	Universitas Negeri Surabaya Faculty of Mathematics and Natural Sciences Undergraduate Physics Study Program	Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Basic Electronics Practicum I	4520101230		T=0	P=1	ECTS=1.59	3	July 18, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	Drs. Imam Sucahyo, M.Si.	Prof. Dr. Munasir, S.Si., M.Si.

Learning model	**Project Based Learning**	
Program Learning Outcomes (PLO)	**PLO study program that is charged to the course**	
	PLO-5	Able to demonstrate as a good scientist, critical thinking skills and innovation in research and professional fields.
	PLO-7	Communicate their ideas and/or research results in academic writing and speaking effectively.
	PLO-15	Solve problems in physical systems comprehensively using mathematics and computational tools.
	Program Objectives (PO)	
	PO - 1	Have the skills to use electrical measuring instruments to obtain measurement data during practicum
	PO - 2	Have the ability to analyze qualitatively and quantitatively experimental data
	PO - 3	Have the ability to think critically and use appropriate concepts to compare practicum results qualitatively and quantitatively.
	PO - 4	Have the skills to use electrical measuring instruments (multimeter and oscilloscope) to obtain measurement data during practicum.
	PO - 5	Have the skills to analyze measurement data during practical work on RC circuits (integrators and differentiators), diode characteristics, signal processing with diodes, transformers and rectifiers and power supplies.
	PLO-PO Matrix	

P.O	PLO-5	PLO-7	PLO-15
PO-1			
PO-2			
PO-3			
PO-4			
PO-5			

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																
PO-5																

Short Course Description	Basic Electronics Practicum 2 course includes: a. Emitter Amplifier Grounded. b. Amplifier with feedback, c. JFET characteristics, d. JFET amplifier, e. Operational Amplifier (O-Amp) Inverting, f. Operational Amplifier (O-Amp) Non Inverting, g. Oscillator and h. Digital Electronic Circuits.
References	**Main :** 1. Tim. 2010. Panduan Praktikum Elektronika Dasar 1. **Supporters:** 1. Sutrisno. 1978. Elektronika 1. Teori dan Penerapannya. Penerbit ITB Bandung. 2. Tooley, M. 2006. Electronics Circuit: Fundamnetals and Applications. Third Edition. Elesevier Ltd. 3. Boylestad, R., and Nashelsky, L. Electronics Devices and Circuits: Theory. Seventh Edition. Prentice Hall.
Supporting lecturer	Drs. Imam Sucahyo, M.Si. Dzulkiflih, S.Si., M.T. Abd. Kholiq, S.Pd., M.T. Meta Yantidewi, S.Si., M.Si.

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	Able to use multimeter electrical measuring instruments	1.Students can use a multimeter correctly 2.Students can read the multimeter scale correctly	**Criteria:** 1.Students are able to use a multimeter 2.Students are able to read the multimeter scale **Form of Assessment** : Practice / Performance		Online 150 minutes	**Material:** Multimeter as a voltmeter, ammeter, and ohmmeter **Reader:** *Tim. 2010. Basic Electronics Practical Guide 1.*	5%
2	Able to use an oscilloscope electrical measuring instrument	1.Students can use an oscilloscope correctly 2.Students can read the oscilloscope scale correctly	**Criteria:** 1.Students are able to use an oscilloscope 2.Students are able to read the oscilloscope scale **Form of Assessment** : Practice / Performance		Online 150 minutes	**Material:** Oscilloscope and AFG **Library:** *Tim. 2010. Basic Electronics Practical Guide 1.*	5%
3	Have the ability to analyze qualitatively and quantitatively experimental data	Students can correctly compare the results of measurements using analog and digital multimeter measuring instruments both for measuring electric current strength, electric voltage and electrical resistance	**Criteria:** 1.Students can correctly compare the results of measurements using analog and digital multimeter measuring instruments both for measuring electric current strength, electric voltage and electrical resistance 2.Students can compare measurement results using oscilloscopes and analog or digital multimeters correctly. **Form of Assessment** : Practical Assessment		Online 150 minutes	**Material:** Multimeter, oscilloscope, and AFG **Library:** *Team. 2010. Basic Electronics Practical Guide 1.*	6%

