



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
Basics of Mathematics	4420103032	Algebra	T=3	P=0	ECTS=4.77	1	June 13, 2022

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

Learning model	Case Studies
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Program Learning Outcomes (PLO)	PLO study program that is charged to the course				
	Program Objectives (PO)				
	PO - 1	Explains the basic understanding of mathematics as a deductive-axiomatic structure, structured thinking, reasoning, and rational-deductive logic, sets, relations, functions, logic, quantifiers, conclusions, and the validity of evidence or conclusions.			
	PO - 2	Expressing problem statements mathematically in the form of relations, functions, or mathematical statements and solving them			
	PO - 3	Prove mathematical statements using some appropriate method			
	PLO-PO Matrix				
		<table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>P.O</td></tr> <tr><td>PO-1</td></tr> <tr><td>PO-2</td></tr> <tr><td>PO-3</td></tr> </table>	P.O	PO-1	PO-2
P.O					
PO-1					
PO-2					
PO-3					

PO Matrix at the end of each learning stage (Sub-PO)																																																																																					
	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">P.O</th> <th colspan="16">Week</th> </tr> <tr> <th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th>11</th><th>12</th><th>13</th><th>14</th><th>15</th><th>16</th> </tr> </thead> <tbody> <tr> <td>PO-1</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>PO-2</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>PO-3</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </tbody> </table>	P.O	Week																1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	PO-1																	PO-2																	PO-3																
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PO-3																																																																																					

Short Course Description	Examining mathematical characteristics, deductive-axiomatic systems and structures, logical operations, quantifiers, drawing conclusions, sets, relations and functions
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References	Main :	
		<ol style="list-style-type: none"> Masriyah, 2017. Dasar-Dasar Matematika , Surabaya: Unesa Press. Yunus, M. 2007. Logika: Suatu Pengantar . Yogyakarta: Graha Ilmu. Robert R. Stoll. 1979. Set Theory and Logic. New York: Dover Publication
	Supporters:	

	<ol style="list-style-type: none"> Yunus, M. 2007. Logika: Suatu Pengantar. Yogyakarta: Graha Ilmu. Kunnen, K. 2009. The Foundation of Mathematics Vol 19. London: College Publications
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Supporting lecturer		Dr. Yusuf Fuad, M.App.Sc. Prof. Dr. Raden Sulaiman, M.Si. Rudianto Artiono, S.Pd., M.Si. Budi Priyo Prawoto, S.Pd., M.Si. Muhammad Jakfar, S.Si., M.Si. Nina Rinda Prihartiwi, S.Pd., M.Pd. Yulia Izza El Milla, 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	Understanding Inductive and Deductive Thinking Patterns, Axiom Systems, definition theorems, and Finite Geometry.	1. Explaining Inductive and Deductive Thinking Patterns, Axiom Systems, definition theorems, and Finite Geometry.	Criteria: quantitative, test Form of Assessment : Practice / Performance	Direct teaching with an Expository approach and Small Group Discussion 150		Material: Inductive and deductive thinking patterns, axiom system Reader: Masriyah, 2017. <i>Basics of Mathematics</i> , Surabaya: Unesa Press. Yunus, M. 2007. <i>Logic: An Introduction</i> . Yogyakarta: Graha Ilmu.	2%
2	Understanding Inductive and Deductive Thinking Patterns, Axiom Systems, definition theorems, and Finite Geometry.	Explaining Inductive and Deductive Thinking Patterns, Axiom Systems, definition theorems, and Finite Geometry. Applying Inductive and Deductive Thinking Patterns, Axiom Systems, definition theorems, and Finite Geometry in mathematics and everyday life	Criteria: quantitative Form of Assessment : Participatory Activities	Collaborative Learning Approach (Lecture, discussion and question and answer) 3 X 50		Material: axiom system Reference: Masriyah, 2017. <i>Basics of Mathematics</i> , Surabaya: Unesa Press. Yunus, M. 2007. <i>Logic: An Introduction</i> . Yogyakarta: Graha Ilmu.	2%
3	Understanding Inductive and Deductive Thinking Patterns, Axiom Systems, definition theorems, and Finite Geometry.	Explaining Inductive and Deductive Thinking Patterns, Axiom Systems, definition theorems, and Finite Geometry. Applying Inductive and Deductive Thinking Patterns, Axiom Systems, definition theorems, and Finite Geometry in mathematics and everyday life	Criteria: quantitative Form of Assessment : Participatory Activities	Collaborative Learning Approach (Lecture, discussion and question and answer) 3 X 50		Material: axiom system Reference: Masriyah, 2017. <i>Basics of Mathematics</i> , Surabaya: Unesa Press. Yunus, M. 2007. <i>Logic: An Introduction</i> . Yogyakarta: Graha Ilmu.	2%

