	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 System Control	2020102058		T=2	P=0	ECTS=3.18	5	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	Dr. Lusia Rakhmawati, S.T., M.T.

Learning model	**Project Based Learning**
Program Learning Outcomes (PLO)	**PLO study program which is charged to the course**
	Program Objectives (PO)
	PLO-PO Matrix

	P.O

PO Matrix at the end of each learning stage (Sub-PO)

P.O	Week															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Short Course Description	Provides knowledge about modeling, control and stability of electrical energy systems. The concept of electrical energy stability, modeling and analysis of synchronous machines, electrical energy system components, power transfer, load models and excitation systems.
References	**Main :**

1. Kundur, Prabha. 1994. Power System Stability and Control , EPRI, McGraw Hill.
2. Elgerd, Olle I. 1971. Electric Energy System Theory: An Introduction , McGraw Hill.
3. Anderson dan Fouad. 2003. Power System Control and Stability, 2nd Edition . Wiley-Interscience.
4. Fabio. 2003. Electric Power System, Analysis and Control . Wiley-Interscience.
5. Grigsby. 2006. Electric Power Engineering Handbook 2nd Edition . Taylor and Francis Group

Supporters:	
Supporting lecturer	Dr. Tri Rijanto, M.Pd., M.T. Fendi Achmad, S.Pd., M.Pd.

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	Explain the principles of Electric Power System Control	1. Explain the electric power system. 2. Explain the stability and control of dynamic systems. 3. Explain the classification of dynamic electric power systems. 4. Explain the safety of electrical power systems.	**Criteria:** Participation: carried out by observing student activities	Lectures, discussions and questions and answers 2 X 50			0%
2	Explain the components contained in an electric power system	1. Explains supply stability. 2. Explains the distribution of electrical energy with good quality. 3. Explain the economical generation and transmission of electric power. 4. Explain the structure of an electric power system 5. Explain amplifier/exiter and automatic voltage regulator. 6. Explain the turbine and governor system 7. Explain transmission and distribution networks	**Criteria:** 1. Participation: carried out by observing student activities 2. Assignment: paper presented in class	Lectures, discussions and questions and answers 2 X 50			0%

3	Explain the components contained in an electric power system	1. Explains supply stability. 2. Explains the distribution of electrical energy with good quality. 3. Explain the economical generation and transmission of electric power. 4. Explain the structure of an electric power system 5. Explain amplifier/exiter and automatic voltage regulator. 6. Explain the turbine and governor system 7. Explain transmission and distribution networks	**Criteria:** 1. Participation: carried out by observing student activities 2. Assignment: paper presented in class	Lectures, discussions and questions and answers 2 X 50			0%
4	Explain the components contained in an electric power system	1. Explains supply stability. 2. Explains the distribution of electrical energy with good quality. 3. Explain the economical generation and transmission of electric power. 4. Explain the structure of an electric power system 5. Explain amplifier/exiter and automatic voltage regulator. 6. Explain the turbine and governor system 7. Explain transmission and distribution networks	**Criteria:** 1. Participation: carried out by observing student activities 2. Assignment: paper presented in class	Lectures, discussions and questions and answers 2 X 50			0%
5	Explain voltage stability	1. Explain the stability criteria 2. explains critical load demand and voltage collapse 3. Explain static analysis	**Criteria:** Participation: carried out by observing activities.	Discussion lectures and questions and answers 2 X 50			0%

6	Explain frequency stability and control	1. Explain automatic generation control 2. explain rotor swing in generator 3. explain frequency drop 4. explains Primary, secondary and tertiary control 5. Explain the defense plan against frequency instability	**Criteria:** Participation: carried out by observing student activities	Lectures, discussions and questions and answers 2 X 50			0%
7	Explain frequency stability and control	1. Explain automatic generation control 2. explain rotor swing in generator 3. explain frequency drop 4. explains Primary, secondary and tertiary control 5. Explain the defense plan against frequency instability	**Criteria:** Participation: carried out by observing student activities	Lectures, discussions and questions and answers 2 X 50			0%
8							0%
9							0%
10							0%
11							0%
12							0%
13							0%
14							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** 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.