and Application. New Jersey: Prentice Hall.*	5%
15	Students can apply multiplexer and demultiplexer circuits	Ability to implement multiplexer and demultiplexer circuits	**Criteria:** Full marks are obtained if you apply the circuit correctly **Form of Assessment** : Practical Assessment	Problem-based learning, lectures, practices and discussions 2 X 50 minutes	Problem-based learning, lectures, practices and discussions 2 X 50 minutes	**Material:** multiplexer and demultiplexer circuits **References:** *Tocci, Ronald J. & Widmer, Neal S. & Moss, Gregory L. 2011. Digital Systems: Principles and Application. New Jersey: Prentice Hall.*	5%
16	Final Semester Exam with material from Meeting 1 to Meeting 15	Full marks are obtained if you apply the circuit correctly	**Criteria:** Full marks are obtained if you apply the circuit correctly **Form of Assessment** : Test	Practice Test	Practice Test	**Material:** Practice questions **References:** *Tocci, Ronald J. & Widmer, Neal S. & Moss, Gregory L. 2011. Digital Systems: Principles and Application. New Jersey: Prentice Hall.*	30%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	20%
2.	Practical Assessment	30%
3.	Test	50%

	100%

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.