



**Universitas Negeri Surabaya**  
**Faculty of Mathematics and Natural Sciences**  
**Bachelor of Mathematics Education Study Program**

Document Code

**SEMESTER LEARNING PLAN**

<b>Courses</b>	<b>CODE</b>	<b>Course Family</b>	<b>Credit Weight</b>			<b>SEMESTER</b>	<b>Compilation Date</b>
Abstract Algebra I	8420203010		T=3	P=0	ECTS=4.77	4	July 18, 2024
<b>AUTHORIZATION</b>	<b>SP Developer</b>		<b>Course Cluster Coordinator</b>			<b>Study Program Coordinator</b>	
	.....		.....			Dr. Endah Budi Rahaju, M.Pd.	
<b>Learning model</b>	<b>Case Studies</b>						
<b>Program Learning Outcomes (PLO)</b>	PLO study program that is charged to the course						
	Program Objectives (PO)						
	PLO-PO Matrix						
		<table border="1" style="margin: auto;"> <tr><td style="width: 100px; height: 20px;">P.O</td></tr> </table>					
P.O							
<b>Short Course Description</b>	This course examines group structures, relationships between structures, Lagrange's theorem, Isomorphism theorem, Cayley's theorem, and symmetry groups through active learning presented in theory with a deductive approach.						
<b>References</b>	<b>Main :</b>						
	1. [1] Gallian, J. 2011. <i>Contemporary Abstract Algebra</i> , Boston: Houghton Mifflin College Div. [2] Herstein, I.N. 1975. <i>Topics in Algebra 2nd Edition</i> . New York: John Wiley and Sons. [3] Herstein, I.N. 1990. <i>Abstract Algebra</i> . New York: John Wiley and Sons.						
	<b>Supporters:</b>						
<b>Supporting lecturer</b>	Dr. Endah Budi Rahaju, M.Pd. Prof. Dr. Dwi Juniati, M.Si. Budi Priyo Prawoto, S.Pd., M.Si. Dini Kinati Fardah, S.Pd.Si., M.Pd. Muhammad Jakfar, S.Si., M.Si.						
<b>Week-</b>	<b>Final abilities of each learning stage (Sub-PO)</b>	<b>Evaluation</b>		<b>Help Learning, Learning methods, Student Assignments, [ Estimated time]</b>		<b>Learning materials [ References ]</b>	<b>Assessment Weight (%)</b>
		<b>Indicator</b>	<b>Criteria &amp; Form</b>	<b>Offline ( offline )</b>	<b>Online ( online )</b>		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

1	<ul style="list-style-type: none"> <li>· Understand sets and their operations</li> <li>· Understand functions and composition of functions</li> <li>· Understand elementary number theory</li> </ul>	<ul style="list-style-type: none"> <li>· Determining the results of operations between two sets</li> <li>· Determining the cross product of two known sets</li> <li>· Showing the relationship between relations and the cross product of two sets</li> <li>· Determining whether a mapping is an injective or surjective or bijective mapping</li> <li>· Determining the composition of two or more functions</li> <li>· Identifying whether an operation Sets are commutative, associative, have identity elements and have inverses</li> </ul>		Discussion and Questions and Answers 6 X 50		0%
2	<ul style="list-style-type: none"> <li>· Understand sets and their operations</li> <li>· Understand functions and composition of functions</li> <li>· Understand elementary number theory</li> </ul>	<ul style="list-style-type: none"> <li>· Determining the results of operations between two sets</li> <li>· Determining the cross product of two known sets</li> <li>· Showing the relationship between relations and the cross product of two sets</li> <li>· Determining whether a mapping is an injective or surjective or bijective mapping</li> <li>· Determining the composition of two or more functions</li> <li>· Identifying whether an operation Sets are commutative, associative, have identity elements and have inverses</li> </ul>		Discussion and Questions and Answers 6 X 50		0%
3	Understand the structure, types and characteristics of groups	<ul style="list-style-type: none"> <li>· Shows a set with certain operations forming a group</li> <li>· Gives examples of groups</li> <li>· Gives examples of everyday life that form a group structure</li> <li>· Identifying commutative groups</li> <li>· Shows a subset with operations that apply to it is a subgroup</li> <li>· Declares whether a particular subgroup is true or not</li> </ul>		Expository, Question and answer and discussion 9 X 50		0%
4	Understand the structure, types and characteristics of groups	<ul style="list-style-type: none"> <li>· Shows a set with certain operations forming a group</li> <li>· Gives examples of groups</li> <li>· Gives examples of everyday life that form a group structure</li> <li>· Identifying commutative groups</li> <li>· Shows a subset with operations that apply to it is a subgroup</li> <li>· Declares whether a particular subgroup is true or not</li> </ul>		Expository, Question and answer and discussion 9 X 50		0%

