



<b>Short Course Description</b>	Building insight into the psychological theory of learning mathematics and its application in learning and teaching mathematics. The material coverage focuses on mathematics learning problems with a psychological approach which includes the formation of mathematical concepts, schematic ideas, mathematical thinking, interpersonal and emotional factors as well as mathematical problem solving, learning skills (Critical thinking, Creativity, Collaboration, Communication) , life skills, literacy skills; mathematical literacy (mathematical literacy), and statistical literacy (statistical literacy). This lecture will be carried out through active learning activities with discussions, presentations, simulations, or independent learning that utilizes communication and information technology.						
<b>References</b>	<b>Main :</b>		<ol style="list-style-type: none"> <li>1. Skemp, R. R. 1987. The psychology of learning mathematics. Lawrence Erlbaum Associates, Inc.</li> <li>2. Trilling, B. &amp; Fadel, C. 2009. 21st Century Skills: Learning for Life in Our Times. John Wiley &amp; Sons, Inc.</li> <li>3. Stacey, K. &amp; Turner, R. (Eds.). 2015. Assessing Mathematical Literacy: The PISA Experience. Springer International Publishing Switzerland.</li> <li>4. Ben-Zvi, D. &amp; Garfield, J. (Eds). 2005. The Challenge of Developing Statistical Literacy, Reasoning and Thinking. Springer Science + Business Media, Inc.</li> </ol>				
	<b>Supporters:</b>		<ol style="list-style-type: none"> <li>1. Santrock, J. W. 2017. Educational Psychology (6th Ed.). McGraw Hill.</li> <li>2. Schoenfeld, A. H. 1987. Cognitive science and mathematics education. Routledge.</li> <li>3. Von Glasersfeld, E. (Ed.). 2002. Radical constructivism in Mathematics Education. Kluwer Academic Publishers.</li> <li>4. Gutiérrez, A.; Leder, G.C. &amp; Boero, P. (Eds.). 2016. The Second Handbook of Research on the Psychology of Mathematics Education: The Journey Continues. Sense Publishers.</li> <li>5. Mayer, R.E. &amp; Alexander, P.A. 2011. Handbook of Research on Learning and Instruction. Routledge.</li> <li>6. Ismail. 2021. Pelatihan Pembelajaran Berpikir Kritis bagi Guru Matematika SMP di Kabupaten Nganjuk. Jurnal ABDI.</li> </ol>				
<b>Supporting lecturer</b>	Dr. Rini Setianingsih, M.Kes. Dr. Siti Khabibah, 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 human intelligence	Explain human intelligence	<b>Criteria:</b> Qualitative	100 minutes presentation and discussion	Direct (Zoom meeting), Collaborative (expository & discussion) 100 minutes	<b>Material:</b> Mathematics and Human Intelligence [page: 6-7] <b>References:</b> Skemp, RR 1987. The psychology of learning mathematics. Lawrence Erlbaum Associates, Inc.	7%
2	Understand the formation of mathematical concepts	Explains the process of forming mathematical concepts and its implications for learning mathematics	<b>Criteria:</b> Qualitative	100 minutes presentation and discussion	Direct (Zoom meeting), Collaborative (presentation & discussion) 100 minutes	<b>Material:</b> The formation of mathematical concepts [page: 9-21] <b>References:</b> Skemp, RR 1987. The psychology of learning mathematics. Lawrence Erlbaum Associates, Inc.	7%
3	Understand the idea of schema	Explains the idea of schema and its implications in learning mathematics	<b>Criteria:</b> Qualitative	100 minutes presentation and discussion	Direct (Zoom meeting), Collaborative (presentation & discussion) 100 minutes	<b>Material:</b> The idea of a schema [page: 22-34] <b>References:</b> Skemp, RR 1987. The psychology of learning mathematics. Lawrence Erlbaum Associates, Inc.	7%

