

# MODULE HANDBOOK

## Calculus I



UNDERGRADUATE PROGRAM  
DEPARTMENT OF STATISTICS

FACULTY OF SCIENCE AND DATA ANALYTICS  
INSTITUT TEKNOLOGI SEPULUH NOPEMBER

## ENDORSEMENT PAGE



# MODULE HANDBOOK CALCULUS I

DEPARTMENT OF STATISTICS  
INSTITUT TEKNOLOGI SEPULUH NOPEMBER

Proses <i>Process</i>	Penanggung Jawab <i>Person in Charge</i>			Tanggal <i>Date</i>
	Nama <i>Name</i>	Jabatan <i>Position</i>	Tandatangan <i>Signature</i>	
Perumus <i>Preparation</i>	Dr. Tahiyatul Asfihani, S.Si, M.Si	Dosen <i>Lecturer</i>		
Pemeriksa dan Pengendalian <i>Review and Control</i>	Mathematics Team	Tim kurikulum <i>Curriculum team</i>		
Persetujuan <i>Approval</i>		Koordinator RMK <i>Course Cluster Coordinator</i>		
Penetapan <i>Determination</i>	Dr. Kartika Fithriasari, M.Si	Kepala Departemen <i>Head of Department</i>		


# MODULE HANDBOOK

## CALCULUS I

Module name	<b>Calculus I</b>	
Module level	Undergraduate	
Code	SM224101	
Course (if applicable)	Calculus I	
Semester	1 <sup>st</sup> semester	
Person responsible for the module	Dr. Tahiyatul Asfihani, S.Si, M.Si	
Lecturer	Mathematics Team	
Language	Bahasa Indonesia and English	
Relation to curriculum	Undergraduate degree program, <b>mandatory</b> , 1 <sup>st</sup> semester.	
Type of teaching, contact hours	Case Method (25%) Other SCL Methods (18.75%) Non-SCL Methods (56.25%)	
Workload	<ol style="list-style-type: none"> <li>1. Lectures[L]: 3 x 50 = 150 minutes per week.</li> <li>2. Exercises and Assignments[EA]: 3 x 60 = 180 minutes (3 hours) perweek.</li> <li>3. Independent Learning[IL]: 3 x 60 = 180 minutes (3 hours)per week.</li> </ol>	
Credit points	3 credit points (sks), Equivalent 4.8 ECTS	
Requirements according to the examination regulations	A student must have attended at least 80% of the lectures to sit in the exams.	
Mandatory prerequisites	-	
Learning outcomes and their corresponding PLOs	CLO-1 Students are able to apply equalities or inequalities as well as graphs of Linear Equation functions. CLO-2 Students are able to apply complex variable forms in polar form and get the roots of the equation. CLO-3 Students are able to apply matrix concepts to solve a linear equation system and determine the eigen value . CLO-4 Students are able to determine the continuity of functions and their derivatives. CLO-5 Students are able to apply integrals through the fundamental theorem of calculus.	PLO.1 PLO.4

Content	<p>In this course, the students will learn the matrix concept, determinant, and system of linear equations, the concept of mathematical thinking in solving the artificial problems, modeling, etc in the technique that related to the differential application. The materials in this course are emphasized on the problem solving of real cases that can be formulated in the one dependent variable function.</p> <p>The materials include: matrix and determinant, system of linear equations, real number system (ordered, absolute value), complex number and algebraic operations, functions and limits in the polar form of the complex number, derivatives including its applications, and indefinite integrals.</p>
Assessment and its weight	<p>Cognitive Assignment (20%)  Cognitive Quiz 1 (15%)  Cognitive Quiz 2 (15%)  Cognitive Midterm Exam (25%)  Cognitive Final Exam (25%)</p>
Media employed	LCD, whiteboard, websites (myITS Classroom), zoom.
Reading list	<ol style="list-style-type: none"> <li>1. Krezig, E, Advanced Engineering Mathematics, 10-th edition, John Wiley &amp; Sons, Singapore, 2011</li> <li>2. Purcell, J, E, Rigdon, S., E., Calculus, 9-th edition, Prentice-Hall, New Jersey, 2006</li> <li>3. James Stewart , Calculus, ed.7, Brooks/cole-Cengage Learning, Canada,2012</li> </ol>

