

 UNESA	Universitas Negeri Surabaya Faculty of Engineering, Electrical Engineering Undergraduate Study Program						Document Code																																																	
SEMESTER LEARNING PLAN																																																								
Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date																																																	
ELECTRIC POWER TRANSMISSION SYSTEM	2020102305	Compulsory Study Program Subjects	T=0	P=0	ECTS=0	6	April 17, 2023																																																	
AUTHORIZATION	SP Developer		Course Cluster Coordinator			Study Program Coordinator																																																		
	Ibrohim, S.T., M.T. ; Dr. Tri Wrahatnolo, M.Pd., M.T.		Prof. Dr. Bambang Suprianto, M.T.			Dr. Lusia Rakhmawati, S.T., M.T.																																																		
Learning model	Case Studies																																																							
Program Learning Outcomes (PLO)	PLO study program that is charged to the course																																																							
	Program Objectives (PO)																																																							
	PO - 1	Able to apply basic knowledge of electric power transmission systems to gain a thorough understanding of the basic functions and main components required																																																						
	PLO-PO Matrix																																																							
		<table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td style="text-align: center;">P.O</td></tr> <tr><td style="text-align: center;">PO-1</td></tr> </table>						P.O	PO-1																																															
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PO Matrix at the end of each learning stage (Sub-PO)																																																								
	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">P.O</th> <th colspan="16">Week</th> </tr> <tr> <th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th>11</th><th>12</th><th>13</th><th>14</th><th>15</th><th>16</th> </tr> </thead> <tbody> <tr> <td>PO-1</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </tbody> </table>						P.O	Week																1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	PO-1																
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	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16																																								
PO-1																																																								
Short Course Description	Understanding and study of: SKKNI for Electric Power Transmission, basic concepts of alternating current electric power systems, transmission line parameters, load and power flow calculations on transmission lines, transmission line construction, reactive compensation on transmission lines and transient analysis and maintenance of transmission lines .																																																							
References	Main :																																																							
	<ol style="list-style-type: none"> 1. Artono Arismunandar & Sususmu Kuwahara. 1975. Buku Pegangan Teknik Tenaga Listrik Jilid I . Jakarta: PT. Pradnya Paramita. Artono Arismunandar& Sususmu Kuwahara. 1975. Buku Pegangan Teknik Tenaga Listrik Jilid II . Jakarta: PT. Pradnya Paramita. Artono Arismunandar& Sususmu Kuwahara. 1975. Buku Pegangan Teknik Tenaga Listrik Jilid III . Jakarta: PT. Pradnya Paramita. Departemen Energi dan Sumber Daya Mineral. 2004. Sosialisasi Standar Latih Kompetensi (SLK) Tenaga Teknik Ketenagalistrikan Bidang Transmisi Tenaga Listrik. Jakarta: Pusat Diklat Energi dan Ketenagalistrikan. Djliteng Marsudi (2002). Pembangkitan Energi Listrik . Jakarta: Penerbit Erlangga. Djliteng Marsudi (2006). Operasi Sistem Tenaga Listrik . Jakarta: Penerbit Graha Ilmu. Gross, A. Charles. (1990). Power System Analisis , New York: John Wiley & Sons. Hutauruk. (1985) Transmisi Daya Listrik. Jakarta: Erlangga. Stam H. N. C. 1993. Keselamatan dan Kesehatan di Tempat Kerja . Penebar Swadaya: Jakarta. Standar Nasional Indonesia. 2000. Persyaratan Umum Instalasi Listrik 2000 . Jakarta: Yayasan PUIL. William D. Stevenson Jr . (1994). Element of Power System Analysis Fourth Edition , New York: McGraw-Hill. 																																																							
	Supporters:																																																							
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Supporting lecturer		Prof.Dr. Tri Wrahatnolo, M.Pd., M.T. Ibrohim, S.T., M.T.					
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	Students can discuss the function of the transmission system and the main components, identify the electrical characteristics of transmission lines, differentiate transmission lines for channel analysis purposes	Evaluation Rubric	Criteria: Evaluation Rubric Form of Assessment : Participatory Activities	Case method 2 x 50		Material: learning material 1 Bibliography: Artono Arismunandar & Sususmu Kuwahara. 1975. <i>Handbook of Electrical Power Engineering Volume I.</i> Jakarta: PT. Pradnya Paramita. Artono Arismunandar & Sususmu Kuwahara. 1975. <i>Handbook of Electrical Power Engineering Volume II.</i> Jakarta: PT. Pradnya Paramita. Artono Arismunandar & Sususmu Kuwahara. 1975. <i>Handbook of Electrical Power Engineering Volume III.</i> Jakarta: PT. Pradnya Paramita. Department of Energy and Mineral Resources. 2004. <i>Socialization of Competency Training Standards (SLK) for Electrical Engineering Personnel in the Field of Electrical Power Transmission.</i> Jakarta: Energy and Electricity Training Center. Djiliteng Marsudi (2002). <i>Electrical Energy Generation.</i> Jakarta: Erlangga Publishers.	10%

