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

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Electronics	8320102250	Compulsory Study Program Subjects	T=2	P=0	ECTS=3.18	3	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	Dr. Nur Kholis, S.T., M.T.

Learning model	**Project Based Learning**	
Program Learning Outcomes (PLO)	**PLO study program that is charged to the course**	
	PLO-13	Able to design circuits, devices and products in the electrical and electronics engineering expertise program (SSC3.1).
	PLO-14	Able to become a practitioner who can apply his knowledge and skills to develop products in a comprehensive electrical engineering and electronics engineering skills program (SSC4.1)
	Program Objectives (PO)	
	PO - 1	Mastering the theoretical concepts of Diode components
	PO - 2	Mastering the theoretical concepts of transistor components
	PO - 3	Mastering the theoretical concept of transistor components as amplifiers
	PO - 4	Analyze transistor circuits using circuit models
	PLO-PO Matrix	

P.O	PLO-13	PLO-14
PO-1		
PO-2		
PO-3		
PO-4		

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																
PO-4																

Short Course Description	This course discusses the theory of intrinsic semiconductors, extrinsic p and n types and p and n connections, diodes, transistors as resistance and switches, power amplifiers, op-amps, oscillators, digital electronics, and logic circuits. Lectures are carried out with modeling, presentations, discussions and practicums.
References	**Main :**

1. Agung Nugroho, 2010. Mekatronika. Yogyakarta: Graha Ilmu.
2. Brophy. 1992. Basic Elektronic for Scientist and Engineers . Jhon Wiley.
3. Dwi Sunar, 2008. Belajar Sistem Cepat Elektronika . Yogyakarta: Absolut.
4. Schultz, Mitchel E. 2011. Grobs Basic Electronics 11th Edition. New York: McGraw Hill.
5. Thomas Sri W, 2002. Elektronika Dasar . Salemba Teknik.
6. Albert Malvino, David Bates. 2015. Electronic Principles-McGraw-Hill Education
7. Robert Boylestad. Louis Nashelsky. Electronic Devices and Circuit Theory 7th Edition. Prentice Hall

Supporters:

	1. Media software Proteus, multisim, LTSpice, dan lain-lain.
Supporting lecturer	Dr. Nur Kholis, 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	Master the theoretical concepts of electronic components	Get to know the types of electronic components,	**Criteria:** 1. 4: correct description 2. 3: the description is generally correct, there is one aspect where the explanation is incorrect 3. 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4. 1: the description is wrong **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Practice / Performance, Tests	Lectures, Discussions 3 X 50			89%
2	Mastering the concept of voltage replacement circuits	Get to know the types of electronic components and active components	**Criteria:** 1. 4: correct description 2. 3: the description is generally correct, there is one aspect where the explanation is incorrect 3. 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4. 1: the description is wrong	Discussion 3 X 50	Discussion		0%
3	Mastering the theoretical concepts of passive electronic components	Get to know the types of passive components	**Criteria:** 1. 4: correct description 2. 3: the description is generally correct, there is one aspect where the explanation is incorrect 3. 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4. 1: the description is wrong	Lectures, Discussions 3 X 50			0%

4	Mastering the concept of Logic Gates Mastering the theoretical concept of electrical semi-conductors. Able to make decisions based on information and data analysis and provide guidance in choosing alternative solutions. Responsible for informing the results of information and data analysis both orally and in writing. Able to utilize science and technology in the field of intrinsic semi-conductor theory	1. Analyzing Logic Gates 2. Get to know intrinsic semiconductors	**Criteria:** 1. 4: correct description 2. 3: the description is generally correct, there is one aspect where the explanation is incorrect 3. 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4. 1: the description is wrong	Lectures and discussions 3 X 50			0%
5	Mastering the concept of extrinsic semi-conductor theoretical Power Amplifiers. Able to make decisions based on information and data analysis and provide guidance in choosing alternative solutions. Responsible for informing the results of information and data analysis both orally and in writing. Able to utilize science and technology in the field of extrinsic semi-conductor theory	1. Analyzing Power Amplifiers/Applifiers 2. Get to know extrinsic semiconductors	**Criteria:** 1. 4: correct description 2. 3: the description is generally correct, there is one aspect where the explanation is incorrect 3. 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4. 1: the description is wrong	Lectures and discussions 3 X 50			0%
6	Mastering the concept of wave rectification. Able to make decisions based on information and data analysis and provide guidance in choosing alternative solutions. Responsible for informing the results of information and data analysis both orally and in writing. Able to utilize science and technology in the field of intrinsic, extrinsic semiconductor theory of p and n types and p and n junctions, diodes.	1. Analyzing wave rectifiers 2. Get to know p and n type semi conductors	**Criteria:** 1. 4: correct description 2. 3: the description is generally correct, there is one aspect where the explanation is incorrect 3. 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4. 1: the description is wrong	Lectures and discussions 3 X 50			0%

