	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
Control System Basics	2020103019	Compulsory Study Program Subjects	T=3	P=0	ECTS=4.77	4	May 1, 2023

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
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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 electronic control systems to gain a thorough understanding of engineering principles.
PO - 2	Able to understand the need for lifelong learning in the field of electronic control systems related to relevant current issues

PLO-PO Matrix

P.O
PO-1
PO-2

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
PO-1																
PO-2																

Short Course Description: Introduction to the concepts and general characteristics of regulatory systems, the meaning of open and closed loop transfer functions, block diagrams and their simplifications, system characteristics (sensitivity, accuracy, stability), transient analysis of first order and second order systems, methods for determining system stability, control techniques on process control, PID compensation techniques and linear system design planning.

References

Main :

1. Edward Arnold. 1995. Priciples of Control Engineering,Fred White
2. Ogata. 1997, Modern Control System 3rd Ed, Prentice Hall

Supporters:

1. Joseph J.Di Stefano. 1992,Sistem Pengendalian Dan Umpan Balik, Erlangga, Jakarta

Supporting lecturer: Endryansyah, 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 are able to explain basic knowledge of control, signal and system concepts	Students are able to explain basic knowledge of control, signal and system concepts	**Criteria:** Evaluation Rubric **Form of Assessment** : Participatory Activities	IN 3 X 50		**Material:** Meeting material 1 **Reader:** *Edward Arnold. 1995. Principles of Control Engineering, Fred White*	5%
2	Students are able to explain basic knowledge of control, signal and system concepts	Students are able to explain basic knowledge of control, signal and system concepts correctly	**Criteria:** Evaluation Rubric **Form of Assessment** : Participatory Activities	IN 3 X 50		**Material:** Meeting material 2 **Reader:** *Ogata. 1997, Modern Control Systems 3rd Ed, Prentice Hall*	5%
3	Students are able to understand the concept of closed and open loop regulatory systems and their solution methods and applications.	- Explain the concept of closed and open loop regulatory systems - Explain examples of various problems related to closed loop and open loop regulatory systems and their solution techniques.	**Criteria:** Evaluation Rubric **Form of Assessment** : Participatory Activities	Lecture, Discussion, 3 X 50		**Material:** Meeting material 3 **Reader:** *Edward Arnold. 1995. Principles of Control Engineering, Fred White*	5%
4	Students are able to understand the concept of closed and open loop regulatory systems and their solution methods and applications.	- Explain the concept of closed and open loop regulatory systems - Explain examples of various problems related to closed loop and open loop regulatory systems and their solution techniques.	**Criteria:** Evaluation Rubric **Form of Assessment** : Participatory Activities	Lecture, Discussion, 3 X 50		**Material:** Meeting material 4 **Reader:** *Joseph J. Di Stefano. 1992, Control and Feedback Systems, Erlangga, Jakarta*	5%
5	Students are able to understand the use of the Laplace Transformation in regulatory systems.	- Explain the Laplace transformation, inverse Laplace transformation and differential equations; - Explain the properties of the Laplace transformation. - Implement existing questions with the MATLAB program	**Criteria:** Evaluation Rubric	contextual Instruction 3 X 50		**Material:** Meeting material 5 **Reference:** *Ogata. 1997, Modern Control Systems 3rd Ed, Prentice Hall*	5%

