	Universitas Negeri Surabaya Faculty of Mathematics and Natural Sciences Undergraduate Mathematics Study Program	Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Mathematical Modeling	4420103088		T=3	P=0	ECTS=4.77	4	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	Prof. Dr. Raden Sulaiman, M.Si.

Learning model	**Case Studies**
Program Learning Outcomes (PLO)	**PLO study program that 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	Studying the basic concepts of mathematical modeling, implementing modeling of everyday life phenomena (physics, biology, chemistry, economics, social) into mathematical models in the fields of statistics, linear programming, graph theory, differential equations, systems and control theory, analyzing and completing models, evaluating and interpreting model completion. The approach is problem and project based learning which requires students to be able to prepare reports and present the results well.
References	**Main :**

1. Giordano F.R, Fox W.P, and Horton. S.B, 2014. A First Course in Mathematical Modelling, Fifth Edition. Brooks/Cole, Cengage Learning, Boston, MA 02210 USA
2. Dym, C. L., 2004. Principle of Mathematical Modelling, 2nd edition. Elsevier Academic Press, California.
3. Meyer W.J, 1984. Consepts of Mathematical Modeling. Dover Publications, inc, Mineola, New York.

	Supporters:
Supporting lecturer	Dr. Yusuf Fuad, M.App.Sc. Dr. Abadi, M.Sc. Dr. Dian Savitri, S.Si., M.Si. Yuliani Puji Astuti, S.Si., M.Si. Dimas Avian Maulana, S.Si., M.Si.

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 meaning of modeling, basic concepts and principles of mathematical modeling (CLO-1, CLO-2)	1. Explain the meaning of mathematical modeling 2. Explains the principles of mathematical modeling		Lectures using LMS: Vinesa 3 X 50			0%
2	Understand the meaning of modeling, basic concepts and principles of mathematical modeling (CLO-1, CLO-2)	1. Explains the principles of mathematical modeling. 2. Analyzing a mathematical model based on modeling principles		Discussion learning approach using LMS: Vinesa 3 X 50			0%
3	Understand the meaning of modeling, basic concepts and principles of mathematical modeling (CLO-1, CLO-2)	1. Explain the meaning of mathematical modeling 2. Explains the principles of mathematical modeling 3. Analyzing a mathematical model based on modeling principles		Learning approach (discussion and question and answer) in the LMS 3 X 50 forum			0%
4	Understand mathematical modeling through case studies of simple problems in everyday life (CLO-2, CLO-3)	1. Create mathematical models of simple problems in everyday life 2. Analyze and solve mathematical models 3. Interpreting mathematical model solutions		Discussion in the discussion forum on LMS Answering practice questions on LMS 3 X 50			0%
5	Understand mathematical modeling through case studies of simple problems in everyday life (CLO-2, CLO-3)	1. Create mathematical models of simple problems in everyday life 2. Analyze and solve mathematical models 3. Interpreting mathematical model solutions		Discussion in the discussion forum on LMS Answering practice questions on LMS 3 X 50			0%
6	Understand mathematical modeling through case studies of simple problems in everyday life (CLO-2, CLO-3)	1. Create mathematical models of simple problems in everyday life. 2. Analyze and solve mathematical models. 3. Interpreting mathematical model solutions		Learning approach with discussions and answering practice questions in discussion forums and LMS 3 X 50			0%

7	Understand mathematical modeling through case studies of simple problems in everyday life (CLO-2, CLO-3)	1. Create mathematical models of simple problems in everyday life 2. Analyze and solve mathematical models 3. Interpreting mathematical model solutions		Discussion learning approach and answering 3 X 50 practice questions			0%
8	U.S.S	U.S.S		USS 3X50			0%
9	Understand the mathematical modeling process in dynamic and control system problems (CLO-1, CLO-2, CLO-3)	1. Creating mathematical models of problems in everyday life in dynamic and control models 2. Analyze and solve mathematical models in dynamic systems 3. Simulate the model solution numerically 4. Interpreting dynamic model solutions		The problem-solving based learning approach takes the form of a 3 X 50 group project			0%
10	Understand the mathematical modeling process in dynamic and control system problems (CLO-1, CLO-2, CLO-3)	1. Mathematical models of problems in everyday life in dynamic and control models 2. Analysis and solution of mathematical models in dynamic systems 3. Simulate the solution of the model numerically 4. Interpretation of dynamic model solutions		A problem-solving based learning approach in the form of a 3 X 50 group project			0%
11	Understand the mathematical modeling process in dynamic and control system problems (CLO-1, CLO-2, CLO-3)	1. Create mathematical models of problems in everyday life in dynamic and control models 2. Analyze and solve mathematical models in dynamic systems 3. Simulate model solutions numerically Interpret dynamic model solutions		A problem-solving based learning approach in the form of a 3 X 50 group project			0%

12	Understand the mathematical modeling process in dynamic and control system problems (CLO-1, CLO-2, CLO-3)	1. Create mathematical models of problems in everyday life in dynamic and control models 2. Analyze and solve mathematical models in dynamic systems 3. Simulate model solutions numerically 4. Interpret dynamic model solutions		A problem-solving based learning approach in the form of a 3 X 50 group project			0%
13	Understand the mathematical modeling process in dynamic and control system problems (CLO-1, CLO-2, CLO-3)	1. Create mathematical models of problems in everyday life in dynamic and control models 2. Analyze and solve mathematical models in dynamic systems 3. Simulate model solutions numerically 4. Interpret dynamic model solutions		A learning approach based on 3 X 50 group project problem solving			0%
14	Understand the mathematical modeling process in dynamic and control system problems (CLO-1, CLO-2, CLO-3)	1. Creating mathematical models of problems in everyday life in dynamic and control models 2. Analyze and solve mathematical models in dynamic systems 3. Simulate the model solution numerically 4. Interpreting dynamic model solutions		Mathematical model completion progress activities (articles and solutions) in LSM 3 X 50			0%
15	Understand the mathematical modeling process in dynamic and control system problems (CLO-1, CLO-2, CLO-3)	1. Create mathematical models of problems in everyday life in dynamic and control models 2. Analyze and solve mathematical models in dynamic systems 3. Simulate model solutions numerically 4. Interpret dynamic model solutions		3 X 50			0%
16							0%

Evaluation Percentage Recap: Case Study

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** 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.