



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												
Electrical Materials	8320102012		T=2 P=0 ECTS=3.18	3	August 1, 2023												
AUTHORIZATION	SP Developer		Course Cluster Coordinator	Study Program Coordinator													
	Prof. Dr. Joko, M.Pd. MT.		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-9	Able to communicate in Indonesian and English well orally and in writing (General).															
	PLO-10	Have a responsible character and be committed to professional ethics (General/SSC4.6).															
	Program Objectives (PO)																
	PLO-PO Matrix																
		P.O	PLO-9	PLO-10													
	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 studying the concepts, theories and applications of electrical materials including: conducting materials, insulating materials, resistance materials, electrical contact materials, magnetic materials, special materials and electrical structural materials and optical fibers																
References	Main :																
	1. William D. Callister, JR., David AG. Rethwisch. 2017. Materials Science and Engineering AN INTRODUCTION, 10th Edition. Hoboken NJ : Wiley 2. Kapur, P.L. 1984. A Textbook of Electrical Enginnering Materials . New Delhi: Khanna Publisher 3. Salahuddin. 2014. Bahan Ajar Bahan Listrik. Fakultas Teknik Universitas Malikussaleh Jurusan Teknik Elektro 4. I Ketut Wijaya. 2015. Material Teknik Elektro. Jurusan Teknik Elektro Dan Komputer Fakultas Teknik Universitas Udayana																
	Supporters:																
	1. Joko, 2023. RPS Mata Kuliah Bahan Listrik, S1 Prodi Pendidikan Teknik Elektro. FT, Unesa																
Supporting lecturer	Prof. Dr. Ismet Basuki, M.Pd. Prof. Dr. Joko, M.Pd., M.T. Dr. Subuh Isnur Haryudo, S.T., M.T. Fendi Achmad, S.Pd., M.Pd.																
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	Understanding College Contracts	Understanding college contracts	<p>Criteria:</p> <ol style="list-style-type: none"> 1.Accuracy of explanation, max score 50 2.Participative, min score 50 <p>Form of Assessment : Portfolio Assessment</p>	Presentations, discussions, questions and answers, and reflections 2 X 50		<p>Material: RPS Library: Joko, 2023. <i>RPS Electrical Materials Course, S1 Electrical Engineering Education Study Program. FT, Unesa</i></p>	5%
2	Understand the basic concepts of electrical materials	Browse relevant sources of information, discuss, analyze, conclude and present results with PPT, and reflect	<p>Criteria:</p> <ol style="list-style-type: none"> 1.Accuracy in tracing relevant sources of information, discussing, analyzing, concluding and presenting results with PPT, and reflection, max score 50 2.Participative, min score 50 <p>Form of Assessment : Participatory Activities, Portfolio Assessment</p>	Playing video tutorials and graphics, discussions, questions and answers, assignments to search for relevant sources of information, discussions, analyzing, concluding and presenting results with PPT, and reflection 2 X 50		<p>Material: Basic concepts of electrical materials References: <i>William D. Callister, JR., David AG. Rethwisch. 2017. Materials Science and Engineering AN INTRODUCTION, 10th Edition. Hoboken NJ : Wiley</i></p>	4%
3	Understand the concept of bonding	Tracing sources of information, discussions, analyzing, concluding, and presenting results using PPT, reflection	<p>Criteria:</p> <ol style="list-style-type: none"> 1.Accuracy in tracing sources of information, discussions, analyzing, concluding, and presenting results using PPT, and reflection, max score 50 2.Participative, min score 50 <p>Form of Assessment : Participatory Activities, Portfolio Assessment</p>	Lecturer short presentations, discussions, assignments to explore sources of information, discussions, analyzing, concluding and presenting results using PPT, reflection 2 X 50		<p>Material: Concept of bond overview Reader: <i>Salahuddin. 2014. Electrical Materials Teaching Materials. Malikussaleh University Faculty of Engineering, Department of Electrical Engineering</i></p> <p>Material: The concept of ties Reader: <i>Salahuddin. 2014. Electrical Materials Teaching Materials. Malikussaleh University Faculty of Engineering, Department of Electrical Engineering</i></p>	4%
4	Understand the concept of Dielectric Polarization	<ol style="list-style-type: none"> 1.Students understand the concepts of polarization, permittivity, and the basic mechanisms of dielectric polarization 2. 	<p>Criteria:</p> <ol style="list-style-type: none"> 1.Searching for sources of information, discussion, analyzing, concluding, and presenting results using PPT, and reflection, max score 50 2.Participative, min score 50 <p>Form of Assessment : Participatory Activities, Portfolio Assessment</p>	Lecturer's short presentation, assignment to explore sources of information, discussion, analysis, conclusion, and presentation of results using PPT, and reflection 2 X 50		<p>Material: concepts of polarization, permittivity, and basic mechanisms of dielectric polarization Reference: <i>I Ketut Wijaya. 2015. Electrical Engineering Materials. Department of Electrical and Computer Engineering, Faculty of Engineering, Udayana University</i></p>	4%

