	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
History of Mathematics	8420202197		T=2 P=0 ECTS=3.18	2	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	Dr. Endah Budi Rahaju, M.Pd.

Learning model	**Case Studies**

Program Learning Outcomes (PLO)

PLO study program which is charged to the course	
PLO-8	Designing, implementing and evaluating mathematics learning using IT
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
PLO-13	Demonstrate pedagogical knowledge in designing, implementing and evaluating mathematics learning.
Program Objectives (PO)	
PO - 1	Able to understand the nature of the history of mathematics as history and heritage and its relationship with mathematical concepts taught in school
PO - 2	Able to analyze mathematics learning that develops from the history of mathematical concepts
PO - 3	Able to understand the value and development of mathematical concepts to develop materials and learning in schools that pay attention to the development of mathematics as a science.
PO - 4	Able to evaluate mathematics learning developed from the historical aspect of mathematical concepts

PLO-PO Matrix

P.O	PLO-8	PLO-10	PLO-13
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	Studying about the development of mathematics, the discovery of mathematical concepts and connecting mathematics material in schools with reinvention through active learning based on assignments and presentations by utilizing up-to-date information using valid internet sources

References

Main :

1. Wahyudin dan Kartasasmita, B. G.2011. Sejarah dan Filsafat Matematika . Jakarta: Universitas Terbuka.
2. Burton, D. M.2010. The History of Mathematics : An Introduction 7th ed ition . New York: McGraw-Hill
3. Katz, V. J. 2008. A History of Mathematics: An Introduction, 3rd edition . Boston: Addison-Wesley.
4. Katz, V. J. 2000. Using History to Teach Mathematics: An International Perspective . The Mathematical Association of America, Washington
5. http://aleph0.clarku.edu/~djoyce/java/elements/elements.html
6. https://books.google.co.id/books?id=CbZ_YsdCmP0C&printsec=frontcover&dq=using history to teach mathematics pdf&hl=en&sa=X&redir_esc=y#v=onepage&q&f=false
7. Fiangga, S. 2021. Modul Perkuliahan Sejarah Matematika: Pengantar Sejarah Matematika untuk Pembelajaran Matematika

Supporters:

1. https://www.youtube.com/watch?v=PUYE6lmICVk
2. https://www.youtube.com/watch?v=urgYWNCN-RA

Supporting lecturer	Dr. Rini Setianingsih, M.Kes. Dr. Janet Trineke Manoy, M.Pd. Nurus Saadah, S.Pd., M.Pd. Shofan Fiangga, S.Pd., M.Sc. Nina Rinda Prihartiwi, S.Pd., M.Pd. Mukhtamilatus Sa'diyah, 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	Applying the development of mathematical science as history or heritage	1. Explain the importance of using the historical aspects of a concept in learning 2. Provide examples of the use of historical aspects of a concept in learning	**Criteria:** 1. The assessment is carried out on the following aspects: 2. 1. Participation during lectures and presentation opportunities is carried out through observation (weight 2) 3. 2. Subsummative test, carried out once assessing all relevant indicators through a written exam, students are declared to have passed if their final exam score is more than or equal to 60 (weight 2) 4. 3. Evaluation of proof papers uses performance and product assessments as assignments, grades are then given (weight 3) 5. 4. UAS is carried out at the end of the lecture, completing the final assignment and maintaining the paper in the form given in the presentation (weight 3) 6. The final NA is (participation grade") (Assignment grade%2 3) (UTS grade%2 2) UAS grade (3) divided by 10 **Form of Assessment** : Participatory Activities	Collaborative Learning Approach (Lecture, discussion and question and answer) 2 X 50		**Material:** History or Heritage" historical aspects in mathematics learning. **Reference:** *Katz, VJ 2008. A History of Mathematics: An Introduction, 3rd edition. Boston: Addison-Wesley.* **Material:** History or Heritage" historical aspects in mathematics learning **Reference:** *Fiangga, S. 2021. History of Mathematics Lecture Module: Introduction to the History of Mathematics for Mathematics Learning* **Material:** Euclid's Proof **Library:** *https://www.youtube.com/...*	5%
2	Analyzing examples of implementing historical aspects of a mathematical concept in learning	Provide examples of the use of historical aspects of a mathematical concept in mathematics learning	**Criteria:** Able to show historical aspects of a relevant concept 30% Able to determine appropriate school mathematics material 30% Able to elaborate on the design of learning activities using historical aspects 40% **Form of Assessment** : Participatory Activities	Collaborative Learning Approach (Lecture, discussion and question and answer) 2 X 50		**Material:** History of numbers **References:** *Katz, VJ 2008. A History of Mathematics: An Introduction, 3rd edition . Boston: Addison-Wesley.* **Material:** Implementation of the history of mathematics in learning **Reference:** *Fiangga, S. 2021. History of Mathematics Lecture Module: Introduction to the History of Mathematics for Mathematics Learning* **Material:** History of numbers **References:** *Katz, VJ 2000. Using History to Teach Mathematics: An International Perspective. The Mathematical Association of America, Washington* **Material:** History of numbers **References:** *Burton, DM2010. The History of Mathematics: An Introduction 7th edition. New York: McGraw-Hill*	5%