7	Master the theoretical concepts of p and n connections in depth. Able to make decisions based on information and data analysis and provide guidance in choosing alternative solutions. Responsible for informing the results of information and data analysis both orally and in writing. Able to utilize science and technology in the field of theory of intrinsic, extrinsic semiconductors of p and n types and p and n junctions, diodes.	1. Analyzing p and n connections, 2. Understand how diodes work 3. Understand the use of diodes in electronic circuits	**Criteria:** 1. 4: correct description 2. 3: the description is generally correct, there is one aspect where the explanation is incorrect 3. 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4. 1: the description is wrong	Lectures and discussions 3 X 50			0%
8	UTS (Mid-Semester Exam)	Answering UTS questions	**Criteria:** 1. 4: correct description 2. 3: the description is generally correct, there is one aspect where the explanation is incorrect 3. 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4. 1: the description is wrong	Written test 3 X 50			0%
9	Master the theoretical concepts of digital electronics in solving problems procedurally. Able to make decisions based on information and data analysis and provide guidance in choosing alternative solutions. Responsible for informing the results of information and data analysis both verbally and in writing. Able to utilize science and technology in the fields of power amplifier theory, digital electronics and logic circuits.	1. Describe the concept of power amplifiers and op-amps. 2. Analyzing digital electronics concepts.	**Criteria:** 1. 4: correct description 2. 3: the description is generally correct, there is one aspect where the explanation is incorrect 3. 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4. 1: the description is wrong	Demonstration, lecture, discussion and practice 3 X 50			0%

10	Master the theoretical concepts of logical circuits in depth and formulate them in solving problems procedurally. Able to make decisions based on information and data analysis and provide guidance in choosing alternative solutions. Responsible for informing the results of information and data analysis both orally and in writing. Able to utilize science and technology in the fields of power amplifier theory, digital electronics and logic circuits.	Analyze the concept of logic circuits.	**Criteria:** 1. 4: correct description 2. 3: the description is generally correct, there is one aspect where the explanation is incorrect 3. 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4. 1: the description is wrong	Demonstration, lecture, discussion and practice 3 X 50			0%
11	Master the theoretical concepts of op-amps in depth and formulate them in solving problems procedurally. Able to make decisions based on information and data analysis and provide guidance in choosing alternative solutions. Responsible for informing the results of information and data analysis both orally and in writing. Able to utilize science and technology in the fields of power amplifier theory, digital electronics and logic circuits.	Describe the concept of power amplifiers and op-amps.	**Criteria:** 1. 4: correct description 2. 3: the description is generally correct, there is one aspect where the explanation is incorrect 3. 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4. 1: the description is wrong	Demonstration, lecture, discussion and practice 3 X 50			0%
12	Master the theoretical concepts of power amplifiers, digital electronics and logic circuits in depth and formulate them in solving problems procedurally. Able to make decisions based on information and data analysis and provide guidance in choosing alternative solutions. Responsible for informing the results of information and data analysis either verbally and writing. Able to utilize science and technology in the fields of power amplifier theory, digital electronics and logic circuits.	1. Describe the concept of power amplifiers and op-amps. 2. Analyzing digital electronics concepts. 3. Analyze the concept of logic circuits.	**Criteria:** 1. 4: correct description 2. 3: the description is generally correct, there is one aspect where the explanation is incorrect 3. 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4. 1: the description is wrong	Demonstration, lecture, discussion and practice 3 X 50			0%

13	Master the semi-conductor theoretical concept of procedural problem solving. Able to make decisions based on information and data analysis and provide guidance in selecting alternative solutions. Responsible for informing the results of information and data analysis both orally and in writing. Able to utilize science and technology in the fields of power amplifier theory, digital electronics and logic circuits.	Describe the concept of semi conductors	**Criteria:** 1. 4: correct description 2. 3: the description is generally correct, there is one aspect where the explanation is incorrect 3. 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4. 1: the description is wrong	Demonstration, lecture, discussion and practice 3 X 50			0%
14	Master the theoretical concept of H-Bridge in depth and formulate it in procedural problem solving. Able to make decisions based on information and data analysis and provide guidance in choosing alternative solutions. Responsible for informing the results of information and data analysis both orally and in writing. Able to utilize science and technology in the fields of power amplifier theory, digital electronics and logic circuits.	Describe the H-Bridge concept	**Criteria:** 1. 4: correct description 2. 3: the description is generally correct, there is one aspect where the explanation is incorrect 3. 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4. 1: the description is wrong	Demonstration, lecture, discussion and practice 3 X 50			0%
15	Master the theoretical concepts of current control circuits in depth and formulate them in solving problems procedurally. Able to make decisions based on information and data analysis and provide guidance in choosing alternative solutions. Responsible for informing the results of information and data analysis both orally and in writing. Able to utilize science and technology in the fields of power amplifier theory, digital electronics and logic circuits.	Describe the concept of current control circuits	**Criteria:** 1. 4: correct description 2. 3: the description is generally correct, there is one aspect where the explanation is incorrect 3. 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4. 1: the description is wrong	Demonstration, lecture, discussion and practice 3 X 50			0%

16	UAS (Final Semester Exam)		**Criteria:** 1. 4: correct description 2. 3: the description is generally correct, there is one aspect where the explanation is incorrect 3. 2: the description is generally correct, there is more than one aspect where the explanation is incorrect 4. 1: the description is wrong	Written test 3 X 50			0%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	22.25%
2.	Project Results Assessment / Product Assessment	22.25%
3.	Practice / Performance	22.25%
4.	Test	22.25%
		89%

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.