5	Understand the concept of Electrical Material Classification	Exploring sources of information on the concept of classification of electrical materials from metal, ceramics and polymers, group discussions, analyzing, concluding and presenting results with PPT, and reflection	<p>Criteria:</p> <ol style="list-style-type: none"> 1.Accuracy in tracing sources of information, group discussions, analyzing, concluding, presenting results with PPT, and reflection, max score 50 2.Participative, min score 50 <p>Form of Assessment : Participatory Activities, Portfolio Assessment</p>	Lecturer's brief explanation, discussion and question and answer, assignment to search for sources of information, group discussion, analyzing, concluding and presenting results with PPT, and reflection 2 X 50		<p>Material: Classification of electrical materials from metal, ceramics and polymers</p> <p>Reference: I Ketut Wijaya. 2015. <i>Electrical Engineering Materials</i>. Department of Electrical and Computer Engineering, Faculty of Engineering, Udayana University</p>	4%
6	Understand the concept of Electrical Material Classification	Exploring sources of information on the concept of classification of electrical materials from metal, ceramics and polymers, group discussions, analyzing, concluding and presenting results with PPT, and reflection	<p>Criteria:</p> <ol style="list-style-type: none"> 1.Accuracy in tracing sources of information, group discussions, analyzing, concluding, presenting results with PPT, and reflection, max score 50 2.Participative, min score 50 <p>Form of Assessment : Participatory Activities, Portfolio Assessment</p>		Short lecturer explanations, discussions and answers, assignments to search for sources of information, group discussions, analyzing, concluding and presenting results using PPT, and reflection. 2 X 50	<p>Material: Classification of electrical materials from metal, ceramics and polymers</p> <p>Reference: I Ketut Wijaya. 2015. <i>Electrical Engineering Materials</i>. Department of Electrical and Computer Engineering, Faculty of Engineering, Udayana University</p>	5%
7	Understand the concept of Insulators	Students understand the characteristics, properties and characteristics of insulating materials	<p>Criteria:</p> <ol style="list-style-type: none"> 1.Accuracy in tracing sources of information, group discussions, analyzing, concluding, and presenting results using PPT, and reflection with a max score of 50 2.Participative, min score 50 <p>Form of Assessment : Participatory Activities, Portfolio Assessment</p>		Brief explanation, discussion and question and answer, assignment to search for sources of information, group discussion, analyzing, concluding and presenting results using PPT, and reflection 2 X 50	<p>Material: Characteristics, properties and characteristics of insulating materials.</p> <p>Library: Salahuddin. 2014. <i>Electrical Materials Teaching Materials</i>. Malikussaleh University Faculty of Engineering, Department of Electrical Engineering</p>	5%
8	UTS		<p>Form of Assessment : Participatory Activities, Tests</p>	2 X 50			15%
9	Understanding the concept of Insulators (Part 2)	Searching for sources of information, discussions, analyzing, concluding, presenting using PPT, and reflecting	<p>Criteria: Accuracy of the results of searching information sources, discussion, analyzing, concluding, presenting using PPT, and reflection, max score 50</p> <p>Forms of Assessment : Participatory Activities, Project Results Assessment / Product Assessment, Portfolio Assessment</p>	Short explanation , discussion, assignment to explore sources of information, discussion, analysis, conclusion, presentation using PPT, and reflection 2 X 50		<p>Material: Characteristics, properties and characteristics of insulating materials.</p> <p>Library: Salahuddin. 2014. <i>Electrical Materials Teaching Materials</i>. Malikussaleh University Faculty of Engineering, Department of Electrical Engineering</p>	5%

