



1	Students are able to understand the unit system in electrical measurements.	<ol style="list-style-type: none"> <li>1.Explain the units and quantities of electricity.</li> <li>2.Convert various units of electrical quantities into basic quantities and derived quantities.</li> <li>3.Explain the symbols for electrical measuring instruments.</li> <li>4.Using international units for measuring electricity.</li> </ol>	<p><b>Criteria:</b> Students will get marks if they can explain correctly.</p> <p><b>Form of Assessment :</b> Participatory Activities</p>	Lectures, discussions and practice assignments. 3 X 50		<p><b>Material:</b> Basics of Electricity</p> <p><b>Reference:</b> Soedjana S and Nishino O. 2000. <i>Measurements and Electrical Measuring Instruments.</i> Jakarta: Paradnya Paramita.</p>	1%
2	Students are able to understand the unit system in electrical measurements.	<ol style="list-style-type: none"> <li>1.Explain the units and quantities of electricity.</li> <li>2.Convert various units of electrical quantities into basic quantities and derived quantities.</li> <li>3.Explain the symbols for electrical measuring instruments.</li> <li>4.Using international units for measuring electricity.</li> </ol>	<p><b>Criteria:</b> Students will get marks if they can correctly explain the system of units</p> <p><b>Form of Assessment :</b> Participatory Activities</p>	Lectures, discussions and practice assignments. 3 X 50		<p><b>Material:</b> Basic Electricity</p> <p><b>Reference:</b> Cooper W D. 1999. <i>Electronic Instrumentation and Measurement Techniques, 2nd Edition.</i> Jakarta: Erlangga Publishers.</p>	1%
3	Students are able to understand electrical measurement techniques.	<ol style="list-style-type: none"> <li>1.Explain the types of measurements.</li> <li>2.Explain how to measure.</li> <li>3.Explain the general construction of measuring instruments.</li> <li>4.Describes a pointer or note taker.</li> </ol>	<p><b>Criteria:</b> Students will get marks if they can take measurements and explain correctly</p> <p><b>Form of Assessment :</b> Participatory Activities</p>	Lectures, questions and answers and discussions. 3 X 50			1%
4	Students are able to understand electrical measurement techniques.	<ol style="list-style-type: none"> <li>1.Explain the types of measurements.</li> <li>2.Explain how to measure.</li> <li>3.Explain the general construction of measuring instruments.</li> <li>4.Describes a pointer or note taker.</li> </ol>	<p><b>Criteria:</b> Students will get marks if they can take measurements and explain correctly</p> <p><b>Form of Assessment :</b> Participatory Activities</p>	Lectures, questions and answers and discussions. 3 X 50			1%
5	Students are able to understand electrical measurement techniques.	<ol style="list-style-type: none"> <li>1.Explain the types of measurements.</li> <li>2.Explain how to measure.</li> <li>3.Explain the general construction of measuring instruments.</li> <li>4.Describes a pointer or note taker.</li> </ol>	<p><b>Criteria:</b> Students will get marks if they can take measurements and explain correctly</p> <p><b>Form of Assessment :</b> Participatory Activities</p>	Lectures, questions and answers and discussions. 3 X 50			1%

