



**Universitas Negeri Surabaya
Faculty of Engineering
Civil Engineering Undergraduate Study Program**

Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date																																										
Mathematics I	2220103039		T=3	P=0	ECTS=4.77	1	July 18, 2024																																										
AUTHORIZATION	SP Developer		Course Cluster Coordinator			Study Program Coordinator																																											
			Yogie Risdianto, S.T., M.T.																																											
Learning model	Case Studies																																																
Program Learning Outcomes (PLO)	PLO study program that is charged to the course																																																
	Program Objectives (PO)																																																
	PLO-PO Matrix																																																
		<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="width: 50px; height: 20px;">P.O</td> <td colspan="16"></td> </tr> </table>						P.O																																									
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	PO Matrix at the end of each learning stage (Sub-PO)																																																
	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td rowspan="2" style="width: 30px; height: 20px;">P.O</td> <td colspan="16" style="text-align: center;">Week</td> </tr> <tr> <td style="width: 20px;">1</td> <td style="width: 20px;">2</td> <td style="width: 20px;">3</td> <td style="width: 20px;">4</td> <td style="width: 20px;">5</td> <td style="width: 20px;">6</td> <td style="width: 20px;">7</td> <td style="width: 20px;">8</td> <td style="width: 20px;">9</td> <td style="width: 20px;">10</td> <td style="width: 20px;">11</td> <td style="width: 20px;">12</td> <td style="width: 20px;">13</td> <td style="width: 20px;">14</td> <td style="width: 20px;">15</td> <td style="width: 20px;">16</td> </tr> </table>																P.O	Week																1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
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Short Course Description	Study of the basics of mathematics through understanding the concepts of theorems and their application to various problems including real number systems, complexes, vectors, functions, function limits, graphs of functions, polar coordinates, derivatives of functions along with their application to straight line equations, minimum maximum values and related rate changes so that Students can apply it in the civil field																																																
References	Main :																																																
	1. [1]. LouisLeithold, 1991, <i>Kalkulus dan Ilmu UkurAnalitik</i> ,edisi 5,Jakarta :Erlangga. [2] L. Susskind, G. Hrabovsky, 2013, TheTheoretical Minimum, New York : Basic Book [3].Purcell dan Verberg,1992, <i>Kalkulus dan Geometri Analitis</i> , Jakarta:Erlangga [4].Stroud, K.A, 1986, [alih bahasa oleh Erwin Sucipto] <i>Matematika Untuk Teknik</i> , Penerbit:Erlangga ,Jakarta. [5]. Baisuni , M.H.,1986 , <i>Kalkulus , Jakarta Universitas Indonesia</i>																																																
	Supporters:																																																
Supporting lecturer	Ninik Wahyu Hidajati, S.Si., M.Si.																																																
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	Able to explain number systems starting from the simplest numbers to the most complex numbers, radical power numbers and mathematical operations of equations and inequalities	<ol style="list-style-type: none"> 1.Explain the types of numbers starting from the simplest numbers to the most complex numbers 2.Explains radical power numbers and their mathematical operations. 3.Explain and be able to solve equations and inequalities 	Criteria: Full marks are obtained if you do all the questions correctly	Brainstorming discussions and problem-based learning 3 X 50			0%
2	Understand the definition of vectors and relations and vector algebra operations and be able to calculate the angle formed by 2 vectors calculate the area of a parallelogram and be able to calculate the volume of a parallelepipedum	<ol style="list-style-type: none"> 1.Explains the definition of vectors and relations and vector algebra operations 2.Calculating the angle formed by 2 vectors calculates the area of a parallelogram and calculates the volume of a parallelepipedum 	Criteria: Full marks are obtained if you do all the questions correctly	Problem-based learning and discussion 3 X 50			0%
3	Understand the definition of vectors and relations and vector algebra operations and be able to calculate the angle formed by 2 vectors calculate the area of a parallelogram and be able to calculate the volume of a parallelepipedum	<ol style="list-style-type: none"> 1.Explains the definition of vectors and relations and vector algebra operations 2.Calculating the angle formed by 2 vectors calculates the area of a parallelogram and calculates the volume of a parallelepipedum 	Criteria: Full marks are obtained if you do all the questions correctly	Problem-based learning and discussion 3 X 50			0%
4	Understand the definition of vectors and relations and vector algebra operations, and be able to calculate the angle formed by 2 vectors, calculate the area of a parallelogram and be able to calculate the volume of a parallelepipedum	<ol style="list-style-type: none"> 1.Explains the definition of vectors and relations and vector algebra operations 2.Calculating the angle formed by 2 vectors, calculating the area of a parallelogram and calculating the volume of a parallelepipedum 	Criteria: Full marks are obtained if you do all the questions correctly	Problem-based learning and discussion 3 X 50			0%