						<p>Djliteng Marsudi (2006). <i>Electric Power System Operations</i>. Jakarta: Graha Ilmu Publishers.</p> <p>Gross, A. Charles. (1990). <i>Power System Analysis</i>, New York: John Wiley & Sons.</p> <p>Hutauruk. (1985) <i>Electric Power Transmission</i>. Jakarta: Erlangga.</p> <p>Stam HNC 1993. <i>Safety and Health in the Workplace</i>. Self-Help Spreader: Jakarta.</p> <p>Indonesian National Standards. 2000. <i>General Requirements for Electrical Installations 2000</i>. Jakarta: PUJIL Foundation.</p> <p>William D. Stevenson Jr. (1994). <i>Elements of Power Systems Analysis Fourth Edition</i>, New York: McGraw-Hill.</p>	
2	Students can discuss the function of the transmission system and the main components, identify the electrical characteristics of transmission lines, differentiate transmission lines for channel analysis purposes	Evaluation Rubric	<p>Criteria: Evaluation Rubric</p> <p>Form of Assessment : Participatory Activities</p>	Case method 2 x 50		<p>Material: learning material 1</p> <p>Bibliography: Artono Arismunandar & Sususmu Kuwahara. 1975. <i>Handbook of Electrical Power Engineering Volume I</i>. Jakarta: PT. Pradnya Paramita.</p> <p>Artono Arismunandar & Sususmu Kuwahara. 1975. <i>Handbook of Electrical Power Engineering Volume II</i>. Jakarta: PT. Pradnya Paramita.</p> <p>Artono Arismunandar & Sususmu Kuwahara. 1975. <i>Handbook of</i></p>	10%

