



Universitas Negeri Surabaya
Faculty of Mathematics and Natural Sciences,
Mathematics Education Masters Study Program

Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Mathematics Education Research Methodology (Methods of Research in Mathematics Education)	8410203149		T=3	P=0	ECTS=6.72	1	July 17, 2024
AUTHORIZATION	SP Developer		Course Cluster Coordinator			Study Program Coordinator	
	Prof. Dr. Tatag Yuli Eko Siswono, M.Pd				Dr. Agung Lukito, M.S.	

Learning model	Project Based Learning																											
Program Learning Outcomes (PLO)	PLO study program that is charged to the course																											
	PLO-7 Able to design, implement, and critically evaluate contemporary mathematics education research																											
	PLO-11 Collaborate and be responsible professionally and ethically in completing mathematics and mathematics education tasks																											
	Program Objectives (PO)																											
	PO - 1 Evaluate research paradigms and basic concepts of mathematics education research.																											
	PO - 2 Comparing experimental and non-experimental quantitative research paradigms in mathematics education.																											
	PO - 3 Analyzing various qualitative research methods in mathematics education.																											
	PO - 4 Evaluate school action research methods, classroom action research, and mathematics education development research.																											
	PO - 5 Comparing various combined research methods (mixed methods).																											
	PO - 6 Develop research designs, implement research results, and critically evaluate contemporary research results and develop a research plan.																											
	PO - 7 Prepare a mathematics education research proposal and present it independently and responsibly.																											
	PO - 8 Collaborate and be responsible professionally and ethically in completing research case assignments and preparing research proposals																											
	PLO-PO Matrix																											
	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>P.O</th> <th>PLO-7</th> <th>PLO-11</th> </tr> </thead> <tbody> <tr><td>PO-1</td><td></td><td></td></tr> <tr><td>PO-2</td><td></td><td></td></tr> <tr><td>PO-3</td><td></td><td></td></tr> <tr><td>PO-4</td><td></td><td></td></tr> <tr><td>PO-5</td><td></td><td></td></tr> <tr><td>PO-6</td><td></td><td></td></tr> <tr><td>PO-7</td><td></td><td></td></tr> <tr><td>PO-8</td><td></td><td></td></tr> </tbody> </table>	P.O	PLO-7	PLO-11	PO-1			PO-2			PO-3			PO-4			PO-5			PO-6			PO-7			PO-8		
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PO Matrix at the end of each learning stage (Sub-PO)																												

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Short Course Description	This course provides students with competencies and skills in Mathematics education research methodology and drafting research proposals. Coverage of material regarding the philosophy of various research approaches, quantitative and qualitative research methods, experimental and non-experimental research with research fields at school level mathematics education and mathematics teacher education levels. Lectures are carried out by involving student activity through assignment presentations and in-depth discussions of the main points of the material, as well as discussions and reflections on formulating research ideas based on reputable international journals, including quantitative and qualitative analysis, and making research proposals which can be addressed as final assignments. .																																																																																																																																																																																									
References	Main : 1. Siswono, Tatag Y.E. 2019. Paradigma Penelitian Pendidikan: Pengembangan Teori dan Aplikasi Pendidikan Matematika . Bandung: Rosdakarya Supporters: 1. Research Methods in Education (Louis Cohen, Lawrence Manion and Keith Morrison; 2007:Abingdon: Routledge) 2. Dick, W., Carey, L., & Carey, J. O. 2014. The systematic design of instruction . New York: Prentice Hall College Div. 3. English, L. D. (ed.). 2002. Handbook of international research in mathematics education. London : Routedge. 4. Merriam, S. B. 2007. Qualitative research and case study application in education. San Fransisco: Jossey Bass Publisher.																																																																																																																																																																																									
Supporting lecturer	Prof. Dr. Mega Teguh Budiarto, M. Pd. Prof. Dr. Tatag Yuli Eko Siswono, 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 (%)																																																																																																																																																																																			
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1	Comparing various research paradigms and basic research concepts	1.Explains various research paradigms and basic research concepts 2.Evaluate research paradigms and concepts through case analysis of mathematics education research articles	Criteria: Accuracy of answers	Presentation, discussion and reflection 3 X 50	Presentation, discussion and reflection Case 1: Why Do You Need to Research? 3 X 50	Material: Paradigms and Basic Concepts of Research Literature: Siswono, Tatag YE 2019. Educational Research Paradigms: Theory Development and Applications in Mathematics Education. Bandung: Rosdakarya	3%																																																																																																																																																																																			