4	Understanding Logic, conjunctions in logic, tautology, quantifiers, premises and arguments	· Explain the concept of logic, conjunctions in logic, tautology, quantifiers, premises and arguments. · Apply the concept of logic, conjunctions in logic, tautology, quantifiers, premises and arguments.	Criteria: Explain the concept of logic, conjunctions in logic, tautology, quantifiers, premises and arguments. Form of Assessment : Participatory Activities	Collaborative Learning Approach (Lecture, discussion and question and answer), solving cases together 3 X 50		Material: logic Reader: <i>Robert R. Stoll. 1979. Set Theory and Logic. New York: Dover Publications</i>	2%
5	Understanding Logic, conjunctions in logic, tautology, quantifiers, premises and arguments	· Explain the concept of logic, conjunctions in logic, tautology, quantifiers, premises and arguments. · Apply the concept of logic, conjunctions in logic, tautology, quantifiers, premises and arguments.	Criteria: Applying the concept of Logic, conjunctions in logic, tautology, quantifiers, premises and arguments. Form of Assessment : Participatory Activities	Collaborative Learning Approach (Lecture, discussion and question and answer), solving cases together 3 X 50		Material: logic Reader: <i>Robert R. Stoll. 1979. Set Theory and Logic. New York: Dover Publications</i>	2%
6	Understand the validity of proofs, indirect proofs, and the application of logic in electrical networks	· Explain the concepts of proof validity, indirect proof, and logic applications in electrical networks. · Apply the concepts of proof validity, indirect proof, and logic applications in power networks	Criteria: · Explain the concept of validity of proof, indirect proof, and application of logic Form of Assessment : Participatory Activities	Collaborative Learning Approach (Lecture, discussion and question and answer), completing cases related to 3 X 50 validation		Material: logic Reader: <i>Robert R. Stoll. 1979. Set Theory and Logic. New York: Dover Publications</i>	2%
7	Understand the validity of proofs, indirect proofs, and the application of logic in electrical networks	· Explain the concepts of proof validity, indirect proof, and logic applications in electrical networks. · Apply the concepts of proof validity, indirect proof, and logic applications in power networks	Criteria: Apply the concept of validity of proof, indirect proof, and application of logic in electrical networks Form of Assessment : Participatory Activities	Collaborative Learning Approach (Lectures, discussions and questions and answers), solving cases related to the validity of arguments prepared by students themselves based on existing phenomena (happening) 3 X 50		Material: logic Reader: <i>Robert R. Stoll. 1979. Set Theory and Logic. New York: Dover Publications</i> Material: logic References: <i>Yunus, M. 2007. Logic: An Introduction. Yogyakarta: Graha Ilmu.</i>	3%

8	UTS	Definitions, theorems, logic	Criteria: Definitions, theorems, logic Form of Assessment : Practical Assessment, Test	Written Test 2x50		Material: logic Reader: <i>Robert R. Stoll. 1979. Set Theory and Logic. New York: Dover Publications</i> Material: axiom system Reference: <i>Masriyah, 2017. Basics of Mathematics, Surabaya: Unesa Press. Yunus, M. 2007. Logic: An Introduction. Yogyakarta: Graha Ilmu.</i>	20%
9	Understand sets and their operations, set families, and power sets	· Explain the concept of sets and their operations, set families, and power sets · Apply the concept of sets and their operations, set families, and power sets	Criteria: · Explain the concept of sets and their operations, families of sets, and power sets Form of Assessment : Participatory Activities	Collaborative Learning Approach (Lecture, discussion and question and answer) 3 X 50		Material: Bibliography : <i>Masriyah, 2017. Basics of Mathematics, Surabaya: Unesa Press. Yunus, M. 2007. Logic: An Introduction. Yogyakarta: Graha Ilmu.</i> Material: set Bibliography: <i>Kunnen, K. 2009. The Foundation of Mathematics Vol 19. London: College Publications</i>	3%
10	Understand sets and their operations, set families, and power sets	· Explain the concept of sets and their operations, set families, and power sets · Apply the concept of sets and their operations, set families, and power sets	Criteria: Apply the concept of sets and their operations, set families, and power sets Form of Assessment : Participatory Activities	Collaborative Learning Approach (Lecture, discussion and question and answer) 3 X 50		Material: collection Bibliography: <i>Robert R. Stoll. 1979. Set Theory and Logic. New York: Dover Publications</i> Material: set Bibliography: <i>Kunnen, K. 2009. The Foundation of Mathematics Vol 19. London: College Publications</i>	3%

