



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

Document Code

**SEMESTER LEARNING PLAN**

<b>Courses</b>	<b>CODE</b>	<b>Course Family</b>	<b>Credit Weight</b>	<b>SEMESTER</b>	<b>Compilation Date</b>																																											
Electric Power Distribution System	8320102168		T=2 P=0 ECTS=3.18	4	July 17, 2024																																											
<b>AUTHORIZATION</b>	<b>SP Developer</b>		<b>Course Cluster Coordinator</b>		<b>Study Program Coordinator</b>																																											
	.....		.....		Dr. Nur Kholis, S.T., M.T.																																											
<b>Learning model</b>	<b>Project Based Learning</b>																																															
<b>Program Learning Outcomes (PLO)</b>	<b>PLO study program that is charged to the course</b>																																															
	<b>Program Objectives (PO)</b>																																															
	<b>PLO-PO Matrix</b>																																															
		P.O																																														
	<b>PO Matrix at the end of each learning stage (Sub-PO)</b>																																															
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;"></td> <td colspan="15" style="text-align: center;">Week</td> </tr> <tr> <td style="text-align: center;">P.O</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> <td style="text-align: center;">4</td> <td style="text-align: center;">5</td> <td style="text-align: center;">6</td> <td style="text-align: center;">7</td> <td style="text-align: center;">8</td> <td style="text-align: center;">9</td> <td style="text-align: center;">10</td> <td style="text-align: center;">11</td> <td style="text-align: center;">12</td> <td style="text-align: center;">13</td> <td style="text-align: center;">14</td> <td style="text-align: center;">15</td> <td style="text-align: center;">16</td> </tr> </table>															Week															P.O	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Week																																															
P.O	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16																																
<b>Short Course Description</b>	Understanding and study of: SKKNI for Electrical Power Distribution, Basic Concepts of Distribution Systems, Classification of Distribution Networks, Overhead Lines, Underground Distribution Networks, Direct Current Distribution Networks, Alternating Current Distribution Networks, Voltage Regulation, Applications of Capacitors and Protection for Distribution Networks and Grounding Systems.																																															
<b>References</b>	<b>Main :</b>																																															
	<ol style="list-style-type: none"> <li>1. ferensi</li> <li>2. Artono Arismunandar&amp; Sususmu Kuwahara. 1975. Buku Pegangan Teknik Tenaga Listrik Jilid II dan III . Jakarta: PT. Pradnya Paramita.</li> <li>3. Departemen Energi dan Sumber Daya Mineral. 2004. Sosialisasi Standar Latih Kompetensi (SLK) Tenaga Teknik Ketenagalistrikan Bidang Distribusi Tenaga Listrik . Jakarta: Pusat Diklat Energi dan Ketenagalistrikan.</li> <li>4. Makmun &amp; Sri Lestari. 2007. Permasalahan Bidang Ketenagalistrikan di Indonesia . Jakarta: Fokus Media.</li> <li>5. Suhadi dan Tri Wrahatnolo. (2009). Diklat Kuliah Sistem Distribusi Tenaga Listrik . Surabaya : Unesa Press.</li> <li>6. T.A. Short. (2004). Electrical Distribution- HandBook . London: CRC Press.</li> <li>7. Yamanaka. Electric Wire &amp; Cable . Sinar Merbabu: Surabaya Jurnal</li> <li>8. IEEE Transaction on Power Apparatus and System</li> <li>9. IEEE Transaction on Power Delivery</li> <li>10. IEEE Spectrum</li> <li>11. IEEE Power Engineer review.</li> </ol>																																															
	<b>Supporters:</b>																																															
<b>Supporting lecturer</b>	Prof.Dr. Tri Wrahatnolo, M.Pd., M.T. Dr. Subuh Isnur Haryudo, S.T., M.T. Roswina Dianawati, S.Pd., M.Ed.																																															
<b>Week-</b>	<b>Final abilities of each learning stage (Sub-PO)</b>	<b>Evaluation</b>		<b>Help Learning, Learning methods, Student Assignments, [ Estimated time]</b>		<b>Learning materials [ References ]</b>	<b>Assessment Weight (%)</b>																																									
		<b>Indicator</b>	<b>Criteria &amp; Form</b>	<b>Offline ( offline )</b>	<b>Online ( online )</b>																																											
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)																																									