## Rencana Pembelajaran Semester / Learning Plan

	<b>INSTITUT TEKNOLOGI SEPULUH NOPEMBER</b> <b>FAKULTAS SAINS DAN ANALITIKA DATA</b> <b>STATISTIKA</b> <b>S1 STATISTIKA</b>					<b>Kode Dokumen</b>
	<b>RENCANA PEMBELAJARAN SEMESTER</b>					
<b>MATA KULIAH (MK)</b>	<b>KODE</b>	<b>Rumpun MK</b>	<b>BOBOT (sks)</b>		<b>SEMESTER</b>	<b>Tgl Penyusunan</b>
Kalkulus 1 / Calculus 1	SM224101		3		1	26 Agustus 2022
<b>OTORISASI / PENGESAHAN</b>	<b>Dosen Pengembang RPS</b>		<b>Koordinator RMK</b>		<b>Ka PRODI</b>	
	Dr. Tahiyatul Asfihani, S.Si, M.Si		Tanda tangan		Dr. Kartika Fithriasari, M.Si	
<b>Capaian Pembelajaran</b>	<b>CPL-PRODI yang dibebankan pada MK</b>					
	CPL-1	[C2] Mahasiswa mampu mengidentifikasi dan menjelaskan pondasi matematika yang meliputi murni, terapan dan dasar-dasar komputasi				
	LO-1	<i>[C2] Students are able to identify and explain foundations of mathematics that include pure, applied, and the basic of computing</i>				
	CPL-2	[C3] Mahasiswa mampu menyelesaikan permasalahan sederhana dan praktis dengan mengaplikasikan pernyataan matematika dasar, metode dan komputasi				
	LO-2	<i>[C3] Students are able to solve simple and practical problems by applying basic mathematical statements, methods and computations</i>				
	<b>Capaian Pembelajaran Mata Kuliah (CPMK) – Bila CP MK sebagai kemampuan pada tiap tahap pembelajaran CP MK = Sub CP MK</b>					
	<b>CPMK-1</b> <b>CLO-1</b>	Mahasiswa mampu menerapkan persamaan atau pertidaksamaan serta grafik fungsi Persamaan Linear. <i>Students are able to apply equalities or inequalities as well as graphs of Linear Equation functions.</i>				
	<b>CPMK-2</b> <b>CLO-2</b>	Mahasiswa mampu mengaplikasikan bentuk peubah kompleks dalam bentuk polar serta menarik akar-akar persamaannya. <i>Students are able to apply complex variable forms in polar form and get the roots of the equation.</i>				

