



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

Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight	SEMESTER	Compilation Date																																																																					
Basic mathematic	8420102186		T=2 P=0 ECTS=3.18	1	July 17, 2024																																																																					
AUTHORIZATION	SP Developer		Course Cluster Coordinator	Study Program Coordinator																																																																						
	Prof. Dr. Erman, M.Pd.																																																																						
Learning model	Project Based Learning																																																																									
Program Learning Outcomes (PLO)	PLO study program that is charged to the course																																																																									
	Program Objectives (PO)																																																																									
	PO - 1	Students are able to demonstrate knowledge and insight into real functions, function limits, derivatives and their applications, integrals and their applications, matrices and solutions to linear equations																																																																								
	PO - 2	Able to implement the basic principles of function concepts, limits, derivatives and their applications, integrals and their applications, matrices and solutions of linear equations in problem solving activities using ICT																																																																								
	PLO-PO Matrix																																																																									
		<table border="1" style="margin: auto;"> <tr><td style="text-align: center;">P.O</td></tr> <tr><td style="text-align: center;">PO-1</td></tr> <tr><td style="text-align: center;">PO-2</td></tr> </table>				P.O	PO-1	PO-2																																																																		
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PO-2																																																																										
PO Matrix at the end of each learning stage (Sub-PO)																																																																										
	<table border="1" style="margin: auto;"> <tr> <td style="text-align: center;">P.O</td> <td colspan="16" style="text-align: center;">Week</td> </tr> <tr> <td></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> <tr> <td style="text-align: center;">PO-1</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td style="text-align: center;">PO-2</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>				P.O	Week																	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	PO-1																		PO-2																	
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PO-1																																																																										
PO-2																																																																										
Short Course Description	Study of functions, function limits, function continuity, function derivatives and their applications, integrals and their applications, and matrices for solving systems of linear equations.																																																																									
References	Main :																																																																									
	1. 1. Purcel, EJ dan D. Verberg. 1996. Kalkulus dan Geometri Analitik I . Terjemahan Ind. Susila B. Kartasasmita dan Rawuh. Erlangga, Jakarta. 2. Finney, R.L., Weir, M.D., Giordano F.R., 2001. Thomas' Calculus 10th Edition . USA : Addison-Wesley Publishing Company 2. Finney, R.L., Weir, M.D., Giordano F.R., 2001. Thomas' Calculus 10th Edition . USA : Addison-Wesley Publishing Company																																																																									
	Supporters:																																																																									
Supporting lecturer	Dr. Rini Setianingsih, M.Kes. Ika Kurniasari, S.Pd., M.Pd. Yulia Izza El Milla, 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 (%)																																																																			
		Indicator	Criteria & Form	Offline (offline)	Online (online)																																																																					

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Understanding functions, origin areas, product areas, drawing function graphs.	1.Determine the origin and result regions of a function. 2.Draw function graphs.	Criteria: 1.The accuracy of the answers given by students when asked and answered 2.The accuracy of the answers given by students in the UTS answer sheet Form of Assessment : Participatory Activities	Quantitative and Test 2 x 50 minutes		Material: Concept of function, origin area, product area, function graphs References: <i>Thomas Jr., G., et. al. 2018. Thomas' Calculus 14th Edition. Boston: Addison-Wesley</i>	7%
2	Understanding function limits.	1.Determining the limits of algebraic functions. 2.Determining the limits of trigonometric functions.	Criteria: 1.The accuracy of the answers given by students when asked and answered 2.The accuracy of the answers given by students in the UTS answer sheet Form of Assessment : Participatory Activities, Tests	Quantitative and Test 2 x 50 minutes		Material: Limits of algebraic functions and limits of trigonometric functions References: <i>Thomas Jr., G., et. al. 2018. Thomas' Calculus 14th Edition. Boston: Addison-Wesley</i>	10%
3	Understanding function limits.	Determine the limit at infinity and the limit towards infinity.	Criteria: 1.The accuracy of the answers given by students when asked and answered 2.The accuracy of the answers given by students in the UTS answer sheet Form of Assessment : Participatory Activities, Tests	Quantitative and Test 2 x 50 minutes		Material: Limit at infinity and limit towards infinity. Bibliography: <i>Thomas Jr., G., et. al. 2018. Thomas' Calculus 14th Edition. Boston: Addison-Wesley</i>	5%
4	Understand the derivatives of algebraic, trigonometric and exponential functions.	1.Determining the derivative of an algebraic function. 2.Determine the derivative of a trigonometric algebraic function. 3.Determine the derivative of an exponential function.	Criteria: 1.The accuracy of the answers given by students when asked and answered 2.The accuracy of the answers given by students in the UTS answer sheet Form of Assessment : Participatory Activities, Tests	Quantitative and Test 2 x 50 minutes		Material: Derivatives of algebraic, trigonometric and exponential functions. Bibliography: <i>Thomas Jr., G., et. al. 2018. Thomas' Calculus 14th Edition. Boston: Addison-Wesley</i>	8%