6	Students are able to understand electrical measurement techniques.	<ol style="list-style-type: none"> <li>1.Explain the types of measurements.</li> <li>2.Explain how to measure.</li> <li>3.Explain the general construction of measuring instruments.</li> <li>4.Describes a pointer or note taker.</li> </ol>	<p><b>Criteria:</b> Students will get marks if they can take measurements and explain correctly</p> <p><b>Form of Assessment :</b> Participatory Activities</p>	Lectures, questions and answers and discussions. 3 X 50			1%
7	Students are able to formulate the relationship between energy and electrical power, as well as their use in everyday life.	<ol style="list-style-type: none"> <li>1.Explain the relationship between V and I and the electrical energy used.</li> <li>2.Explain the relationship between electrical energy, electrical power and their units (KWh and joules).</li> <li>3.Apply the concept of energy and electrical power in calculating household electricity use based on the numbers printed on the kWh meter.</li> </ol>	<p><b>Criteria:</b> Students will get points if they can take measurements correctly. Students will get points if they can explain electrical power</p> <p><b>Form of Assessment :</b> Project Results Assessment / Product Assessment, Test</p>	Lectures, discussions, assignments, exercises, searching for library sources and other references 3 X 50			10%
8	Midterm Exam (UTS)		<p><b>Form of Assessment :</b> Test</p>	3 X 50			20%
9	Students are able to measure electrical power and power factor	<ol style="list-style-type: none"> <li>1.Explain the principles of measuring electrical power,</li> <li>2.Explain the relationship between active and apparent power</li> </ol>	<p><b>Criteria:</b> Students will get points if they can answer correctly</p> <p><b>Form of Assessment :</b> Participatory Activities, Project Results Assessment / Product Assessment</p>	Lectures, Small Group Discussions 3 X 50			9%
10	Students are able to explain the working principles of measuring transformers and their use	explain the types of measuring transformers, Using measuring transformers	<p><b>Criteria:</b> Students will get points if they can answer correctly</p> <p><b>Form of Assessment :</b> Participatory Activities, Project Results Assessment / Product Assessment</p>	3 X 50			20%
11	Able to understand the basics of electricity regarding power and electrical energy	<ol style="list-style-type: none"> <li>1.Explain the concept of power and electrical energy</li> <li>2.Explain the relationship between V and I and the electrical energy used</li> <li>3.Explain the relationship between electrical energy, electrical power and their units (kWh and joules)</li> </ol>	<p><b>Criteria:</b> Students will get points if they can answer correctly</p> <p><b>Form of Assessment :</b> Participatory Activities</p>	3 X 50			1%

12	Able to understand the basics of electricity regarding power and electrical energy	<ol style="list-style-type: none"> <li>1.Explain the concept of power and electrical energy</li> <li>2.Explain the relationship between V and I and the electrical energy used</li> <li>3.Explain the relationship between electrical energy, electrical power and their units (kWh and joules)</li> </ol>	<p><b>Criteria:</b> Students will get points if they can answer correctly</p> <p><b>Form of Assessment :</b> Participatory Activities</p>	3 X 50			1%
13	Able to understand the basics of electricity regarding power and electrical energy	<ol style="list-style-type: none"> <li>1.Explain the concept of power and electrical energy</li> <li>2.Explain the relationship between V and I and the electrical energy used</li> <li>3.Explain the relationship between electrical energy, electrical power and their units (kWh and joules)</li> </ol>	<p><b>Criteria:</b> Students will get points if they can answer correctly</p> <p><b>Form of Assessment :</b> Participatory Activities</p>	3 X 50			1%
14	Able to understand the basics of electricity regarding power and electrical energy	<ol style="list-style-type: none"> <li>1.Explain the concept of power and electrical energy</li> <li>2.Explain the relationship between V and I and the electrical energy used</li> <li>3.Explain the relationship between electrical energy, electrical power and their units (kWh and joules)</li> </ol>	<p><b>Criteria:</b> Students will get points if they can answer correctly</p> <p><b>Form of Assessment :</b> Participatory Activities</p>	3 X 50			1%
15	Able to understand the basics of electricity regarding power and electrical energy	<ol style="list-style-type: none"> <li>1.Explain the concept of power and electrical energy</li> <li>2.Explain the relationship between V and I and the electrical energy used</li> <li>3.Explain the relationship between electrical energy, electrical power and their units (kWh and joules)</li> </ol>	<p><b>Criteria:</b> Students will get points if they can answer correctly</p> <p><b>Form of Assessment :</b> Participatory Activities</p>	3 X 50			1%

16	Able to understand the basics of electricity regarding power and electrical energy	<ol style="list-style-type: none"> <li>1.Explain the concept of power and electrical energy</li> <li>2.Explain the relationship between V and I and the electrical energy used</li> <li>3.Explain the relationship between electrical energy, electrical power and their units (kWh and joules)</li> </ol>	<b>Criteria:</b> Students will get points if they can answer correctly  <b>Form of Assessment :</b> Participatory Activities	3 X 50			30%
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#### Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	55.5%
2.	Project Results Assessment / Product Assessment	19.5%
3.	Test	25%
		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.