



**Universitas Negeri Surabaya  
Vocational Faculty,  
D4 Electrical Engineering 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>
Communication Technology in Power Systems	2030502047		T=2	P=0	ECTS=3.18	7	July 17, 2024
<b>AUTHORIZATION</b>		<b>SP Developer</b>	<b>Course Cluster Coordinator</b>			<b>Study Program Coordinator</b>	
		.....	.....			Mahendra Widyartono, S.T., M.T.	
<b>Learning model</b>	Case Studies						
<b>Program Learning Outcomes (PLO)</b>	PLO study program that is charged to the course						
	Program Objectives (PO)						
	PLO-PO Matrix						
		P.O					
<b>Short Course Description</b>	Provides knowledge about electric power system automation, components of SCADA systems, SCADA applications, advantages of SCADA in electric power systems, Remote Terminal Units, Components of RTU, SCADA communications and substation automation						
<b>References</b>	<b>Main :</b>						
	1. Stuart A. Boyer. 1999. SCADA: Supervisory Control and Data Acquisition System, Instrumentation. System and Automation Society. 2. Bonar Pandjaitan. 1999. Teknologi Sistem Pengendali Tenaga Listrik berbasis SCADA. Jakarta: Prenhallindo. 3. William. Stallings. 1993. Data and Computer Communications , Macmillan Publishing Company. New York. 4. Deyn Hamdani, Mukmin W. Atmopawiro. 2008. Scada Dalam Sistem Sistem Tenaga. Diktat Kuliah.						
	<b>Supporters:</b>						
<b>Supporting lecturer</b>	Mahendra Widyartono, S.T., M.T. 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	Understand the basic concepts of electric power system automation	<ol style="list-style-type: none"> <li>1.Explain the meaning of electrical power system automation</li> <li>2.Explain SCADA in electric power systems</li> <li>3.Explain the basic functions of SCADA</li> <li>4.Explain the components of a SCADA system</li> <li>5.Explain the advantages of using a SCADA system</li> </ol>		Lectures, discussions and questions and answers 2 X 50			0%
2	Understand the basic concepts of electric power system automation	<ol style="list-style-type: none"> <li>1.Explain the meaning of electrical power system automation</li> <li>2.Explain SCADA in electric power systems</li> <li>3.Explain the basic functions of SCADA</li> <li>4.Explain the components of a SCADA system</li> <li>5.Explain the advantages of using a SCADA system</li> </ol>		Lectures, discussions and questions and answers 2 X 50			0%
3	Understand the basic concepts of electric power system automation	<ol style="list-style-type: none"> <li>1.Explain the meaning of electrical power system automation</li> <li>2.Explain SCADA in electric power systems</li> <li>3.Explain the basic functions of SCADA</li> <li>4.Explain the components of a SCADA system</li> <li>5.Explain the advantages of using a SCADA system</li> </ol>		Lectures, discussions and questions and answers 2 X 50			0%
4	Know SCADA fundamentals	<ol style="list-style-type: none"> <li>1.Explain the fundamentals of SCADA</li> <li>2.Explain open systems and their advantages</li> <li>3.Create SCADA blocks</li> <li>4.Explaining RTU (remote terminal unit)</li> <li>5.Explain IED (Intelligent electronic devices)</li> <li>6.Describe SCADA communications equipment</li> <li>7.Explaining masterstation</li> </ol>		Lectures, discussions and questions and answers 2 X 50			0%