Electrical
Power
Engineering
Volume III.
Jakarta: PT.
Pradnya
Paramita.
Department of
Energy and
Mineral
Resources.
2004.
Socialization
of
Competency
Training
Standards
(SLK) for
Electrical
Engineering
Personnel in
the Field of
Electrical
Power
Transmission.
Jakarta:
Energy and
Electricity
Training
Center.
Djliteng
Marsudi
(2002).
Electrical
Energy
Generation.
Jakarta:
Erlangga
Publishers.
Djliteng
Marsudi
(2006).
Electric Power
System
Operations.
Jakarta:
Graha Ilmu
Publishers.
Gross, A.
Charles.
(1990). Power
System
Analysis, New
York: John
Wiley & Sons.
Hutauruk.
(1985) Electric
Power
Transmission.
Jakarta:
Erlangga.
Stam HNC
1993. Safety
and Health in
the
Workplace.
Self-Help
Spreader:
Jakarta.
Indonesian
National
Standards.
2000. General
Requirements
for Electrical
Installations
2000. Jakarta:
PUIL
Foundation.
William D.
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Elements of
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						<i>Edition, New York: McGraw-Hill.</i>	
3	Students can discuss the function of the transmission system and the main components, identify the electrical characteristics of transmission lines, differentiate transmission lines for channel analysis purposes	Evaluation Rubric	Criteria: Evaluation Rubric Form of Assessment : Participatory Activities	Case method 2 x 50		Material: learning material 1 Bibliography: Artono Arismunandar & Sususmu Kuwahara. 1975. <i>Handbook of Electrical Power Engineering Volume I.</i> Jakarta: PT. Pradnya Paramita. Artono Arismunandar & Sususmu Kuwahara. 1975. <i>Handbook of Electrical Power Engineering Volume II.</i> Jakarta: PT. Pradnya Paramita. Artono Arismunandar & Sususmu Kuwahara. 1975. <i>Handbook of Electrical Power Engineering Volume III.</i> Jakarta: PT. Pradnya Paramita. Department of Energy and Mineral Resources. 2004. <i>Socialization of Competency Training Standards (SLK) for Electrical Engineering Personnel in the Field of Electrical Power Transmission.</i> Jakarta: Energy and Electricity Training Center. Djliteng Marsudi (2002). <i>Electrical Energy Generation.</i> Jakarta: Erlangga Publishers. Djliteng Marsudi (2006). <i>Electric Power System Operations.</i> Jakarta: Graha Ilmu Publishers.	10%

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4	determine and study transmission lines for channel analysis purposes, explaining general constants of transmission lines	Evaluation Rubric	<p>Criteria: Evaluation Rubric</p> <p>Form of Assessment : Participatory Activities</p>	Case method 2 x 50	<p>Material: learning material 1</p> <p>Bibliography: Artono Arismunandar & Sususmu Kuwahara. 1975. <i>Handbook of Electrical Power Engineering Volume I</i>. Jakarta: PT. Pradnya Paramita.</p> <p>Artono Arismunandar & Sususmu Kuwahara. 1975. <i>Handbook of Electrical Power Engineering Volume II</i>. Jakarta: PT. Pradnya Paramita.</p> <p>Artono Arismunandar & Sususmu Kuwahara. 1975. <i>Handbook of Electrical Power Engineering Volume III</i>. Jakarta: PT. Pradnya Paramita. Department of</p>	10%

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5	determine and study transmission lines for channel analysis purposes, explaining general	Evaluation Rubric	<p>Criteria: Evaluation Rubric</p> <p>Form of Assessment :</p>	Case method 2 x 50	<p>Material: learning material 1</p> <p>Bibliography:</p>	5%