3	Analyzing the development of mathematical science in general from Babylonian times to the present (the concept of phytogeny) with the cognitive development of students in the field of mathematics (the concept of ontogeny)	Compiling the general development of mathematical science from Babylonian times to the present (the concept of ontogeny) with the cognitive development of students in the field of mathematics (the concept of phylogeny)	**Criteria:** Able to present the history of a relevant concept 30% Able to illustrate mathematical concepts correctly 30% Able to elaborate into a timeline of the history of mathematics on the material provided 40% **Form of Assessment** : Participatory Activities, Practice/Performance	Collaborative Learning Approach (Lecture, discussion and question and answer) 2 X 50		**Material:** History of geometry **Bibliography:** *Katz, VJ 2008. A History of Mathematics: An Introduction, 3rd edition . Boston: Addison-Wesley.* **Material:** History of geometry **Reference:** *Katz, VJ 2000. Using History to Teach Mathematics: An International Perspective. The Mathematical Association of America, Washington* **Material:** History of geometry **Bibliography:** *Burton, DM2010. The History of Mathematics: An Introduction 7th edition. New York: McGraw-Hill*	10%
4	Analyzing the development of mathematical science specifically in the context of numbers from the perspective of ontogeny and phylogeny.	1.Explain the historical aspects of number systems 2.Summarize the relationships between existing number systems from each period and compare them with student development	**Criteria:** Able to show historical aspects of a relevant number concept 30% Able to determine mathematics material in school that has a correlation with number material 30% Able to elaborate on the design of specific learning activities on number material using historical aspects of numbers 40%	Collaborative Learning Approach (Group presentation, discussion and question and answer) 2 X 50		**Material:** History of geometry **Bibliography:** *Katz, VJ 2008. A History of Mathematics: An Introduction, 3rd edition . Boston: Addison-Wesley.* **Material:** History of geometry **Reference:** *Katz, VJ 2000. Using History to Teach Mathematics: An International Perspective. The Mathematical Association of America, Washington* **Material:** History of geometry **Bibliography:** *Burton, DM2010. The History of Mathematics: An Introduction 7th edition. New York: McGraw-Hill*	0%
5	Analyzing the development of mathematical science specifically in the context of geometry from the perspective of ontogeny and phylogeny.	1.Explains historical aspects of Euclidean, non-Euclid, and Modern Geometry geometry. 2.Analyze the geometric concepts that have developed significantly from each period and compare them with the development of students	**Criteria:** Able to show historical aspects of a relevant geometric concept 30%\Able to determine mathematics material in school that has a correlation with geometric material 30%Able to elaborate on the design of learning activities specific to geometric material using historical aspects of geometry 40%	Collaborative Learning Approach (Group presentation, discussion, and question and answer) 4 X 50		**Material:** History of geometry **Bibliography:** *Katz, VJ 2008. A History of Mathematics: An Introduction, 3rd edition . Boston: Addison-Wesley.* **Material:** History of geometry **Reference:** *Katz, VJ 2000. Using History to Teach Mathematics: An International Perspective. The Mathematical Association of America, Washington* **Material:** History of geometry **Bibliography:** *Burton, DM2010. The History of Mathematics: An Introduction 7th edition. New York: McGraw-Hill*	5%
6	Analyzing the development of mathematical science specifically in the context of geometry from the perspective of ontogeny and phylogeny.	1.Explains historical aspects of Euclidean, non-Euclid, and Modern Geometry geometry. 2.Analyze the geometric concepts that have developed significantly from each period and compare them with the development of students	**Criteria:** Able to show historical aspects of a relevant geometric concept 30%\Able to determine mathematics material in school that has a correlation with geometric material 30%Able to elaborate on the design of learning activities specific to geometric material using historical aspects of geometry 40% **Form of Assessment** : Practice / Performance	Collaborative Learning Approach (Group presentation, discussion, and question and answer) 4 X 50		**Material:** History of algebra **Bibliography:** *Katz, VJ 2008. A History of Mathematics: An Introduction, 3rd edition . Boston: Addison-Wesley.* **Material:** History of algebra **Reference:** *Katz, VJ 2000. Using History to Teach Mathematics: An International Perspective. The Mathematical Association of America, Washington* **Material:** History of algebra **References:** *Burton, DM2010. The History of Mathematics: An Introduction 7th edition. New York: McGraw-Hill*	5%

