	Universitas Negeri Surabaya Vocational Faculty, D4 Electrical Engineering Study Program	Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
DC Electrical Circuits	204010229810		T=0	P=0	ECTS=0	1	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	Mahendra Widyartono, 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: Understanding and study of: (1) atomic theory, knowledge and circuit parameters, (2) basic laws of electricity and basic theory of electrical circuits, (3) direct current electric power (4) mesh current analysis, (mesh current analysis), (5) node voltage analysis, (6) resistance network analysis presented in theoretical form and problem solving.

References

Main :

1. Boylestad, Robert L., 2007. Introductory Circuit Analysis -11th ed . New Jersey; Pearson Prentice Hall
2. Floyd, 2007. Electric Circuits Fundamentals 13 7th ed. New Jersey; Pearson Prentice Hall
3. William, Jack, & Steven. 2005. Engineering Circuit Analysis Sixth Edition (diterjemahkan oleh Wiwit Kastawan) . Jakarta:Erlangga.
4. Ramdhani, Mohamad. 2008. Rangkaian Listrik . Jakarta: Erlangga
5. dll

Supporters:

Supporting lecturer: Reza Rahmadian, S.ST., M.EngSc.

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	Describe, give examples and apply atomic theory, basic knowledge concepts and circuit parameters	1. Explain about atomic theory, 2. Explain the meaning of electron flow 3. Explain the meaning of electric current 4. Explain the meaning of electric potential 5. Explain the meaning of voltage/voltage difference 6. Explain the meaning of electrical units 7. Explain the meaning of electric charge 8. Explain the meaning of capacitance 9. Calculating conductor resistance 10. Calculate changes in resistance due to changes in temperature	**Criteria:** The correct answer gets a score of 100	Discussion, providing examples of application and assignments in the 2 X 50 theory class			0%
2	Describe, give examples and apply atomic theory, basic knowledge concepts and circuit parameters	1. Explain about atomic theory, 2. Explain the meaning of electron flow 3. Explain the meaning of electric current 4. Explain the meaning of electric potential 5. Explain the meaning of voltage/voltage difference 6. Explain the meaning of electrical units 7. Explain the meaning of electric charge 8. Explain the meaning of capacitance 9. Calculating conductor resistance 10. Calculate changes in resistance due to changes in temperature	**Criteria:** The correct answer gets a score of 100	Discussion, providing examples of application and assignments in the 2 X 50 theory class			0%

3	Understand and apply the basic laws of electricity and basic theory of electrical circuits	1. Explain direct current (DC) generation 2. Explain the types of direct current 3. Explain Faraday‘s law 4. Explain Kirchhoff‘s law 19s 5. Explain Ohm‘s law 6. Explain Lenz‘s law 7. Calculate the branch voltage across some resistance 8. Calculate the equivalent resistance in a series circuit. 9. Calculating equivalent resistance in parallel circuits. 10. Calculating the branch current in a two-branch parallel circuit. 11. Calculating equivalent resistance in series-parallel (mixed) circuits 12. Calculate the magnitude of the conductance G	**Criteria:** test score: number of correct answers x 100, divided by the number of test items	Discussion, giving examples of R series problems and assignments in theory class, 2 X 50			0%

4	Understand and apply the basic laws of electricity and basic theory of electrical circuits	1. Explain direct current (DC) generation 2. Explain the types of direct current 3. Explain Faraday‘s law 4. Explain Kirchhoff‘s law 19s 5. Explain Ohm‘s law 6. Explain Lenz‘s law 7. Calculate the branch voltage across some resistance 8. Calculate the equivalent resistance in a series circuit. 9. Calculating equivalent resistance in parallel circuits. 10. Calculating the branch current in a two-branch parallel circuit. 11. Calculating equivalent resistance in series-parallel (mixed) circuits 12. Calculate the magnitude of the conductance G	**Criteria:** test score: number of correct answers x 100, divided by the number of test items	Discussion, giving examples of R series problems and assignments in theory class, 2 X 50			0%
5	Can analyze and evaluate the concept of direct current electric power, and practice in the laboratory	1. Calculate the amount of DC2 electrical power. calculate DC3 electrical work. calculate DC4 electric heat. Skilled in carrying out practical work in the laboratory to validate electrical power.	**Criteria:** The test score is obtained by: number of correct answers x 100 then divided by the number of test items	Discussion, providing examples of electrical power problems and assignments in theory classes. 2 X 50			0%
6	Able to use the mesh current method to solve problems in complex direct current circuits	1. Calculate the number of mesh currents, 2. Determine the direction of the mesh current, 3. Write the mesh current equation 4. Calculate the magnitude of each mesh current using elimination 5. Calculate the magnitude of each mesh current using a matrix.6. Calculate the amount of current, voltage or resistance in the mesh using driving point resistance7. Calculate the amount of current, voltage, or resistance in the mesh using transfer resistance	**Criteria:** The test score is obtained by: number of correct answers x 100 then divided by the number of test items	Discussion, providing examples of solving complex electrical circuits using the mesh current method and assignments in theory classes. 2 X 50			0%