4	Understanding intuitive and reflective intelligence	Analyzing intuitive and reflective intelligence	<b>Criteria:</b> Qualitative	100 minutes presentation and discussion	Direct (Zoom meeting), Collaborative (presentation & discussion) 100 minutes	<b>Material:</b> Intuitive and reflective intelligence [page: 35-45] <b>References:</b> <i>Skemp, RR 1987. The psychology of learning mathematics. Lawrence Erlbaum Associates, Inc.</i>	7%
5	Understand the role of symbols in building mathematical understanding	Explain the various roles of symbols in building mathematical understanding	<b>Criteria:</b> Qualitative	100 minutes presentation and discussion	Direct (Zoom meeting), Collaborative (presentation & discussion) 100 minutes	<b>Material:</b> Symbols [page: 46-65] <b>References:</b> <i>Skemp, RR 1987. The psychology of learning mathematics. Lawrence Erlbaum Associates, Inc.</i>	7%
6	Understand various types of imagery	Explain the relationship between visual symbols and verbal symbols	<b>Criteria:</b> Qualitative	100 minutes presentation and discussion	Direct (Zoom meeting), Collaborative (presentation & discussion) 100 minutes	<b>Material:</b> Different kinds of imagery [page: 66-82] <b>References:</b> <i>Skemp, RR 1987. The psychology of learning mathematics. Lawrence Erlbaum Associates, Inc.</i>	7%
7	Understand interpersonal and emotional factors	Explain how interpersonal and emotional factors influence learning motivation	<b>Criteria:</b> Qualitative	100 minutes presentation and discussion	Direct (Zoom meeting), Collaborative (presentation & discussion) 100 minutes	<b>Material:</b> Interpersonal and emotional factors [page: 83-100] <b>References:</b> <i>Skemp, RR 1987. The psychology of learning mathematics. Lawrence Erlbaum Associates, Inc.</i>	7%
8	Midterm exam						0%
9	Understand interpersonal and emotional factors	Explain how interpersonal and emotional factors influence learning motivation	<b>Criteria:</b> Qualitative	100 minutes presentation and discussion	Direct (Zoom meeting), Collaborative (presentation & discussion) 100 minutes	<b>Material:</b> Interpersonal and emotional factors [page: 83-100] <b>References:</b> <i>Skemp, RR 1987. The psychology of learning mathematics. Lawrence Erlbaum Associates, Inc.</i>	7%

10	Understanding new models of intelligence and their applications	Describes new models of intelligence and their applications	<b>Criteria:</b> Qualitative	100 minutes presentation and discussion	Direct (Zoom meeting), Collaborative (presentation & discussion) 100 minutes	<b>Material:</b> A New Model of Intelligence [pg: 101-114], From Theory into Action: Knowledge, Plans, and Skills [pg: 115-127] <b>Bibliography:</b> Skemp, RR 1987. <i>The psychology of learning mathematics.</i> Lawrence Erlbaum Associates, Inc.	7%
11	Understand the concepts of instrumental and relational understanding, as well as their qualities	Explains the concepts of instrumental and relational understanding, as well as their qualities	<b>Criteria:</b> Qualitative	100 minutes presentation and discussion	Direct (Zoom meeting), Collaborative (presentation & discussion) 100 minutes	<b>Material:</b> Relational Understanding and Instrumental Understanding [pg: 152-163], Goals of Learning and Qualities of Understanding [pg: 164-176] <b>Bibliography:</b> Skemp, RR 1987. <i>The psychology of learning mathematics.</i> Lawrence Erlbaum Associates, Inc.	7%
12	Understand type 1 and type 2 theories	Explain type 1 and type 2 theories	<b>Criteria:</b> Qualitative	100 minutes presentation and discussion	Direct (Zoom meeting), Collaborative (presentation & discussion) 100 minutes	<b>Material:</b> Type 1 Theories and Type 2 Theories: From Behaviorism to Constructivism [page: 128-141] <b>References:</b> Skemp, RR 1987. <i>The psychology of learning mathematics.</i> Lawrence Erlbaum Associates, Inc.	7%
13	Understand the four skills of the 21st century	Explain four 21st century skills	<b>Criteria:</b> Qualitative	100 minutes presentation and discussion	Direct (Zoom meeting), Collaborative (presentation & discussion) 100 minutes	<b>Material:</b> Learning and Innovation Skills: Learning to Create Together [page: 45-60] <b>References:</b> Trilling, B. & Fadel, C. 2009. <i>21st Century Skills: Learning for Life in Our Times.</i> John Wiley & Sons, Inc.	7%

14	Understand literacy skills and mathematical literacy	Explains literacy skills and mathematical literacy	<b>Criteria:</b> Qualitative	100 minutes presentation and discussion	Direct (Zoom meeting), Collaborative (presentation & discussion) 100 minutes	<b>Material:</b> Digital Literacy Skills: Info-Savvy, Media-Fluent, Tech-Tuned [page: 61-72] <b>References:</b> <i>Trilling, B. &amp; Fadel, C. 2009. 21st Century Skills: Learning for Life in Our Times. John Wiley &amp; Sons, Inc.</i>  <b>Material:</b> The Evolution and Key Concepts of the PISA Mathematics Frameworks [page: 6-33] <b>References:</b> <i>Stacey, K. &amp; Turner, R. (Eds.). 2015. Assessing Mathematical Literacy: The PISA Experience. Springer International Publishing Switzerland.</i>	8%
15	Understand life skills and statistical literacy skills	Explains life skills and statistical literacy	<b>Criteria:</b> Qualitative	100 minutes presentation and discussion	Direct (Zoom meeting), Collaborative (presentation & discussion) 100 minutes	<b>Material:</b> Digital Literacy Skills: Info-Savvy, Media-Fluent, Tech-Tuned [page: 61-72] <b>References:</b> <i>Trilling, B. &amp; Fadel, C. 2009. 21st Century Skills: Learning for Life in Our Times. John Wiley &amp; Sons, Inc.</i>	8%
16	Final exams						0%

**Evaluation Percentage Recap: Project Based Learning**

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** 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.