7	Analyzing the development of mathematical science specifically in the context of algebra from the perspective of ontogeny and phylogeny.	1. Explain the historical aspects of algebra 2. Analyze the significantly developed concepts of logarithms and trigonometry that exist from each era	**Criteria:** Able to show historical aspects of a relevant algebra concept 30% Able to determine school mathematics material that has a correlation with algebra material 30% Able to elaborate on the design of specific learning activities on geometry material using historical aspects of algebra 40% **Form of Assessment** : Practice / Performance	Collaborative Learning Approach (Group presentation, discussion, and question and answer) 4 X 50		**Material:** History of algebra **Bibliography:** *Katz, VJ 2008. A History of Mathematics: An Introduction, 3rd edition . Boston: Addison-Wesley.* **Material:** History of algebra **Reference:** *Katz, VJ 2000. Using History to Teach Mathematics: An International Perspective. The Mathematical Association of America, Washington* **Material:** History of algebra **References:** *Burton, DM2010. The History of Mathematics: An Introduction 7th edition. New York: McGraw-Hill*	5%
8	Midterm exam	Midterm exam	**Criteria:** Midterm exam **Form of Assessment** : Test	Midterm Exam 2 X 50			20%
9	Analyzing the development of mathematical science specifically in the context of logarithms and trigonometry,	1. Explain the historical aspects of algebra 2. Analyze the significantly developed concepts of opportunity and statistics that exist from every era	**Criteria:** Able to show historical aspects of a relevant concept of logarithms and trigonometry 30% Able to determine mathematics material in school that has a correlation with logarithm and trigonometry material 30% Able to elaborate on the design of specific learning activities on geometry material using historical aspects of logarithms and trigonometry 40%	Collaborative Learning Approach (Group presentation, discussion and question and answer) 2 X 50		**Material:** History of trigonometry and logarithms **References:** *Katz, VJ 2008. A History of Mathematics: An Introduction, 3rd edition . Boston: Addison-Wesley.* **Material:** Calculating the distance between the sun and the moon **Reference:** *https://www.youtube.com/...* **Material:** History of trigonometry and logarithms **References:** *Katz, VJ 2000. Using History to Teach Mathematics: An International Perspective. The Mathematical Association of America, Washington* **Material:** History of trigonometry and logarithms **References:** *Burton, DM2010. The History of Mathematics: An Introduction 7th edition. New York: McGraw-Hill*	0%
10	Analyzing the development of mathematical science specifically in the context of probability and combinatorics,	1. Explains the historical aspects of probability and combinatorics 2. Analyze the significantly developed concepts of chance and combinatorics that exist from each era	**Criteria:** Able to show historical aspects of relevant concepts of chance and combinatorics 30% Able to determine mathematics material in school that has a correlation with chance and combinatorics material 30% Able to elaborate on the design of specific learning activities on geometry material using historical aspects of chance and combinatorics 40% **Form of Assessment** : Practice / Performance	Collaborative Learning Approach (Group presentation, discussion and question and answer) 2 X 50		**Material:** History of opportunity **Bibliography:** *Katz, VJ 2008. A History of Mathematics: An Introduction, 3rd edition . Boston: Addison-Wesley.* **Material:** History of opportunity **References:** *Katz, VJ 2000. Using History to Teach Mathematics: An International Perspective. The Mathematical Association of America, Washington* **Material:** History of opportunity **Bibliography:** *Burton, DM2010. The History of Mathematics: An Introduction 7th edition. New York: McGraw-Hill*	5%