1	Understanding the Development of Electric Power Distribution Systems	1. Know, classify and analyze data and communicate ideas and information about the Electric Power Distribution System 2. Able to analyze problems, consumption and needs for electric power and development prospects	<b>Criteria:</b> 1. Assessment of participation in lectures, discussions and question and answer activities through observation sheets, score 0-100 2. Assessment of assignments via assessment sheet, score 0-100	Lectures, discussions, questions and answers and assignments. 2 X 50			0%
2	Understand the Basic Concepts of Electric Power Distribution Systems	1. Know, classify and analyze data as well as communicate ideas and information about the Basic Concepts of Electric Power Distribution Systems 2. Able to analyze problems and solve electric power distribution networks	<b>Criteria:</b> 1. Observation of participation and enthusiasm in the learning process, using an observation sheet, score 0-100 2. Assessment of completion of assignments, using the assignment assessment sheet, score 01-00	1. Lecture 2. Discussion 3. Questions and Answers 4. Giving assignments 2 X 50			0%
3	Understand the Basic Concepts of Direct Current Electric Power Distribution Systems	Students are able to: 1. Calculate voltage loss, load point voltage, line end voltage, power loss, system efficiency and cross-section size 2. Analyze problems and solve direct current electric power distribution networks	<b>Criteria:</b> 1. Assessment of participation and enthusiasm in activities: Lectures, giving examples of problem solving, discussions, questions and answers, and practice questions 2. using observation sheet, score 0-100 3. Meanwhile, the assessment of completing assignments uses the assignment assessment sheet, score 0-100.	1. Lecture 2. Providing examples-2 problem solving 3. Discussion 4. Questions and answers 5. Practice questions 6. Giving assignments 2 X 50			0%
4	Understand the Basic Concepts of Direct Current Electric Power Distribution Systems	Students are able to: 1. Calculate voltage loss, load point voltage, line end voltage, power loss, system efficiency and cross-section size 2. Analyze problems and solve direct current electric power distribution networks	<b>Criteria:</b> 1. Assessment of participation and enthusiasm in activities: Lectures, giving examples of problem solving, discussions, questions and answers, and practice questions 2. using observation sheet, score 0-100 3. Meanwhile, the assessment of completing assignments uses the assignment assessment sheet, score 0-100.	1. Lecture 2. Providing examples-2 problem solving 3. Discussion 4. Questions and answers 5. Practice questions 6. Giving assignments 2 X 50			0%

5	Understand the Basic Concepts of Direct Current Electric Power Distribution Systems	Students are able to: 1. Calculate voltage loss, load point voltage, line end voltage, power loss, system efficiency and cross-section size 2. Analyze problems and solve direct current electric power distribution networks	<b>Criteria:</b> 1. Assessment of participation and enthusiasm in activities: Lectures, giving examples of problem solving, discussions, questions and answers, and practice questions 2. using observation sheet, score 0-100 3. Meanwhile, the assessment of completing assignments uses the assignment assessment sheet, score 0-100.	1. Lecture 2. Providing examples-2 problem solving 3. Discussion 4. Questions and answers 5. Practice questions 6. Giving assignments 2 X 50			0%
6	Understand the Basic Concepts of Alternating Current Electric Power Distribution Systems	Students are able to: 1. Calculate voltage loss, load point voltage, line end voltage, power loss, system efficiency and cross-section size 2. Analyze problems and solve alternating current electric power distribution networks	<b>Criteria:</b> 1. Observations use a checklist, score 0-100 2. Performance assessment uses a performance assessment sheet, score 0-100	1. Lecture 2. Sidkusi 3. Questions and answers 4. Practice solving questions 5. Assignment of assignments. 2 X 50			0%
7	Understand the Basic Concepts of Alternating Current Electric Power Distribution Systems	Students are able to: 1. Calculate voltage loss, load point voltage, line end voltage, power loss, system efficiency and cross-section size 2. Analyze problems and solve alternating current electric power distribution networks	<b>Criteria:</b> 1. Observations use a checklist, score 0-100 2. Performance assessment uses a performance assessment sheet, score 0-100	1. Lecture 2. Sidkusi 3. Questions and answers 4. Practice solving questions 5. Assignment of assignments. 2 X 50			0%
8	Understand the Basic Concepts of Alternating Current Electric Power Distribution Systems	Students are able to: 1. Calculate voltage loss, load point voltage, line end voltage, power loss, system efficiency and cross-section size 2. Analyze problems and solve alternating current electric power distribution networks	<b>Criteria:</b> 1. Observations use a checklist, score 0-100 2. Performance assessment uses a performance assessment sheet, score 0-100	1. Lecture 2. Sidkusi 3. Questions and answers 4. Practice solving questions 5. Assignment of assignments. 2 X 50			0%
9	Understanding Primary and secondary Distribution Networks	Students are able to 1. Calculate voltage loss, load point voltage, line end voltage, power loss, system efficiency and cross-sectional size 2. Able to analyze problems and solve direct current electric power distribution networks 3. Understand systems, primary distribution, distribution substations, transformers distribution, Transformer Bank, Consumer Service, and Load Type 4. Able to analyze problems and resolve direct current electric power distribution networks	<b>Criteria:</b> 1. Check list sheet, Score 0-100 2. Performance Assessment Sheet, score 0-100 3. Assignment Assessment Sheet, score 0-100	1. Lecture 2. Discussion 3. Q&A 4. Demonstration 5. Practice solving problems 6. Giving assignments 2 X 50			0%