7	Able to use the mesh current method to solve problems in complex direct current circuits	1. Calculate the number of mesh currents, 2. Determine the direction of the mesh current, 3. Write the mesh current equation 4. Calculate the magnitude of each mesh current using elimination 5. Calculate the magnitude of each mesh current using a matrix.6. Calculate the amount of current, voltage or resistance in the mesh using driving point resistance7. Calculate the amount of current, voltage, or resistance in the mesh using transfer resistance	**Criteria:** The test score is obtained by: number of correct answers x 100 then divided by the number of test items	Discussion, providing examples of solving complex electrical circuits using the mesh current method and assignments in theory classes. 2 X 50			0%
8	UTS			2 X 50			0%
9	Able to use the Branch Current analysis method to solve problems in direct current circuits	1. Determines the number of branching currents 2. Determine the number of equations	**Criteria:** The test score is obtained by: number of correct answers x 100 then divided by the number of test items	Discussion, providing examples of solving electrical circuits using the Branch Current analysis method and assignments in theory classes. 2 X 50			0%
10	Able to use Node analysis methods to solve problems in direct current circuits	1. Defines the reference node as ground/zero potential 2. Determines node voltage 3. Determines the direction of current leaving the node 4. Determine the number of equations	**Criteria:** The test score is obtained by: number of correct answers x 100 then divided by the number of test items	Discussion, providing examples of solving electrical circuits using Node analysis methods and assignments in theory classes. 2 X 50			0%
11	Able to use Node analysis methods to solve problems in direct current circuits	1. Defines the reference node as ground/zero potential 2. Determines node voltage 3. Determines the direction of current leaving the node 4. Determine the number of equations	**Criteria:** The test score is obtained by: number of correct answers x 100 then divided by the number of test items	Discussion, providing examples of solving electrical circuits using Node analysis methods and assignments in theory classes. 2 X 50			0%
12	Able to use the Superposition and Substitution theorem to solve problems in direct current circuits	1. Determine the equivalent circuit by replacing the current source with an internal resistance 2. Determine the equivalent circuit by replacing the voltage source with an internal resistance	**Criteria:** The test score is obtained by: number of correct answers x 100 then divided by the number of test items	Discussion, providing examples of solving electrical circuits using the Superposition and Substitution theorem as well as assignments in theory class. 2 X 50			0%

13	Able to use Thevenin's theorem to solve problems in direct current circuits	1. Determine the short circuit current value 2. Determine the replacement resistance value	**Criteria:** The test score is obtained by: number of correct answers x 100 then divided by the number of test items	Discussion, providing examples of solving electrical circuits using Thevenin's theorem as well as assignments in theory class. 2 X 50			0%
14	Able to use Norton's theorem to solve problems in direct current circuits	1. Determine the terminal point 2. Determines the current value at the terminal 3. Determine the replacement resistance value	**Criteria:** The test score is obtained by: number of correct answers x 100 then divided by the number of test items	Discussion, providing examples of solving electrical circuits using Norton's theorem as well as assignments in theory class. 2 X 50			0%
15	Able to use Millman's theorem and Maximum Power Transfer to solve problems in direct current circuits	1. Determine the number of current sources 2. Determines the maximum power value	**Criteria:** The test score is obtained by: number of correct answers x 100 then divided by the number of test items	Discussion, providing examples of solving electrical circuits using Millman's theorem and Maximum Power Transfer as well as assignments in theory class. 2 X 50			0%
16	UAS			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** abilities in the process and student learning outcomes are specific and measurable statements that identify the abilities 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.