4	Able to use electrical measuring instruments (multimeter and oscilloscope) in integrator and differentiator RC circuit experiments	1. Students can use multimeter and oscilloscope measuring instruments correctly when conducting integrator and differentiator experiments 2. Students can read the scales of multimeters and oscilloscopes so they can get experimental data correctly	**Criteria:** 1. Students can use multimeter and oscilloscope measuring instruments correctly when conducting integrator and differentiator experiments 2. Students can read the scales of multimeters and oscilloscopes so they can get experimental data correctly **Form of Assessment** : Practice / Performance		Online 150 minutes	**Material:** RC integrator and differentiator circuits **Library:** *Tim. 2010. Basic Electronics Practical Guide 1.*	5%
5	Able to use electrical measuring instruments (multimeter and oscilloscope) in integrator and differentiator RC circuit experiments	1. Students can use multimeter and oscilloscope measuring instruments correctly when conducting integrator and differentiator experiments 2. Students can read the scales of multimeters and oscilloscopes so they can get experimental data correctly	**Criteria:** 1. Students can use multimeter and oscilloscope measuring instruments correctly when conducting integrator and differentiator experiments 2. Students can read the scales of multimeters and oscilloscopes so they can get experimental data correctly **Form of Assessment** : Practice / Performance		Online 150 minutes	**Material:** RC integrator and differentiator circuits **Library:** *Tim. 2010. Basic Electronics Practical Guide 1.*	5%
6	Have the ability to analyze qualitatively and quantitatively data from experimental results of RC integrator and differentiator circuits	1. Students can analyze the experimental results of RC integrator and differentiator circuits correctly 2. Students can make written reports on experiments on RC integrator and differentiator circuits properly and correctly	**Criteria:** 1. Students can analyze the experimental results of integrator and differentiator RC circuits correctly with phasor diagrams 2. Students can make written reports on RC circuit integrator and differentiator experiments correctly **Form of Assessment** : Practical Assessment		Online 150 minutes	**Material:** Rangkaia **Library:** *Team. 2010. Basic Electronics Practical Guide 1.*	6%
7	Discuss the results of multimeter, AFG, oscilloscope, integrator and differentiator experiments		**Form of Assessment** : Participatory Activities		Online 150 minutes		5%
8	UTS	Solve UTS questions properly and correctly	**Criteria:** Solve UTS questions properly and correctly **Form of Assessment** : Portfolio Assessment, Test		Online 150 minutes		11%

9	Able to use electrical measuring instruments (multimeter and oscilloscope) in diode characteristics experiments.	1. Students can use multimeters and oscilloscopes correctly when experimenting with diode characteristics 2. Students can read the scales of multimeters and oscilloscopes so they can get experimental data correctly	**Criteria:** 1. Students carry out experiments to determine the characteristics of diodes 2. Students compare the experimental results of diode characteristics with theory **Form of Assessment** : Practice / Performance		Online 150 minutes	**Material:** characteristics of diodes **Library:** *Tim. 2010. Basic Electronics Practical Guide 1.*	5%
10	Able to use electrical measuring instruments (multimeter and oscilloscope) in signal processing experiments with diodes.	1. Students can use multimeters and oscilloscopes correctly when experimenting with signal processing with diodes 2. Students can read the scales of multimeters and oscilloscopes so they can get experimental data correctly	**Criteria:** 1. Students conduct experiments to determine signal processing with diodes 2. Students compare the experimental results of diode characteristics with theory **Form of Assessment** : Practice / Performance		Online 150 minutes	**Material:** signal processing with diodes **Reader:** *Tim. 2010. Basic Electronics Practical Guide 1.* **Material:** clipper diode circuit **Library:** *Tim. 2010. Basic Electronics Practical Guide 1.* **Material:** clipper **Library:** *Team. 2010. Basic Electronics Practical Guide 1.*	5%
11	Have the ability to analyze qualitatively and quantitatively experimental data on diode characteristics and signal processing with diodes	1. Students can analyze the experimental results of diode characteristics and signal processing with differentiator diodes correctly 2. Students can make written reports on experiments on diode characteristics and signal processing with diodes correctly	**Criteria:** Students can make written reports on experiments on diode characteristics and signal processing with diodes correctly **Form of Assessment** : Practical Assessment		Online 150 minutes		6%

12	Able to use electrical measuring instruments (multimeter and oscilloscope) in transformer experiments	1. Students can use multimeter and oscilloscope measuring instruments correctly when experimenting with transformers 2. Students can read the scales of multimeters and oscilloscopes so they can get experimental data correctly	**Criteria:** 1. Students conduct experiments to determine transformer efficiency 2. Students compare the results of transformer efficiency experiments with theory **Form of Assessment** : Practice / Performance		Online 150 minutes	**Material:** transformer **Library:** *Tim. 2010. Basic Electronics Practical Guide 1.*	5%
13	Able to use electrical measuring instruments (multimeter and oscilloscope) in rectifier and power supply experiments	1. Students can use multimeters and oscilloscopes correctly when experimenting with rectifiers and power supplies 2. Students can read the scales of multimeters and oscilloscopes so they can get experimental data correctly	**Criteria:** Students carry out experiments to determine the output voltage of the rectifier/power supply **Form of Assessment** : Practice / Performance		Online 150 minutes	**Material:** rectifier and power supply **Reference:** *Tim. 2010. Basic Electronics Practical Guide 1.*	5%
14	Have the ability to analyze qualitatively and quantitatively data from transformer experiments, as well as rectifiers and power supplies	1. Students can analyze the results of experiments on transformers and power supply rectifiers 2. Students can make written reports on experiments on transformers and power supply rectifiers	**Criteria:** Students can make written reports on experiments on diode characteristics and signal processing with diodes correctly **Form of Assessment** : Practical Assessment, Practice/Performance		Online 150 minutes	**Material:** Transformers, as well as rectifiers and power supplies **References:** *Team. 2010. Basic Electronics Practical Guide 1.*	6%
15	Discuss the experimental results of diode characteristics, signal processing with diodes, transformers and power supply rectifiers		**Form of Assessment** : Participatory Activities		Online 150 minutes		5%
16	UAS	Solve UAS questions properly and correctly	**Criteria:** Solve UAS questions properly and correctly **Form of Assessment** : Portfolio Assessment, Test		Online 150 minutes		15%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	10%
2.	Portfolio Assessment	13%

3.	Practical Assessment	21%
4.	Practice / Performance	43%
5.	Test	13%
		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.