



Universitas Negeri Surabaya
Faculty of Postgraduate School,
Master of Technology and Vocational Education Study Program

Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date																																
Electrical Power Utilization Techniques	8310103041		T=3	P=0	ECTS=6.72	1	July 17, 2024																																
AUTHORIZATION	SP Developer		Course Cluster Coordinator			Study Program Coordinator																																	
	Prof. Dr. Joko, M.Pd. MT.				Dr. Ir. Achmad Imam Agung, M.Pd.																																	
Learning model	Project Based Learning																																						
Program Learning Outcomes (PLO)	PLO study program which is charged to the course																																						
	PLO-7	Have extensive knowledge in the fields of general knowledge, social and humanities																																					
	PLO-11	Able to apply applied research to innovate vocational learning methods, optimize industry-relevant technology																																					
	PLO-14	Able to design circuits, devices and products in the vocational technology education Masters program																																					
	Program Objectives (PO)																																						
	PLO-PO Matrix																																						
		<table border="1" style="margin: auto;"> <tr> <td style="width: 20%;">P.O</td> <td style="width: 20%;">PLO-7</td> <td style="width: 20%;">PLO-11</td> <td style="width: 20%;">PLO-14</td> <td colspan="3"></td> </tr> </table>						P.O	PLO-7	PLO-11	PLO-14																												
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PO Matrix at the end of each learning stage (Sub-PO)																																							
	<table border="1" style="margin: auto;"> <tr> <td rowspan="2" style="width: 10%;">P.O</td> <td colspan="16" style="text-align: center;">Week</td> </tr> <tr> <td style="width: 5%;">1</td> <td style="width: 5%;">2</td> <td style="width: 5%;">3</td> <td style="width: 5%;">4</td> <td style="width: 5%;">5</td> <td style="width: 5%;">6</td> <td style="width: 5%;">7</td> <td style="width: 5%;">8</td> <td style="width: 5%;">9</td> <td style="width: 5%;">10</td> <td style="width: 5%;">11</td> <td style="width: 5%;">12</td> <td style="width: 5%;">13</td> <td style="width: 5%;">14</td> <td style="width: 5%;">15</td> <td style="width: 5%;">16</td> </tr> </table>						P.O	Week																1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
P.O	Week																																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16																							
Short Course Description	Basic concepts of commercial lighting and power electrical installations; Basic provisions in commercial electrical installations (Electrical wiring Commercial) based on PUIL 2000, and other regulations; Electrical wiring Commercial Perfect standard lighting electrical installation for multi-storey buildings, Perfect standard lighting electrical installation for Commercial Buildings; - Electrical power installations in industrial environments, use of bank capacitors in electrical power systems and improvement of power factors in industrial environments; -Planning of Sharing Connection Devices (PHB), Grounding Systems, Lightning Distribution Installations; Electrical Machine Operation Techniques; Operation of the Electro Mechanical Control system; Operation of the Electronic Control system.																																						
References	Main :																																						
	1. Ray C. Mullirt. (1987). Electrical wiring commercial, sixth edition. Canda:Delmar Publisher Inc. Richard J. Fowler. (1994). Electricity principles and applications fourt edition. USA: Glencoe/McGraw-Hill. PUIL, 2000. Peraturan Umum Instalasi Listrik. Supari Muslim dan Joko. (2009). Teknik Perencanaan dan Pemasangan Instalasi Listrik. Jakarta: Dit-PSMK																																						
	Supporters:																																						
Supporting lecturer	SUPARI Prof. Dr. Joko, M.Pd., 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 are able to understand and explain the basic concepts of commercial lighting and power electrical installations	Explain the procedures for making diagram drawings and implementing commercial lighting and power electrical installations according to PUL 2000 and 2011	Criteria: 1.Accuracy of explanation, max score 100 2.Image accuracy, max score Form of Assessment : Participatory Activities, Portfolio Assessment	Lecturer short presentations, discussions, questions and answers, paper assignments, PPTs and 3 X 50 presentations			5%
2	Students are able to explain the basic provisions in commercial electrical installations (Electrical wiring Commercial) based on PUIL 2000, PUIL 2011, and IEC 364-1	Explain the basic provisions in commercial electrical installations (Electrical wiring Commercial) based on PUIL 2000, PUIL 2011, and IEC 364-1	Criteria: accuracy of explaining the main provisions in commercial electrical installations (Electrical wiring Commercial) based on PUIL 2000, PUIL 2011, and IEC 364-1, max score 50 Form of Assessment : Participatory Activities, Portfolio Assessment		Presentations, discussions and questions and answers, assignments, tracing sources of information, summarizing material and PPT 2 X 50		5%
3	Students are able to understand and design Commercial Electrical wiring: - Perfect standard lighting electrical installations for multi-storey buildings - Perfect standard lighting electrical installations for Commercial Buildings	Explaining and designing Commercial Electrical wiring: - Perfect standard lighting electrical installations for multi-storey buildings - Perfect standard lighting electrical installations for Commercial Buildings	Criteria: EA Letters (0-100)	Presentations, discussions, questions and answers and case studies 3 X 50			0%
4	Students are able to understand and design Commercial Electrical wiring: - Electrical power installations in industrial environments - Utilization of Capacitor Banks in electric power systems and improvement of power factors in industrial environments	Explain & design: - Electrical power installations in industrial environments - Explain Capacitor Banks in electrical power systems and power factor improvements in industrial environments	Criteria: EA Letters (0-100)	Presentations, discussions, questions and answers and case studies 2 X 50			0%
5	U.S.S	U.S.S	Criteria: EA Letters (0-100)	USS 3X50			0%
6	Students are able to understand and design Commercial Electrical wiring: Planning Connection Devices (PHB); - Grounding System; -Lightning Distribution Installation	Explain & design: - Planning for Liaison Devices (PHB); - Grounding System; - Lightning Distribution Installation	Criteria: EA Letters (0-100)	Presentations, discussions, questions and answers and case studies 3 X 50			0%
7	Students are able to understand & explain operating techniques: - Generator operation (synchronous) - Synchronous machine operation; -Asynchronous Machine Operation	Explain operating techniques: - Generator operation (synchronous) - Synchronous machine operation; - Asynchronous Machine Operation	Criteria: EA Letters (0-100)	Presentations, discussions, questions and answers and case studies 3 X 50			0%
8	Students are able to understand & explain: -Manual control; -Semi-automatic controller; - Automatic Control;	Explain & design: -Manual control; - Semi-automatic controller; - Automatic Control;	Criteria: EA Letters (0-100)	Presentations, discussions, questions and answers and case studies 3 X 50			0%