11	Analyzing the development of mathematical science specifically in the context of statistics,	1. Explain the historical aspects of statistics 2. Analyze statistical concepts that have developed significantly from each era	**Criteria:** Able to show historical aspects of a relevant statistical concept 30% Able to determine mathematics material in schools that has a correlation with statistical material 30% Able to elaborate on the design of specific learning activities on statistical material using historical aspects of probability and combinatorics 40% **Form of Assessment** : Practice / Performance	Collaborative Learning Approach (Group presentation, discussion and question and answer) 2 X 50		**Material:** History of statistics **References:** *Katz, VJ 2008. A History of Mathematics: An Introduction, 3rd edition . Boston: Addison-Wesley.* **Material:** History of statistics **References:** *Katz, VJ 2000. Using History to Teach Mathematics: An International Perspective. The Mathematical Association of America, Washington* **Material:** History of statistics **References:** *Burton, DM2010. The History of Mathematics: An Introduction 7th edition. New York: McGraw-Hill*	5%
12	Analyzing the development of mathematical science specifically in the context of calculus	Explain the historical aspects of calculus. Analyze calculus concepts that have developed significantly from each era	**Criteria:** Able to show historical aspects of a relevant calculus concept 30% Able to determine school mathematics material that has a correlation with calculus material 30% Able to elaborate on the design of specific learning activities on calculus material using historical aspects of probability and combinatorics 40% **Form of Assessment** : Practice / Performance	Collaborative Learning Approach (Group presentation, discussion, and question and answer) 4 X 50		**Material:** History of calculus **Reference:** *Katz, VJ 2008. A History of Mathematics: An Introduction, 3rd edition . Boston: Addison-Wesley.* **Material:** History of calculus **Reference:** *Katz, VJ 2000. Using History to Teach Mathematics: An International Perspective. The Mathematical Association of America, Washington* **Material:** History of calculus **Reference:** *Burton, DM2010. The History of Mathematics: An Introduction 7th edition. New York: McGraw-Hill*	5%
13	Analyzing the development of mathematical science specifically in the context of calculus	Explain the historical aspects of calculus. Analyze calculus concepts that have developed significantly from each era	**Criteria:** Able to show historical aspects of a relevant calculus concept 30% Able to determine school mathematics material that has a correlation with calculus material 30% Able to elaborate on the design of specific learning activities on calculus material using historical aspects of probability and combinatorics 40% **Form of Assessment** : Practice / Performance	Collaborative Learning Approach (Group presentation, discussion, and question and answer) 4 X 50		**Material:** History of calculus **Reference:** *Katz, VJ 2008. A History of Mathematics: An Introduction, 3rd edition . Boston: Addison-Wesley.* **Material:** History of calculus **Reference:** *Katz, VJ 2000. Using History to Teach Mathematics: An International Perspective. The Mathematical Association of America, Washington* **Material:** History of calculus **Reference:** *Burton, DM2010. The History of Mathematics: An Introduction 7th edition. New York: McGraw-Hill*	5%

14	Constructing learning in schools using the construction of understanding, attitudes and values about mathematics in terms of its nature and history	Designing learning activities in the classroom using the construction of understanding, attitudes and values about mathematics in terms of its nature and history	**Criteria:** 1.Clarity of writing posters/papers/articles 20% 2.chaos of ideas presented 20% 3.Mathematical concepts used (depth of concepts) 4.20% 5.originality and creativity of ideas 20% 6.Argumentation of ideas presented 20% **Form of Assessment** : Project Results Assessment / Product Assessment	Collaborative Learning Approach (Group presentation, discussion, and question and answer) 4 X 50		**Material:** Ideas for developing history in mathematics learning. **Reference:** *Katz, VJ 2008. A History of Mathematics: An Introduction, 3rd edition. Boston: Addison-Wesley.* **Material:** Ideas for developing history in teaching mathematics. **Reference:** *Katz, VJ 2000. Using History to Teach Mathematics: An International Perspective. The Mathematical Association of America, Washington* **Material:** Ideas for developing history in mathematics learning **Reader:** *Wahyudin and Kartasasmita, BG2011. History and Philosophy of Mathematics. Jakarta: Open University.*	10%
15	Constructing learning in schools using the construction of understanding, attitudes and values about mathematics in terms of its nature and history	Designing learning activities in the classroom using the construction of understanding, attitudes and values about mathematics in terms of its nature and history	**Criteria:** 1.Clarity of writing posters/papers/articles 20% 2.chaos of ideas presented 20% 3.Mathematical concepts used (depth of concepts) 4.20% 5.originality and creativity of ideas 20% 6.Argumentation of ideas presented 20% **Form of Assessment** : Project Results Assessment / Product Assessment	Collaborative Learning Approach (Group presentation, discussion, and question and answer) 4 X 50		**Material:** Ideas for developing history in mathematics learning. **Reference:** *Katz, VJ 2008. A History of Mathematics: An Introduction, 3rd edition. Boston: Addison-Wesley.* **Material:** Ideas for developing history in teaching mathematics. **Reference:** *Katz, VJ 2000. Using History to Teach Mathematics: An International Perspective. The Mathematical Association of America, Washington* **Material:** Ideas for developing history in mathematics learning **Reader:** *Wahyudin and Kartasasmita, BG2011. History and Philosophy of Mathematics. Jakarta: Open University.*	20%
16			**Form of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	Create an individual project on designing mathematics learning by integrating the history of mathematics in various forms of activities. 100			0%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	15%
2.	Project Results Assessment / Product Assessment	30%
3.	Practice / Performance	35%
4.	Test	20%
		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.