11	Understand relationships and functions	<ul style="list-style-type: none"> · Explain the concept of relations and functions. · Apply the concepts of relations and functions 	<p>Criteria:</p> <ul style="list-style-type: none"> · Explain the concept of relations and functions <p>Form of Assessment : Practice / Performance</p>	Collaborative Learning Approach (Lecture, discussion and question and answer) 3 X 50		<p>Material: relations and functions Reader: Robert R. Stoll. 1979. <i>Set Theory and Logic</i>. New York: Dover Publications</p> <hr/> <p>Material: relations and functions References: Yunus, M. 2007. <i>Logic: An Introduction</i>. Yogyakarta: Graha Ilmu.</p>	8%
12	Understand relationships and functions	<ul style="list-style-type: none"> · Explain the concept of relations and functions. · Apply the concepts of relations and functions 	<p>Criteria:</p> <ul style="list-style-type: none"> Apply the concepts of relations and functions <p>Form of Assessment : Practice / Performance</p>	Collaborative Learning Approach (Lecture, discussion and question and answer) 3 X 50		<p>Material: relations and functions Reference: Masriyah, 2017. <i>Basics of Mathematics</i>, Surabaya: Unesa Press. Yunus, M. 2007. <i>Logic: An Introduction</i>. Yogyakarta: Graha Ilmu.</p> <hr/> <p>Material: relations and functions References: Kunnen, K. 2009. <i>The Foundation of Mathematics Vol 19</i>. London: College Publications</p>	8%
13	Understanding the cardinality of sets, posets and similar sets	<ul style="list-style-type: none"> · Explain the concept of cardinality of sets, posets and similar sets · Apply the concept of cardinality of sets, posets and similar sets in solving problems 	<p>Criteria:</p> <ul style="list-style-type: none"> Explain the concept of cardinality of sets, posets and similar sets <p>Form of Assessment : Practice / Performance</p>	Collaborative Learning Approach (Lecture, discussion and question and answer) 3 X 50		<p>Material: poset Library: Masriyah, 2017. <i>Basics of Mathematics</i>, Surabaya: Unesa Press. Yunus, M. 2007. <i>Logic: An Introduction</i>. Yogyakarta: Graha Ilmu.</p> <hr/> <p>Material: poset Bibliography: Kunnen, K. 2009. <i>The Foundation of Mathematics Vol 19</i>. London: College Publications</p>	8%

14	Understanding the cardinality of sets, posets and similar sets	· Explain the concept of cardinality of sets, posets and similar sets · Apply the concept of cardinality of sets, posets and similar sets in solving problems	Criteria: Applying the concept of cardinality of sets, posets and similar sets in solving problems Form of Assessment : Practice / Performance	Collaborative Learning Approach (Lecture, discussion and question and answer) 3 X 50		Material: poset Library: <i>Masriyah, 2017. Basics of Mathematics, Surabaya: Unesa Press. Yunus, M. 2007. Logic: An Introduction. Yogyakarta: Graha Ilmu.</i> Material: poset Bibliography: <i>Kunnen, K. 2009. The Foundation of Mathematics Vol 19. London: College Publications</i>	5%
15	Understanding the cardinality of sets, posets and similar sets	· Explain the concept of cardinality of sets, posets and similar sets · Apply the concept of cardinality of sets, posets and similar sets in solving problems	Criteria: Applying the concept of cardinality of sets, posets and similar sets in solving problems Form of Assessment : Practice / Performance	Collaborative Learning Approach (Lecture, discussion and question and answer) 3 X 50		Material: poset Library: <i>Masriyah, 2017. Basics of Mathematics, Surabaya: Unesa Press. Yunus, M. 2007. Logic: An Introduction. Yogyakarta: Graha Ilmu.</i> Material: poset Bibliography: <i>Kunnen, K. 2009. The Foundation of Mathematics Vol 19. London: College Publications</i>	5%
16	UAS	Apply the concepts of sets, relations, functions, set cardinality, posets and similar sets in solving problems	Criteria: Apply the concepts of sets, relations, functions, set cardinality, posets and similar sets in solving problems Form of Assessment : Test	Written Test 2x50		Material: all Library: <i>Masriyah, 2017. Basics of Mathematics, Surabaya: Unesa Press. Yunus, M. 2007. Logic: An Introduction. Yogyakarta: Graha Ilmu.</i>	30%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	19%
2.	Practical Assessment	10%
3.	Practice / Performance	31%
4.	Test	40%
		100%

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.