6	Students are able to understand the use of the Laplace Transformation in regulatory systems.	- Explain the Laplace transformation, inverse Laplace transformation and differential equations; - Explain the properties of the Laplace transformation. - Implement existing questions with the MATLAB program	**Criteria:** Evaluation Rubric **Form of Assessment** : Participatory Activities	Case method 3 X 50		**Material:** Meeting material 6 **Reader:** *Edward Arnold. 1995. Principles of Control Engineering, Fred White*	5%
7	Students are able to understand the use of the Laplace Transformation in regulatory systems.	- Explain the Laplace transformation, inverse Laplace transformation and differential equations; - Explain the properties of the Laplace transformation. - Implement existing questions with the MATLAB program	**Criteria:** Evaluation Rubric **Form of Assessment** : Participatory Activities	Case method 3 X 50		**Material:** Meeting material 6 **Reader:** *Edward Arnold. 1995. Principles of Control Engineering, Fred White*	5%
8	Students are able to understand the use of the Laplace Transformation in regulatory systems.	- Explain the Laplace transformation, inverse Laplace transformation and differential equations; - Explain the properties of the Laplace transformation. - Implement existing questions with the MATLAB program	**Criteria:** Evaluation Rubric **Form of Assessment** : Participatory Activities	Case method 3 X 50		**Material:** Meeting material 6 **Reader:** *Edward Arnold. 1995. Principles of Control Engineering, Fred White*	5%
9	Students are able to understand the use of the Laplace Transformation in regulatory systems.	- Explain the Laplace transformation, inverse Laplace transformation and differential equations; - Explain the properties of the Laplace transformation. - Implement existing questions with the MATLAB program	**Criteria:** Evaluation Rubric	Case method 3 X 50		**Material:** Meeting material 6 **Reader:** *Edward Arnold. 1995. Principles of Control Engineering, Fred White*	5%
10	Students are able to understand the use of the Laplace Transformation in regulatory systems.	- Explain the Laplace transformation, inverse Laplace transformation and differential equations; - Explain the properties of the Laplace transformation. - Implement existing questions with the MATLAB program	**Criteria:** Evaluation Rubric **Form of Assessment** : Participatory Activities	Case method 3 X 50		**Material:** Meeting material 6 **Reader:** *Edward Arnold. 1995. Principles of Control Engineering, Fred White*	5%

11	Students are able to understand the use of the Laplace Transformation in regulatory systems.	- Explain the Laplace transformation, inverse Laplace transformation and differential equations; - Explain the properties of the Laplace transformation. - Implement existing questions with the MATLAB program	**Criteria:** Evaluation Rubric **Form of Assessment** : Participatory Activities	Case method 3 X 50		**Material:** Meeting material 6 **Reader:** *Edward Arnold. 1995. Principles of Control Engineering, Fred White*	5%
12	Students are able to understand the use of the Laplace Transformation in regulatory systems.	- Explain the Laplace transformation, inverse Laplace transformation and differential equations; - Explain the properties of the Laplace transformation. - Implement existing questions with the MATLAB program	**Criteria:** Evaluation Rubric **Form of Assessment** : Participatory Activities	Case method 3 X 50		**Material:** Meeting material 6 **Reader:** *Edward Arnold. 1995. Principles of Control Engineering, Fred White*	5%
13	Students are able to understand the use of the Laplace Transformation in regulatory systems.	- Explain the Laplace transformation, inverse Laplace transformation and differential equations; - Explain the properties of the Laplace transformation. - Implement existing questions with the MATLAB program	**Criteria:** Evaluation Rubric **Form of Assessment** : Participatory Activities	Case method 3 X 50		**Material:** Meeting material 6 **Reader:** *Edward Arnold. 1995. Principles of Control Engineering, Fred White*	5%
14	Students are able to understand the use of the Laplace Transformation in regulatory systems.	- Explain the Laplace transformation, inverse Laplace transformation and differential equations; - Explain the properties of the Laplace transformation. - Implement existing questions with the MATLAB program	**Criteria:** Evaluation Rubric **Form of Assessment** : Participatory Activities	Case method 3 X 50		**Material:** Meeting material 6 **Reader:** *Edward Arnold. 1995. Principles of Control Engineering, Fred White*	5%
15	Students are able to understand the use of the Laplace Transformation in regulatory systems.	- Explain the Laplace transformation, inverse Laplace transformation and differential equations; - Explain the properties of the Laplace transformation. - Implement existing questions with the MATLAB program	**Criteria:** Evaluation Rubric **Form of Assessment** : Participatory Activities	Case method 3 X 50		**Material:** Meeting material 6 **Reader:** *Edward Arnold. 1995. Principles of Control Engineering, Fred White*	5%

16	Students are able to understand the use of the Laplace Transformation in regulatory systems.	- Explain the Laplace transformation, inverse Laplace transformation and differential equations; - Explain the properties of the Laplace transformation. - Implement existing questions with the MATLAB program	**Criteria:** Evaluation Rubric **Form of Assessment** : Participatory Activities	Case method 3 X 50		**Material:** Meeting material 6 **Reader:** *Edward Arnold. 1995. Principles of Control Engineering, Fred White*	5%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	70%
		70%

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.