



Universitas Negeri Surabaya
Faculty of Engineering,
Mechanical Engineering Undergraduate Study Program

Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight	SEMESTER	Compilation Date																																												
Calculus I	2120102029		T=2 P=0 ECTS=3.18	1	July 18, 2024																																												
AUTHORIZATION	SP Developer		Course Cluster Coordinator	Study Program Coordinator																																													
	Ir. Priyo Heru Adiwibowo, 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																																																
		P.O																																															
	PO Matrix at the end of each learning stage (Sub-PO)																																																
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%;"></td> <td colspan="16" style="text-align: center;">Week</td> </tr> <tr> <td style="text-align: center;">P.O</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> <td style="text-align: center;">4</td> <td style="text-align: center;">5</td> <td style="text-align: center;">6</td> <td style="text-align: center;">7</td> <td style="text-align: center;">8</td> <td style="text-align: center;">9</td> <td style="text-align: center;">10</td> <td style="text-align: center;">11</td> <td style="text-align: center;">12</td> <td style="text-align: center;">13</td> <td style="text-align: center;">14</td> <td style="text-align: center;">15</td> <td style="text-align: center;">16</td> </tr> </table>															Week																P.O	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
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Short Course Description	This course provides an introduction, knowledge and understanding of the basic concepts of calculus which include sets of numbers, vectors, matrices, functions, limits and derivatives. With understanding and knowledge of concepts, students are able to solve various problems with the knowledge they have and apply it in the real world, especially in the field of Mechanical Engineering in the Machining/Automotive field of study.																																																
References	Main :																																																
	<ol style="list-style-type: none"> 1. 1. Spiegel, Murray R. 1981. Advanced Calculus: Schaum 19S Series. Singapore: Mc. Graw Hill. 2. 2. Spiegel, Murray R.1981. Advanced Calculus: VektorAnalysis.Schaum 19S Series. Singapore: Mc. Graw Hill. 3. 3. Kreyzig Erwin. 1993. Advance Engineering Mathematic: Edisi ke-7. John Wiley. 4. 4. Paul A. Calter, MSME&Michael A. Calter, Ph.D. Technical. 2011. Mathematics with Calculus. University, United Stated of America: John Willey & Sons Inc. Wesleyan. 5. 5. Huw Fox & W. Bolton. 2011. Mathematics for Engineersand Technologists. Elsevier Science&Technology Books. ISBN: 0750655445. 																																																
	Supporters:																																																
Supporting lecturer	Tri Hartutuk Ningsih, S.T., M.T. Ferly Isnomo Abdi, S.T., S.Pd., M.T.																																																
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 number systems Understand the nature of number systems and their elements	Analyze the number system and its elements	Criteria: According to the Rubric	Lectures, discussions and questions and answers 2 X 50		0%
2	Understand the definition of the real number system. Skilled in using arithmetic operations on whole numbers, fractions, percents and comparisons	Analyzing real number systems Calculating whole numbers, fractions, percent and comparisons	Criteria: According to the Rubric	Lectures, discussions, exercises and questions and answers 1 X 1		0%
3	Understand the definition of the real number system. Skilled in using arithmetic operations on whole numbers, fractions, percents and comparisons	Analyzing real number systems Calculating whole numbers, fractions, percent and comparisons	Criteria: According to the Rubric	Lectures, discussions, exercises and questions and answers 1 X 1		0%
4	Understand complex numbers, properties of complex numbers, conjugate numbers Skilled in using multiplication of complex numbers by their conjugate, division of complex numbers, absolute value	Analyze complex numbers, properties of complex numbers, conjugate numbers	Criteria: According to the Rubric	Lectures, discussions, exercises and questions and answers 2 X 50		0%
5	Understand complex numbers, properties of complex numbers, conjugate numbers Skilled in using multiplication of complex numbers by their conjugate, division of complex numbers, absolute value	Analyze complex numbers, properties of complex numbers, conjugate numbers	Criteria: According to the Rubric	Lectures, discussions, exercises and questions and answers 2 X 50		0%
6	Able to determine the resultant vector (R) and algebraic operations on vectors and vector spaces. Understand vector cross products and their rules. Skilled in presenting equations of straight lines, flat planes and curved vector curves	Calculating vector resultants (R) and vector algebra operations and vector spaces Analyzing vector cross products and their rules. Calculate the equations of straight lines, plane planes and curved vector curves	Criteria: According to the Rubric	Lectures, discussions, questions and answers and 2 X 50 exercises		0%
7	Able to determine the resultant vector (R) and algebraic operations on vectors and vector spaces. Understand vector cross products and their rules. Skilled in presenting equations of straight lines, flat planes and curved vector curves	Calculating vector resultants (R) and vector algebra operations and vector spaces Analyzing vector cross products and their rules. Calculate the equations of straight lines, plane planes and curved vector curves	Criteria: According to the Rubric	Definition of vector, vector resultant (R), vector algebra operations, vector space, vector cross product and its rules, equations of straight lines, flat planes and curved vector curves 2 X 50		0%

8	U.S.S	According to the Rubric	Criteria: According to the Rubric	According to the 2 X 50 Rubric			0%
9	Understand functions and types of functions, properties of functions and function algebra. Skilled in working with various functions and their inverses	Analyzing functions and types of functions, properties of functions and algebra of functions Calculating various functions and their inverses	Criteria: According to the Rubric	Lectures, discussions, questions and answers and 2 X 50 exercises			0%
10	Understand functions and types of functions, properties of functions and function algebra. Skilled in working with various functions and their inverses	Analyzing functions and types of functions, properties of functions and algebra of functions Calculating various functions and their inverses	Criteria: According to the Rubric	Lectures, discussions, questions and answers and 2 X 50 exercises			0%
11	Understand trigonometric function formulas and their uses	Analyze trigonometric function formulas and their uses	Criteria: According to the Rubric	Lectures, discussions, questions and answers, and 2 X 50 exercises			0%
12	Understand function limits and continuity	Calculating function limits and continuity	Criteria: According to the Rubric	Lectures, discussions, questions and answers, and 2 X 50 exercises			0%
13	Understand function limits and continuity	Calculating function limits and continuity	Criteria: According to the Rubric	Lectures, discussions, questions and answers, and 2 X 50 exercises			0%
14	Understand derivative definitions and formulas Skilled in solving derivatives for various functions Skilled in using limits to solve derivatives	Analyzing derivative definitions and formulas Calculating derivative results for various functions Calculating using limits to solve derivatives	Criteria: According to the Rubric	Lectures, discussions, questions and answers, exercises and assignments 2 X 50			0%
15	Understand derivative definitions and formulas Skilled in solving derivatives for various functions Skilled in using limits to solve derivatives	Analyzing derivative definitions and formulas Calculating derivative results for various functions Calculating using limits to solve derivatives	Criteria: According to the Rubric	Lectures, discussions, questions and answers, exercises and assignments 2 X 50			0%
16							0%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
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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.