10	Understand the concept of conductor	Explore sources of information on conductors, conductor materials, and properties of conductor materials, discuss, analyze, summarize, present using PPT, and reflect	<p>Criteria: Accuracy in searching sources of information on conductors, conductor materials, and properties of conductor materials, discussing, analyzing, summarizing, presenting using PPT, and reflection</p> <p>Form of Assessment : Participatory Activities, Practice/Performance</p>	Brief explanation, discussion, assignment to trace sources of information, discussion, analysis, conclusion, presentation using PPT, and reflection 2 X 50		<p>Material: Conductors, conductor materials, and properties of conductor materials</p> <p>Reference: I Ketut Wijaya. 2015. <i>Electrical Engineering Materials</i>. Department of Electrical and Computer Engineering, Faculty of Engineering, Udayana University</p>	4%
11	Understand the concept of Semiconductors	Explore information sources on the definition of semiconductors, energy bands, characteristics of semiconductor materials, discussion, analysis, summarization, presentation using PPT, and reflection, max score 50	<p>Criteria: 1.The accuracy of the results of tracing information sources regarding semiconductors, energy bands, characteristics of semiconductor materials, discussions, analyzing, summarizing, presenting using PPT, and reflection 2.Participative, min score 50</p> <p>Forms of Assessment : Participatory Activities, Portfolio Assessment, Practice / Performance</p>	Short presentations, discussions, assignments to explore sources of information, discussions, analyzing, summarizing, presenting using PPT, and reflection 2 X 50		<p>Material: Semiconductors, energy bands, characteristics of semiconductor materials</p> <p>Reference: I Ketut Wijaya. 2015. <i>Electrical Engineering Materials</i>. Department of Electrical and Computer Engineering, Faculty of Engineering, Udayana University</p>	5%
12	Understand the concept of Semiconductors	Explore information sources on the definition of semiconductors, energy bands, characteristics of semiconductor materials, discussion, analysis, summarization, presentation using PPT, and reflection, max score 50	<p>Criteria: 1.The accuracy of the results of tracing information sources regarding semiconductors, energy bands, characteristics of semiconductor materials, discussions, analyzing, summarizing, presenting using PPT, and reflection 2.Participative, min score 50</p> <p>Form of Assessment : Participatory Activities, Portfolio Assessment</p>	Short presentations, discussions, assignments to explore sources of information, discussions, analyzing, summarizing, presenting using PPT, and reflection 2 X 50		<p>Material: Semiconductors, energy bands, characteristics of semiconductor materials</p> <p>Reference: I Ketut Wijaya. 2015. <i>Electrical Engineering Materials</i>. Department of Electrical and Computer Engineering, Faculty of Engineering, Udayana University</p>	5%
13	Understand the concept of Semiconductors	Explore sources of information on types of semiconductors, energy gaps in semiconductors, charge mobility in semiconductors, utilization of semiconductors, discussions, analysis, conclusions, group presentations and reflections	<p>Criteria: 1.Accuracy of results of tracing information sources, discussions, analyzing, concluding, group presentations, and reflections, max score 50 2.Participative, min score 50</p> <p>Form of Assessment : Participatory Activities</p>	Short presentations, discussions, assignments to explore sources of information, discussions, analysis, conclusions, group presentations and reflections 2 X 50		<p>Material: Types of semiconductors, energy gaps in semiconductors, charge mobility in semiconductors, and utilization of semiconductors</p> <p>Library: I Ketut Wijaya. 2015. <i>Electrical Engineering Materials</i>. Department of Electrical and Computer Engineering, Faculty of Engineering, Udayana University</p>	5%

14	Understand the concept of Semiconductors	Explore sources of information on types of semiconductors, energy gaps in semiconductors, charge mobility in semiconductors, utilization of semiconductors, discussions, analysis, conclusions, group presentations and reflections	Criteria: 1.Accuracy of results of tracing information sources, discussions, analyzing, concluding, group presentations, and reflections, max score 50 2.Participative, min score 50 Form of Assessment : Participatory Activities		Short presentations, discussions, assignments to explore sources of information, discussions, analysis, conclusions, group presentations and reflections 2 X 50	Material: Types of semiconductors, energy gaps in semiconductors, charge mobility in semiconductors, and utilization of semiconductors Library: <i>I Ketut Wijaya. 2015. Electrical Engineering Materials. Department of Electrical and Computer Engineering, Faculty of Engineering, Udayana University</i>	5%
15			Criteria: 1.Accuracy in tracing sources of information on materials, characteristics and use of optical conductors, discussion, analyzing, concluding, presenting and reflecting, max score 50. 2.Participative, min score 50 Form of Assessment : Participatory Activities		Lecturer short presentations, discussions, assignments exploring sources of information on materials, characteristics and use of optical conductors, discussions, analyzing, concluding, presenting and reflecting. 2 X 50	Material: Materials, characteristics and use of optical conductors Reference: <i>Salahuddin. 2014. Electrical Materials Teaching Materials. Malkussaleh University Faculty of Engineering, Department of Electrical Engineering</i>	5%
16			Form of Assessment : Participatory Activities, Tests	UAS			20%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	53.34%
2.	Project Results Assessment / Product Assessment	1.67%
3.	Portfolio Assessment	23.84%
4.	Practice / Performance	3.67%
5.	Test	17.5%
		100%

Notes

- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- Forms of assessment:** test and non-test.
- 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.
- 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.
- Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
- 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%.
- TM=Face to face, PT=Structured assignments, BM=Independent study.