2	Comparing experimental and non-experimental quantitative research paradigms from several mathematics education studies.	Describe the methods of data collection and data analysis	Criteria: Accuracy of answers	Presentation, Discussion and reflection 3 X 50	Live (Zoom meeting), Case Based Learning, Discussion, Question and Answer. Case 2: What is the effectiveness of Augmented Reality Based Applications on volume materials? 3 x 50	Material: Quantitative Research Bibliography: Siswono, Tatag YE 2019. <i>Educational Research Paradigm: Theory Development and Applications in Mathematics Education.</i> Bandung: Rosdakarya	3%
3		Comparing various non-experimental quantitative research methods (descriptive)	Criteria: Accuracy of answers	Presentation, Discussion and reflection 3 X 50	Live (Zoom meeting), Case Based Learning, Discussion, Question and Answer. Case 3: How do young children in China, Japan, and America learn mathematics? Case 4: How is anxiety and students' mathematical abilities correlated? 3x50	Material: Quantitative Research Bibliography: Siswono, Tatag YE 2019. <i>Educational Research Paradigm: Theory Development and Applications in Mathematics Education.</i> Bandung: Rosdakarya	4%
4		Comparing various experimental quantitative research methods and designs	Criteria: Accuracy of answers	Presentation and discussion 3 X 50	Live (Zoom meeting), Case Based Learning, Discussion, Question and Answer. Case 5: Is there an influence of project-based teaching on student motivation in learning mathematics using technology? 3x50	Material: Quantitative Research (Experiment) References: Siswono, Tatag YE 2019. <i>Educational Research Paradigm: Theory Development and Applications in Mathematics Education.</i> Bandung: Rosdakarya	4%

5	Analyzing various qualitative research methods from several mathematics education research results.	Comparing the methods of various qualitative research	Criteria: certainty of answer	Presentation, discussion, reflection. Case 6: How do Singaporean math teachers implement online home-based learning and student engagement during the COVID-19 pandemic? 3 X 50	Presentation, discussion, reflection. Case 6: How do Singaporean math teachers implement Online Home-Based Learning and Student Engagement During the COVID-19 Pandemic? 3 x50	Material: Qualitative Research References: <i>Merriam, SB 2007. Qualitative research and case study application in education. San Francisco: Jossey Bass Publishers.</i> Material: Qualitative Research References: <i>Siswono, Tatag YE 2019. Educational Research Paradigm: Theory Development and Applications in Mathematics Education. Bandung: Rosdakarya</i>	4%
6		1. Comparing various qualitative research designs. 2. Compare participant selection techniques, instruments, and analysis methods.	Criteria: Accuracy of answers	Presentation, discussion, reflection. Case 7: What are Pre-service Mathematics Teachers' Early Experiences and Their Influence on Their Beliefs about Mathematics Teaching? 3 X 50	Live (Zoom meeting), Case-Based Learning, Discussion, Q&A Case 7: What are pre-service Mathematics teachers' initial experiences and their influence on their beliefs about Mathematics teaching?	Material: Qualitative Research References: <i>Merriam, SB 2007. Qualitative research and case study application in education. San Francisco: Jossey Bass Publishers.</i> Material: Qualitative Research References: <i>Siswono, Tatag YE 2019. Educational Research Paradigm: Theory Development and Applications in Mathematics Education. Bandung: Rosdakarya</i>	4%
7	Evaluate school action research methods, classroom action research, and development research from several research results	Comparing classroom action research (PTK) and school action research (PTS)	Criteria: Accuracy of answers	Presentation, discussion, reflection. Case 8: How is mathematics classroom practice transformed through participatory action research? 3 X 50	Live (Zoom meeting), Case Based Learning, Discussion, Question and Answer	Material: Action Research Bibliography: <i>Siswono, Tatag YE 2019. Educational Research Paradigm: Theory Development and Applications in Mathematics Education. Bandung: Rosdakarya</i>	4%
8		Midterm exam	Criteria: Answer Accuracy	3 X 50			20%