constants of
transmission lines

Participatory
Activities

Artono
Arismunandar
& Sususmu
Kuwahara.
1975.
*Handbook of
Electrical
Power
Engineering
Volume I.*
Jakarta: PT.
Pradnya
Paramita.
Artono
Arismunandar
& Sususmu
Kuwahara.
1975.
*Handbook of
Electrical
Power
Engineering
Volume II.*
Jakarta: PT.
Pradnya
Paramita.
Artono
Arismunandar
& Sususmu
Kuwahara.
1975.
*Handbook of
Electrical
Power
Engineering
Volume III.*
Jakarta: PT.
Pradnya
Paramita.
Department of
Energy and
Mineral
Resources.
2004.
*Socialization
of
Competency
Training
Standards
(SLK) for
Electrical
Engineering
Personnel in
the Field of
Electrical
Power
Transmission.*
Jakarta:
Energy and
Electricity
Training
Center.
Djliteng
Marsudi
(2002).
*Electrical
Energy
Generation.*
Jakarta:
Erlangga
Publishers.
Djliteng
Marsudi
(2006).
*Electric Power
System
Operations.*
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Graha Ilmu
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System
Analysis,* New
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6	identify current carrying capacity	Evaluation Rubric	<p>Criteria: Evaluation Rubric</p> <p>Form of Assessment : Participatory Activities</p>	Case method 2 x 50		<p>McGraw-Hill.</p> <p>Material: meeting materials 6</p> <p>References: Pansini, Anthony J. (2006). <i>Electrical Distribution Engineering</i>. USA: Taylor & Francis Ltd.</p>	10%
7	identify current carrying capacity	Evaluation Rubric	<p>Criteria: Evaluation Rubric</p> <p>Form of Assessment : Participatory Activities</p>	Case method 2 x 50		<p>Material: meeting materials 6</p> <p>References: Pansini, Anthony J. (2006). <i>Electrical Distribution Engineering</i>. USA: Taylor & Francis Ltd.</p>	5%
8	Complete the Midterm Exam	Evaluation Rubric	<p>Criteria: Evaluation Rubric</p> <p>Form of Assessment : Participatory Activities</p>	Written test 2 x 50		<p>Material: meeting materials 6</p> <p>References: Pansini, Anthony J. (2006). <i>Electrical Distribution Engineering</i>. USA: Taylor & Francis Ltd.</p>	5%
9	categorize circuit diagrams and power flow in transmission lines	Evaluation Rubric	<p>Criteria: Evaluation Rubric</p>	Case method 2 x 50		<p>Material: meeting materials 6</p> <p>References: Pansini, Anthony J. (2006). <i>Electrical Distribution Engineering</i>. USA: Taylor & Francis Ltd.</p>	10%

10	categorize circuit diagrams and power flow in transmission lines	Evaluation Rubric	Criteria: Evaluation Rubric	Case method 2 x 50		Material: meeting materials 6 References: <i>Pansini, Anthony J. (2006). Electrical Distribution Engineering. USA: Taylor & Francis Ltd.</i>	5%
11	classify the transmission and distribution systems of electric power systems	Evaluation Rubric	Criteria: Evaluation Rubric	Case method 2 x 50		Material: meeting materials 6 References: <i>Pansini, Anthony J. (2006). Electrical Distribution Engineering. USA: Taylor & Francis Ltd.</i>	5%
12	classify the transmission and distribution systems of electric power systems	Evaluation Rubric	Criteria: Evaluation Rubric	Case method 2 x 50		Material: meeting materials 6 References: <i>Pansini, Anthony J. (2006). Electrical Distribution Engineering. USA: Taylor & Francis Ltd.</i>	5%
13	explore the latest technological developments in electric power transmission and distribution systems	Evaluation Rubric	Criteria: Evaluation Rubric Form of Assessment : Participatory Activities	contextual instruction 2 x 50		Material: meeting materials 6 References: <i>Pansini, Anthony J. (2006). Electrical Distribution Engineering. USA: Taylor & Francis Ltd.</i>	5%
14	explore the latest technological developments in electric power transmission and distribution systems	Evaluation Rubric	Criteria: Evaluation Rubric Form of Assessment : Participatory Activities	contextual instruction 2 x 50		Material: meeting materials 6 References: <i>Pansini, Anthony J. (2006). Electrical Distribution Engineering. USA: Taylor & Francis Ltd.</i>	5%
15	explore the latest technological developments in electric power transmission and distribution systems	Evaluation Rubric	Criteria: Evaluation Rubric Form of Assessment : Participatory Activities	contextual instruction 2 x 50		Material: meeting materials 6 References: <i>Pansini, Anthony J. (2006). Electrical Distribution Engineering. USA: Taylor & Francis Ltd.</i>	5%

16	Carry out UAS Meetings 1 to 15	Evaluation Rubric	Criteria: Evaluation Rubric Form of Assessment : Participatory Activities	contextual instruction 2 x 50		Material: meeting materials 6 References: <i>Pansini, Anthony J. (2006). Electrical Distribution Engineering. USA: Taylor & Francis Ltd.</i>	10%
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Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	90%
		90%

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.