5	Understand the structure, types and characteristics of groups	<ul style="list-style-type: none"> <li>Shows a set with certain operations forming a group</li> <li>Gives examples of groups</li> <li>Gives examples of everyday life that form a group structure</li> <li>Identifying commutative groups</li> <li>Shows a subset with operations that apply to it is a subgroup</li> <li>Declares whether a particular subgroup is true or not</li> </ul>		Expository, Question and answer and discussion 9 X 50			0%
6	Understand the structure of cyclic groups and permutation groups with examples	<ul style="list-style-type: none"> <li>Identifying cyclic groups</li> <li>Determining the generator elements of a cyclic group</li> <li>Identifying permutation groups</li> </ul>		Expository, Question and answer and discussion 6 X 50			0%
7	Understand the structure of cyclic groups and permutation groups with examples	<ul style="list-style-type: none"> <li>Identifying cyclic groups</li> <li>Determining the generator elements of a cyclic group</li> <li>Identifying permutation groups</li> </ul>		Expository, Question and answer and discussion 6 X 50			0%
8							0%
9	Understand the concept of cosets and their properties	<ul style="list-style-type: none"> <li>Give examples of left/right cosets in a subgroup</li> <li>Determine the index of a subgroup in a group</li> <li>Prove the properties of cosets</li> </ul>		Expository, Question and answer and discussion 6 X 50			0%
10	Understand the concept of cosets and their properties	<ul style="list-style-type: none"> <li>Give examples of left/right cosets in a subgroup</li> <li>Determine the index of a subgroup in a group</li> <li>Prove the properties of cosets</li> </ul>		Expository, Question and answer and discussion 6 X 50			0%
11	understand the concept of normal subgroups and factor groups	<ol style="list-style-type: none"> <li>Determining a subgroup is a normal subgroup of a specified group</li> <li>Apply the normal subgroup theorem that left coset = right coset</li> <li>Proving that the intersection of two normal subgroups is a normal subgroup</li> <li>Shows the collection of all left/right cosets of a normal subgroup forming a group under a certain operation</li> </ol>		Expository, Question and answer and discussion 3 X 50			0%

12	understand the concept of normal subgroups and factor groups	<ol style="list-style-type: none"> <li>1. Determining a subgroup is a normal subgroup of a specified group</li> <li>2. Apply the normal subgroup theorem that left coset = right coset</li> <li>3. Proving that the intersection of two normal subgroups is a normal subgroup</li> <li>4. Shows the collection of all left/right cosets of a normal subgroup forming a group under a certain operation</li> </ol>		Expository, Question and answer and discussion 3 X 50			0%
13	understand the concept of normal subgroups and factor groups	<ol style="list-style-type: none"> <li>1. Determining a subgroup is a normal subgroup of a specified group</li> <li>2. Apply the normal subgroup theorem that left coset = right coset</li> <li>3. Proving that the intersection of two normal subgroups is a normal subgroup</li> <li>4. Shows the collection of all left/right cosets of a normal subgroup forming a group under a certain operation</li> </ol>		Expository, Question and answer and discussion 3 X 50			0%
14	Understand the concept of group homomorphism	<ol style="list-style-type: none"> <li>1. Identifying whether a mapping from group to group is a homomorphism or not</li> <li>2. Give an example of homomorphism</li> <li>3. Identifying whether a homomorphism is an isomorphism or not</li> </ol>		Expository, Question and answer and discussion 3 X 50			0%

15	Understand the concept of group homomorphism	1. Identifying whether a mapping from group to group is a homomorphism or not 2. Give an example of homomorphism 3. Identifying whether a homomorphism is an isomorphism or not		Expository, Question and answer and discussion 3 X 50			0%
16							0%

**Evaluation Percentage Recap: Case Study**

No	Evaluation	Percentage
		0%

**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.
- 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.
- 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.
- Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
- 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%.
- TM=Face to face, PT=Structured assignments, BM=Independent study.