5	Able to define functions, understand various functions, be able to draw function graphs, determine the origin area (domain) and result area (function), understand graph shifts, calculate function operations and function composition and be able to draw function graphs in polar coordinates	<ol style="list-style-type: none"> 1.Explain the definition of function 2.Explain the various functions 3.Draw function graphs, determine domain areas and function areas 4.Draw function graphs with translation/shift laws 5.Explains the occurrence of new functions based on the operation of functions and function composition 6.Explain the depiction of function graphs in polar coordinates 	Criteria: Full marks are obtained if you do all the questions correctly	Problem-based learning and discussion 3 X 50			0%
6	Able to define functions, understand various functions, be able to draw function graphs, determine the origin area (domain) and result area (function), understand graph shifts, calculate function operations and function composition and be able to draw function graphs in polar coordinates	<ol style="list-style-type: none"> 1.Explain the definition of function 2.Explain the various functions 3.Draw function graphs, determine domain areas and function areas 4.Draw function graphs with translation/shift laws 5.Explains the occurrence of new functions based on the operation of functions and function composition 6.Explain the depiction of function graphs in polar coordinates 	Criteria: Full marks are obtained if you do all the questions correctly	Problem-based learning and discussion 3 X 50			0%
7	Able to define functions, understand various functions, be able to draw function graphs, determine the origin area (domain) and result area (function), understand graph shifts, calculate function operations and function composition and be able to draw function graphs in polar coordinates	<ol style="list-style-type: none"> 1.Explain the definition of function 2.Explain the various functions 3.Draw function graphs, determine domain areas and function areas 4.Draw function graphs with translation/shift laws 5.Explains the occurrence of new functions based on the operation of functions and function composition 6.Explain the depiction of function graphs in polar coordinates 	Criteria: Full marks are obtained if you do all the questions correctly	Problem-based learning and discussion 3 X 50			0%

8	Midterm exam	Midterm exam	Criteria: Full marks are obtained if you do all the questions correctly	Midterm Exam 3 X 50			0%
9	Able to solve function limits	<ol style="list-style-type: none"> 1.Explain the definition of limit 2.Explain limit theorems 3.Explain the limits of trigonometric functions 4.Explain the limits of rational numbers 5.Explain the limit of indefinite numbers 6.Explain the limits of exponential numbers 	Criteria: Full marks are obtained if you do all the questions correctly	Problem-based learning and discussion 3 X 50			0%
10	Able to solve function limits	<ol style="list-style-type: none"> 1.Explain the definition of limit 2.Explain limit theorems 3.Explain the limits of trigonometric functions 4.Explain the limits of rational numbers 5.Explain the limit of indefinite numbers 6.Explain the limits of exponential numbers 	Criteria: Full marks are obtained if you do all the questions correctly	Problem-based learning and discussion 3 X 50			0%
11	Able to understand the continuity of function at one point	Proving the condition that the function is continuous at one point	Criteria: Full marks are obtained if you do all the questions correctly	Problem-based learning and discussion 3 X 50			0%
12	Understand the definition and properties of derivatives and be able to find derivatives of various functions	<ol style="list-style-type: none"> 1.Explain the definition of a derivative and the properties of a derivative 2.Explain derivatives with chain rules, higher order derivatives, implicit function derivatives and parameter function derivatives 	Criteria: Full marks are obtained if you do all the questions correctly	Problem-based learning and discussion 3 X 50			0%
13	Understand the definition and properties of derivatives and be able to find derivatives of various functions	<ol style="list-style-type: none"> 1.Explain the definition of a derivative and the properties of a derivative 2.Explain derivatives with chain rules, higher order derivatives, implicit function derivatives and parameter function derivatives 	Criteria: Full marks are obtained if you do all the questions correctly	Problem-based learning and discussion 3 X 50			0%
14	Able to understand the application of the derivative of a function	Explain the application of the derivative of a function to the velocity of solid particles, liquid velocity, extreme values (maximum-minimum) and the associated rate of change	Criteria: Full marks are obtained if you do all the questions correctly	Problem-based learning and discussion 3 X 50			0%

15	Able to understand the application of the derivative of a function	Explain the application of the derivative of a function to the velocity of solid particles, liquid velocity, extreme values (maximum-minimum) and the associated rate of change	Criteria: Full marks are obtained if you do all the questions correctly	Problem-based learning 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.