5	Understand the derivatives of algebraic, trigonometric and exponential functions.	<ol style="list-style-type: none"> Determining the derivative of an algebraic function. Determine the derivative of a trigonometric algebraic function. Determine the derivative of an exponential function. 	<p>Criteria:</p> <ol style="list-style-type: none"> The accuracy of the answers given by students when asked and answered The accuracy of the answers given by students in the UTS answer sheet <p>Form of Assessment : Participatory Activities, Tests</p>	Quantitative and Test 2 x 50 minutes		<p>Material: Derivatives of algebraic, trigonometric and exponential functions.</p> <p>Bibliography: <i>Thomas Jr., G., et. al. 2018. Thomas' Calculus 14th Edition. Boston: Addison-Wesley</i></p>	7%
6	Solve problems related to derivatives.	Solve everyday problems using derivatives by first constructing a mathematical model of the given problem.	<p>Criteria:</p> <ol style="list-style-type: none"> The accuracy of the answers given by students when asked and answered The accuracy of the answers given by students in the UTS answer sheet <p>Form of Assessment : Participatory Activities, Tests</p>	Qualitative and Test 2 x 50 minutes		<p>Material: First derivative test to test the monotonicity of a function and second derivative test to test the concavity of a function.</p> <p>References: <i>Thomas Jr., G., et. al. 2018. Thomas' Calculus 14th Edition. Boston: Addison-Wesley</i></p>	8%
7	Solve problems related to derivatives.	Solve everyday problems using derivatives by first constructing a mathematical model of the given problem.	<p>Criteria:</p> <ol style="list-style-type: none"> The accuracy of the answers given by students when asked and answered The accuracy of the answers given by students in the UTS answer sheet <p>Form of Assessment : Participatory Activities, Tests</p>	Qualitative and Test 2 x 50 minutes		<p>Material: Extreme values, inflection points, derivative tests to determine extreme values.</p> <p>Bibliography: <i>Thomas Jr., G., et. al. 2018. Thomas' Calculus 14th Edition. Boston: Addison-Wesley</i></p>	7%
8	UTS		<p>Form of Assessment : Test</p>	Test 2 x 50 minutes			0%
9	Understand function integrals.	<ol style="list-style-type: none"> Determining the indefinite integral of a function. Solving integrals using algebraic substitution integration techniques. 	<p>Criteria:</p> <ol style="list-style-type: none"> The accuracy of the answers given by students when asked and answered The accuracy of the answers given by students in the UTS answer sheet <p>Form of Assessment : Participatory Activities, Tests</p>	Quantitative and Test 2 x 50 minutes		<p>Material: Indefinite integrals, integration techniques with algebraic substitution</p> <p>References: <i>Thomas Jr., G., et. al. 2018. Thomas' Calculus 14th Edition. Boston: Addison-Wesley</i></p>	8%

10	Understand function integrals.	1.Solve integrals using trigonometric substitution integration techniques. 2.Solve integrals using partial integral techniques.	Criteria: 1.The accuracy of the answers given by students when asked and answered 2.The accuracy of the answers given by students in the UTS answer sheet Form of Assessment : Participatory Activities, Tests	Quantitative and Test 2 x 50 minutes		Material: Integration techniques with trigonometric substitution and partial integrals. Bibliography: <i>Thomas Jr., G., et. al. 2018. Thomas' Calculus 14th Edition. Boston: Addison-Wesley</i>	8%
11		1.Determining Riemann quantities. 2.Determining the indefinite integral of a function.	Criteria: 1.The accuracy of the answers given by students when asked and answered 2.The accuracy of the answers given by students in the UTS answer sheet Form of Assessment : Participatory Activities	Quantitative and Test 2 x 50 minutes		Material: Riemann sums, indefinite integrals References: <i>Thomas Jr., G., et. al. 2018. Thomas' Calculus 14th Edition. Boston: Addison-Wesley</i>	8%
12	Understand the application of integrals.	Determine the area under the curve.	Criteria: 1.The accuracy of the answers given by students when asked and answered 2.The accuracy of the answers given by students in the UTS answer sheet Form of Assessment : Participatory Activities	Quantitative and Test 2 x 50 minutes		Material: Indefinite integral to determine the area of a curve bounded area. Bibliography: <i>Thomas Jr., G., et. al. 2018. Thomas' Calculus 14th Edition. Boston: Addison-Wesley</i>	8%
13	Understand the application of integrals.	Determines the volume of a rotating object.	Criteria: 1.The accuracy of the answers given by students when asked and answered 2.The accuracy of the answers given by students in the UTS answer sheet Form of Assessment : Participatory Activities	Quantitative and Test 2 x 50 minutes		Material: Indefinite integral to determine the volume of rotating objects. Bibliography: <i>Thomas Jr., G., et. al. 2018. Thomas' Calculus 14th Edition. Boston: Addison-Wesley</i>	8%

14	Understanding matrices and systems of linear equations.	Determining the SPL solution using the Gauss-Jordan method	Criteria: 1.The accuracy of the answers given by students when asked and answered 2.The accuracy of the answers given by students in the UTS answer sheet Form of Assessment : Participatory Activities, Tests	Quantitative and Test 2 x 50 minutes		Material: Matrix, solving SPL using the Gauss-Jordan method References: Anton, Howard & Rorres, Chris. 2014. <i>Elementary Linear Algebra 11th Edition</i> . Danvers: Wiley.	4%
15	Understanding matrices and systems of linear equations.	Determine the SPL solution using the Cramer method	Criteria: 1.The accuracy of the answers given by students when asked and answered 2.The accuracy of the answers given by students in the UTS answer sheet Form of Assessment : Participatory Activities, Tests	Quantitative and Test 2 x 50 minutes		Material: Matrix, solving SPL using the Cramer method References: Anton, Howard & Rorres, Chris. 2014. <i>Elementary Linear Algebra 11th Edition</i> . Danvers: Wiley.	4%
16	UAS			2 x 50 minutes			0%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	65.5%
2.	Test	34.5%
		100%

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.