9		Comparing various development research and design research	Criteria: Progress of the draft proposal and feasibility of the proposal	Presentation, discussion, reflection. Case 10: How to develop Augmented Reality learning tools to foster spatial abilities in Mathematics lessons? 3 X 50	Presentation, discussion, reflection. Live (Zoom meeting), Case Based Learning, Discussion, Question and Answer 3x50	Material: Action Research and Library Development Research : <i>Siswono, Tatag YE 2019. Educational Research Paradigm: Theory Development and Applications in Mathematics Education. Bandung: Rosdakarya</i> <hr/> Material: Action Research and Library Development Research : <i>Dick, W., Carey, L., & Carey, JO 2014. The systematic design of instruction. New York: Prentice Hall College Div.</i>	4%
10	Comparing various mixed research methods from several research results	Comparing various combined research methods (mixed methods).	Criteria: Progress of the draft proposal and feasibility of the proposal	Presentation, discussion, reflection. Case 11: Can research methods be combined? 3 X 50	Presentation, discussion, reflection. Live (Zoom meeting), Case Based Learning, Discussion, Question and Answer 3 x 50	Material: Mixed Research (Mixed Methods) References: <i>Siswono, Tatag YE 2019. Educational Research Paradigm: Theory Development and Applications in Mathematics Education. Bandung: Rosdakarya</i>	4%
11	Analyzing international journals to design a research proposal (first draft) for mathematics education as a project assignment.	1. Critically evaluate contemporary research results according to research ideas 2. Implement research results based on research articles	Criteria: Progress of the draft proposal and feasibility of the proposal Form of Assessment : Practice / Performance	Presentation, discussion, reflection. 3 X 50	Live (Zoom meeting), Project Based Learning, Discussion, Q&A 3x50'	Material: Preparation of Bibliography Proposal : <i>Siswono, Tatag YE 2019. Educational Research Paradigm: Theory Development and Applications in Mathematics Education. Bandung: Rosdakarya</i>	4%

12		<ol style="list-style-type: none"> Critically evaluate contemporary research results according to research ideas Implementing research results based on research articles, Develop a research design 	<p>Criteria: Progress of the draft proposal and feasibility of the proposal</p> <p>Form of Assessment : Practice / Performance</p>	Presentation, discussion, reflection 3 X 50	Presentation, discussion, reflection. Live (Zoom meeting), Project Based Learning, Discussion, Q&A 3 X 50	<p>Material: Preparation of Bibliography Proposal : <i>Siswono, Tatag YE 2019. Educational Research Paradigm: Theory Development and Applications in Mathematics Education. Bandung: Rosdakarya</i></p>	3%
13	Preparing a research proposal (second draft) for mathematics education as a project assignment.	<ol style="list-style-type: none"> Develop a research design Communicate research proposals that are developed independently and responsibly. 	<p>Criteria: Progress of the draft proposal and feasibility of the proposal</p> <p>Form of Assessment : Practice / Performance</p>	Presentation, discussion, reflection 3 X 50	Live (Zoom meeting), Project Based Learning, Discussion, Q&A 3x50'	<p>Material: Preparation of Bibliography Proposal : <i>Siswono, Tatag YE 2019. Educational Research Paradigm: Theory Development and Applications in Mathematics Education. Bandung: Rosdakarya</i></p>	3%
14	Prepare a mathematics education research proposal (revised results, after presentation) as a project assignment.	<ol style="list-style-type: none"> Prepare quality mathematics education research proposals Communicate research proposals in writing and orally that are developed independently and responsibly 	<p>Criteria: Progress of the draft proposal and feasibility of the proposal</p> <p>Form of Assessment : Practice / Performance</p>	Presentation, discussion, reflection 3 X 50'	Live (Zoom meeting), Case Based Learning, Discussion, Question and Answer 3 x 50'	<p>Material: Preparation of Bibliography Proposal : <i>Siswono, Tatag YE 2019. Educational Research Paradigm: Theory Development and Applications in Mathematics Education. Bandung: Rosdakarya</i></p>	3%
15		<ol style="list-style-type: none"> Prepare quality mathematics education research proposals Communicate research proposals in writing and orally that are developed independently and responsibly 	<p>Criteria: Progress of the draft proposal and feasibility of the proposal</p> <p>Form of Assessment : Practice / Performance</p>	Presentation, discussion, reflection 3 X 50	Live (Zoom meeting), Case Based Learning, Discussion, Question and Answer 3 x 50'	<p>Material: Preparation of Bibliography Proposal : <i>Siswono, Tatag YE 2019. Educational Research Paradigm: Theory Development and Applications in Mathematics Education. Bandung: Rosdakarya</i></p>	3%
16		Final Semester Examination (UAS)-Final Project Report					30%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Practice / Performance	16%
		16%

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.