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

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Solution to problem	8420202148		T=2	P=0	ECTS=3.18	4	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
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Learning model	**Project Based Learning**	
Program Learning Outcomes (PLO)	**PLO study program which is charged to the course**	
	PLO-10	Make decisions based on data/information in completing assignments that are the student's responsibility and evaluate the work that has been done
	Program Objectives (PO)	
	PO - 1	Able to solve mathematical problems (algebra, geometry, statistics, discrete, probability, mathematical literacy, and numeracy)
	PO - 2	Able to explain problems and their meaning, problem solving in learning, problem solving and posing, mathematical thinking and problem solving, and problem solving skills
	PO - 3	Able to arrange questions into problem categories
	PO - 4	Able to determine strategies and steps to solve problems and evaluate the work that has been done

PLO-PO Matrix

P.O	PLO-10
PO-1	
PO-2	
PO-3	
PO-4	

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																
PO-3																
PO-4																

Short Course Description	This course examines the definition of problems, types of problems, problem solving strategies, and stages of problem solving and their application through ICT-assisted task-based active learning	
References	**Main :**	

	1. Utama [1] Siswono, Y.E.S, Tatag. 2008. Model Pembelajaran Matematika Berbasis Pengajuan dan Pemecahan Masalah Untuk Meningkatkan Kemampuan Berpikir Kreatif . Surabaya: Unesa University Press [2] Kaur, at all. 2009 . Mathematical Problem Solving. Yearbook 2009. Association of Mathematics Educators . Singapore: World Scientivic Publishing Pendukung [3] Djukie, et. All. 2011. The IMO Compedium a Collection of Problems Suggested for International Mathematical Olimpiads Second Edition. London: Springer [4] Posamentier, Alfred S. Krulik, Stephen. 1998. Problem-Solving Strategies for Efficient and Elegant Solutions: A Resource for The Mathematics Teacher . California: Corwin Press. Inc [5] Polya G. 1957. How to So l ve it, A New Aspect of Mathematical Method . New Jersey: Princenton University Press [6] Tall, David. 2013. How Humans Learn to Think Mathematically. Exploring The Three Worlds of Mathematics . USA: Cambridge University Press [7] Schleicher, A. 2018. Pisa 2018 Insights and Interpretations . Diakses pada 30 Januari 2020, dari https://www.oecd.org/pisa/PISA 2018 Insights and Interpretations FINAL PDF.pdf [8] Mason, J., Burton, L., & Stacey, K. 2010. Thinking Mathematically Second Edition. England: Pearson Education Limited.
	Supporters:
Supporting lecturer	Dr. Pradnyo Wijayanti, M.Pd. Prof. Dr. Tatag Yuli Eko Siswono, S.Pd., M.Pd. Abdul Haris Rosyidi, S.Pd., M.Pd. Nurus Saadah, S.Pd., M.Pd. Nina Rinda Prihartiwi, 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	Understand the basic foundations of problem solving	Explain the meaning and various types of problems	**Criteria:** Quantitative **Form of Assessment** : Participatory Activities	Collaborative Learning Approach (Lecture, discussion and question and answer) 2 X 50			5%
2	Understand the basic foundations of problem solving	Explain the meaning and various types of problems	**Criteria:** Quantitative **Form of Assessment** : Participatory Activities	Collaborative Learning Approach (Lecture, discussion and question and answer) 2 X 50			5%
3	Understanding problem solving in learning	Explaining the strategic position of problem solving in mathematics learning	**Criteria:** Quantitative **Form of Assessment** : Participatory Activities	Discussion and Question and Answer 2 X 50			5%
4	Understand the stages and strategies for problem solving	1. Explain the stages of problem solving and be able to provide examples 2. Explain various problem solving strategies	**Criteria:** Quantitative **Form of Assessment** : Participatory Activities	Discussion and presentation 2 X 50			5%
5	Understand the stages and strategies for problem solving	1. Explain the stages of problem solving and be able to provide examples 2. Explain various problem solving strategies	**Criteria:** Quantitative **Form of Assessment** : Participatory Activities	Discussion and presentation 2 X 50			5%

6	Understand the relationship between problem solving and problem posing	1. Explain the relationship between solving and posing problems 2. Provide examples of problem posing	**Criteria:** Quantitative **Form of Assessment** : Participatory Activities	Discussion and presentation 2 X 50			0%
7	Understand the relationship between problem solving and mathematical thinking	Explain the relationship between problem solving and mathematical thinking	**Criteria:** Quantitative **Form of Assessment** : Participatory Activities	Collaborative Learning Approach (Problem solving and problem posing, discussions, presentations, and questions and answers) 2 X 50			0%
8	Midterm Evaluation / Midterm Exam		**Form of Assessment** : Participatory Activities, Tests	2 X 50			30%
9	Skilled at solving mathematical problems (algebra, geometry, statistics, discrete, probability, mathematical literacy, and numeracy)	Skilled at solving problems for a variety of mathematical topics	**Criteria:** Quantitative **Form of Assessment** : Participatory Activities	Collaborative Learning Approach (Problem solving and problem posing, discussions, presentations, and questions and answers) 2 X 50			5%
10	Skilled at solving mathematical problems (algebra, geometry, statistics, discrete, probability, mathematical literacy, and numeracy)	Skilled at solving problems for a variety of mathematical topics	**Criteria:** Quantitative **Form of Assessment** : Participatory Activities	Collaborative Learning Approach (Problem solving and problem posing, discussions, presentations, and questions and answers) 2 X 50			5%
11	Skilled at solving mathematical problems (algebra, geometry, statistics, discrete, probability, mathematical literacy, and numeracy)	Skilled at solving problems for a variety of mathematical topics	**Criteria:** Quantitative **Form of Assessment** : Participatory Activities	Collaborative Learning Approach (Problem solving and problem posing, discussions, presentations, and questions and answers) 2 X 50			5%
12		Skilled at solving mathematical problems (algebra, geometry, statistics, discrete, probability, mathematical literacy, and numeracy)	**Criteria:** Quantitative **Form of Assessment** : Participatory Activities	Collaborative Learning Approach (Problem solving and problem posing, discussions, presentations, and questions and answers) 2 X 50			0%

13	Skilled in compiling questions in problem categories	Skilled in compiling problems in problem categories on various mathematical topics (algebra, geometry, statistics, discrete, probability, mathematical literacy, and numeracy)	**Criteria:** Quantitative **Form of Assessment** : Participatory Activities	Collaborative Learning Approach (Problem solving and problem posing, discussions, presentations, and questions and answers) 2 X 50			0%
14	Skilled in compiling questions in problem categories	Skilled in compiling problems in problem categories on various mathematical topics (algebra, geometry, statistics, discrete, probability, mathematical literacy, and numeracy)	**Criteria:** Quantitative **Form of Assessment** : Participatory Activities	Collaborative Learning Approach (Problem solving and problem posing, discussions, presentations, and questions and answers) 2 X 50			0%
15	Skilled in compiling questions in problem categories	Skilled in compiling problems in problem categories on various mathematical topics (algebra, geometry, statistics, discrete, probability, mathematical literacy, and numeracy)	**Criteria:** Quantitative **Form of Assessment** : Participatory Activities	Collaborative Learning Approach (Problem solving and problem posing, discussions, presentations, and questions and answers) 2 X 50			0%
16	Final Semester Evaluation / Final Semester Examination		**Form of Assessment** : Test	2 X 50			30%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	55%
2.	Test	45%
		100%

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.