9	Students are able to explain - Electromechanical controllers -Star-delta controllers and dynamic braking	-Explain & design electromechanical controllers -Star-delta controllers and dynamic braking	Criteria: EA Letters (0-100)	Presentations, discussions, questions and answers and case studies 3 X 50			0%
10	U.S.S	U.S.S	Criteria: EA Letters (0-100)	USS 3X50			0%
11	Students are able to explain Problems, Maintenance and Repair of Synchronous Motors	Explaining Problems, Maintenance and Repair of Synchronous Motors	Criteria: EA Letters (0-100)	Presentations, discussions, questions and answers and case studies 3 X 50			0%
12	Students are able to explain Problems, Maintenance and Repair of Asynchronous Motors	explains Asynchronous Motor Troubleshooting, Maintenance and Repair	Criteria: EA Letters (0-100)	Presentations, discussions, questions and answers and case studies 3 X 50			0%
13	Students are able to explain Problems, Maintenance and Repair: Repulsion motors, capacitor motors, universal motors, and saded pole motors	explains Problems, Maintenance and Repair: Repulsion Motors, capacitor motors, universal motors, and saded pole motors	Criteria: EA Letters (0-100)	Presentations, discussions, questions and answers and case studies 3 X 50			0%
14	Students are able to explain - Operation of Electronic Control systems: - Application of transistors to control the rotation of DC electric motors; - Transistor application to control the rotation of 2 (two) motors sequentially.	Explain & design - Operation of Electronic Control systems: - Application of transistors to control the rotation of DC electric motors; - Application of transistors to control the rotation of 2 (two) motors sequentially.	Criteria: EA Letters (0-100)	Presentations, discussions, questions and answers and case studies 3 X 50			0%
15	U.S.S	U.S.S	Criteria: EA Letters (0-100)	USS 3X50			0%
16	Students are able to explain Electronic Controllers: - 68HC11 microcontroller as a 3 phase induction motor controller; - Micronrol AT89S8252 as an AC motor rotation controller	Explain and design Electronic Controllers: - 68HC11 microcontroller as a 3 phase induction motor controller; - Micronrol AT89S8252 as an AC motor rotation controller	Criteria: EA Letters (0-100)	Presentations, discussions, questions and answers and case studies 3 X 50			0%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	5%
2.	Portfolio Assessment	5%
		10%

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.

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.