10	Understanding Primary and secondary Distribution Networks	Students are able to 1. Calculate voltage loss, load point voltage, line end voltage, power loss, system efficiency and cross-sectional size 2. Able to analyze problems and solve direct current electric power distribution networks 3. Understand systems, primary distribution, distribution substations, transformers distribution, Transformer Bank, Consumer Service, and Load Type 4. Able to analyze problems and resolve direct current electric power distribution networks	<b>Criteria:</b> 1. Check list sheet, Score 0-100 2. Performance Assessment Sheet, score 0-100 3. Assignment Assessment Sheet, score 0-100	1. Lecture 2. Discussion 3. Q&A 4. Demonstration 5. Practice solving problems 6. Giving assignments 2 X 50			0%
11	Understanding above ground distribution networks (SUTM and SUTR)	Students are able to: 1. Prepare, collect, organize and analyze data and communicate ideas and information about above-ground distribution networks 2. Determine the impedance of above-ground distribution networks (SUTR and SUTM)	<b>Criteria:</b> 1. Observation Sheet, score 0-100 2. Performance Assessment Sheet, score 0-100 3. Assignment Assessment Sheet, score 0-100	1. Lecture 2. Demonstration 3. Practicum 4. Questions and answers 5. Discussion 6. Exercise 7. Completion of assignments 2 X 50			0%
12	Understanding above ground distribution networks (SUTM and SUTR)	Students are able to: 1. Prepare, collect, organize and analyze data and communicate ideas and information about above-ground distribution networks 2. Determine the impedance of above-ground distribution networks (SUTR and SUTM)	<b>Criteria:</b> 1. Observation Sheet, score 0-100 2. Performance Assessment Sheet, score 0-100 3. Assignment Assessment Sheet, score 0-100	1. Lecture 2. Demonstration 3. Practicum 4. Questions and answers 5. Discussion 6. Exercise 7. Completion of assignments 2 X 50			0%
13	1. Understanding underground distribution networks 2. Understanding Power Transformers	Students are able to 1. Prepare, collect, organize and analyze data and communicate ideas and information about underground distribution networks 2. Determine the impedance of underground distribution networks 3. Identify, differentiate, operate and analyze data and communicate ideas and information about Power Transformers 4. Calculating transformer loading and losses. 5. Assembling the power transformer (GTT), power panel and its components/distribution substation	<b>Criteria:</b> 1. Observation sheet, score 0-100 2. Performance assessment sheet, score 0-100 3. Assignment assessment sheet, score 0-100	1. Lecture 2. Practical 3. Discussion 4. Questions and answers 5. Practice questions 6. Doing 2 X 50 assignments			0%
14	1. Understanding underground distribution networks 2. Understanding Power Transformers	Students are able to 1. Prepare, collect, organize and analyze data and communicate ideas and information about underground distribution networks 2. Determine the impedance of underground distribution networks 3. Identify, differentiate, operate and analyze data and communicate ideas and information about Power Transformers 4. Calculating transformer loading and losses. 5. Assembling the power transformer (GTT), power panel and its components/distribution substation	<b>Criteria:</b> 1. Observation sheet, score 0-100 2. Performance assessment sheet, score 0-100 3. Assignment assessment sheet, score 0-100	1. Lecture 2. Practical 3. Discussion 4. Questions and answers 5. Practice questions 6. Doing 2 X 50 assignments			0%
15							0%
16							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.