5	Know SCADA fundamentals	<ol style="list-style-type: none"> <li>1.Explain the fundamentals of SCADA</li> <li>2.Explain open systems and their advantages</li> <li>3.Create SCADA blocks</li> <li>4.Explaining RTU (remote terminal unit)</li> <li>5.Explain IED (Intelligent electronic devices)</li> <li>6.Describe SCADA communications equipment</li> <li>7.Explaining masterstation</li> </ol>		Lectures, discussions and questions and answers 2 X 50			0%
6	Know SCADA fundamentals	<ol style="list-style-type: none"> <li>1.Explain the fundamentals of SCADA</li> <li>2.Explain open systems and their advantages</li> <li>3.Create SCADA blocks</li> <li>4.Explaining RTU (remote terminal unit)</li> <li>5.Explain IED (Intelligent electronic devices)</li> <li>6.Describe SCADA communications equipment</li> <li>7.Explaining masterstation</li> </ol>		Lectures, discussions and questions and answers 2 X 50			0%
7	Know SCADA fundamentals	<ol style="list-style-type: none"> <li>1.Explain the fundamentals of SCADA</li> <li>2.Explain open systems and their advantages</li> <li>3.Create SCADA blocks</li> <li>4.Explaining RTU (remote terminal unit)</li> <li>5.Explain IED (Intelligent electronic devices)</li> <li>6.Describe SCADA communications equipment</li> <li>7.Explaining masterstation</li> </ol>		Lectures, discussions and questions and answers 2 X 50			0%
8	UTS		<b>Criteria:</b> Full marks are obtained if you do all the questions correctly	2 X 50			0%

9	Understand communication in SCADA	<ol style="list-style-type: none"> <li>1.Understand the concept of communication protocols</li> <li>2.Understanding how communication works in SCADA</li> <li>3.Get to know the types of protocols in SCADA</li> <li>4.Understand the differences in Protocol Types in SCADA</li> </ol>		2 X 50			0%
10	Understand communication in SCADA	<ol style="list-style-type: none"> <li>1.Understand the concept of communication protocols</li> <li>2.Understanding how communication works in SCADA</li> <li>3.Get to know the types of protocols in SCADA</li> <li>4.Understand the differences in Protocol Types in SCADA</li> </ol>		2 X 50			0%
11	Able to understand the overall SCADA concept	<ol style="list-style-type: none"> <li>1.Understand the parts that make up a SCADA system</li> <li>2.RTU, IED, Master Control, Protocol, Communication channels</li> <li>3.Data Acquisition, Data Processing</li> <li>4.Data Monitoring</li> </ol>		2 X 50			0%
12	Able to understand the overall SCADA concept	<ol style="list-style-type: none"> <li>1.Understand the parts that make up a SCADA system</li> <li>2.RTU, IED, Master Control, Protocol, Communication channels</li> <li>3.Data Acquisition, Data Processing</li> <li>4.Data Monitoring</li> </ol>		2 X 50			0%
13	Able to understand the overall SCADA concept	<ol style="list-style-type: none"> <li>1.Understand the parts that make up a SCADA system</li> <li>2.RTU, IED, Master Control, Protocol, Communication channels</li> <li>3.Data Acquisition, Data Processing</li> <li>4.Data Monitoring</li> </ol>		2 X 50			0%

14	Able to understand the overall SCADA concept	1.Understand the parts that make up a SCADA system 2.RTU, IED, Master Control, Protocol, Communication channels 3.Data Acquisition, Data Processing 4.Data Monitoring		2 X 50			0%
15	Able to understand the overall SCADA concept	1.Understand the parts that make up a SCADA system 2.RTU, IED, Master Control, Protocol, Communication channels 3.Data Acquisition, Data Processing 4.Data Monitoring		2 X 50			0%
16	-	test	<b>Criteria:</b> test  <b>Form of Assessment :</b> Participatory Activities, Tests	UAS 100		<b>Material:</b> UAS <b>Reader:</b> <i>Stuart A. Boyer. 1999. SCADA: Supervisory Control and Data Acquisition System, Instrumentation. Systems and Automation Society.</i>  <b>Material:</b> UAS <b>Library:</b> <i>Bonar Pandjaitan. 1999. SCADA-based Electric Power Control System Technology. Jakarta: Prenhallindo.</i>  <b>Material:</b> UAS <b>Reader:</b> <i>William. Stallings. 1993. Data and Computer Communications, Macmillan Publishing Company. New York.</i>	0%

**Evaluation Percentage Recap: Case Study**

No	Evaluation	Percentage
		0%

**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** 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.