	<b>CPMK-3</b> <b>CLO-3</b>	Mahasiswa mampu menerapkan konsep matriks untuk menyelesaikan sistem persamaan linier dan menentukan nilai eigen. <i>Students are able to apply matrix concepts to solve a linear equation system and determine the eigen value .</i>																		
	<b>CPMK-4</b> <b>CLO-4</b>	Mahasiswa mampu menentukan kekontinuan fungsi dan turunanannya. <i>Students are able to determine the continuity of functions and their derivatives.</i>																		
	<b>CPMK-5</b> <b>CLO-5</b>	Mahasiswa mampu menerapkan integral melalui teorema fundamental kalkulus. <i>Students are able to apply integrals through the fundamental theorem of calculus.</i>																		
<b>Peta CPL – CP MK</b>	<table border="1"> <thead> <tr> <th></th> <th><b>CPL-1</b> <b>LO-1</b></th> <th><b>CPL-2</b> <b>LO-2</b></th> </tr> </thead> <tbody> <tr> <td><b>CPMK-1</b> <b>CLO-1</b></td> <td><b>X</b></td> <td>X</td> </tr> <tr> <td><b>CPMK-2</b> <b>CLO-2</b></td> <td><b>X</b></td> <td>X</td> </tr> <tr> <td><b>CPMK-3</b> <b>CLO-3</b></td> <td><b>X</b></td> <td>X</td> </tr> <tr> <td><b>CPMK-4</b> <b>CLO-4</b></td> <td><b>X</b></td> <td>X</td> </tr> <tr> <td><b>CPMK-5</b> <b>CLO-5</b></td> <td><b>X</b></td> <td>X</td> </tr> </tbody> </table>			<b>CPL-1</b> <b>LO-1</b>	<b>CPL-2</b> <b>LO-2</b>	<b>CPMK-1</b> <b>CLO-1</b>	<b>X</b>	X	<b>CPMK-2</b> <b>CLO-2</b>	<b>X</b>	X	<b>CPMK-3</b> <b>CLO-3</b>	<b>X</b>	X	<b>CPMK-4</b> <b>CLO-4</b>	<b>X</b>	X	<b>CPMK-5</b> <b>CLO-5</b>	<b>X</b>	X
	<b>CPL-1</b> <b>LO-1</b>	<b>CPL-2</b> <b>LO-2</b>																		
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<b>CPMK-5</b> <b>CLO-5</b>	<b>X</b>	X																		
<b>Diskripsi Singkat MK</b>	<p>Dalam Mata Kuliah ini mahasiswa akan mempelajari pokok bahasan pokok bahasan sebagai berikut:</p> <ol style="list-style-type: none"> <li>1. Konsep dasar sistem bilangan real: pengertian sistem bilangan real, bentuk desimal bilangan real, sistem koordinat , sifat urutan, pengertian nilai mutlak, garis – grafik persamaan linear.</li> <li>2. Konsep dasar bilangan kompleks: penjumlahan, perkalian, hasil bagi, bentuk polar bilangan kompleks beserta operasi aljabarnya dan penarikan akar persamaan dalam sistem bilangan kompleks.</li> <li>3. Konsep dasar aljabar matrik, sifat-sifat determinan, operasi baris elementer, sistem persamaan linier dan masalah nilai eigen atau vector eigen.</li> <li>4. Konsep-konsep fungsi, limit: domain, range, fungsi linier, kuadratik dan trigonometri atau transcendent, grafik fungsi, limit fungsi dan kontinuitas.</li> <li>5. Diferensial/turunan: definisi turunan, aturan-aturan diferensiasi (untuk fungsi polynomial, trigonometri, tramsendent), aturan rantai dan turunan fungsi implisit.</li> </ol>																			

<p><b>Short Description of Course</b></p>	<p>6. Aplikasi Turunan: laju-laju berkaitan, interval naik-turun, kecekungan, sketsa grafik yang mempunyai asimtot dan puncak, nilai ekstrema dan aplikasi masalah optimasi.</p> <p>7. Integral tak-tentu: turunan dan anti turunan , Theorema Fundamental Kalkulus.</p> <p><i>In this course, students will learn the following subjects:</i></p> <ol style="list-style-type: none"> <li><i>1. Basic concept of real number system: definition of real number system, decimal form of real number, coordinate system, nature of sequence, definition of absolute value, graph of linear equations.</i></li> <li><i>2. The basic concept of complex numbers: addition, multiplication, quotient, polar form of complex numbers and their algebraic operations and the drawing of equations in complex number systems.</i></li> <li><i>3. The basic concept of matrix algebra, determinant properties, elementary line operations, systems of linear equations and the problem of eigenvalues or eigenvectors.</i></li> <li><i>4. The concepts of function, limit: domain, range, linear, quadratic and trigonometric or transcendent function, function graph, limit function and continuity.</i></li> <li><i>5. Differential / derivative: definition of derivatives, referenced rules (for polynomial, trigonometric, transendent functions), chain rules and implicit derivatives of functions.</i></li> <li><i>6. Derivative Applications: corresponding rates, increment interval, slope, graph sketch having asymptotes and peaks, extrema values and application of optimization problems.</i></li> <li><i>7. Indefinite integral: Derivative and anti-derivative, Fundamental Theorems of Calculus.</i></li> </ol>
<p><b>Bahan Kajian:</b> Materi pembelajaran</p> <p><b>Course Materials:</b></p>	<ul style="list-style-type: none"> <li>• Matrik dan Determinan. / <i>Matrix and Determinant</i></li> <li>• Persamaan, pertidaksamaan, grafik fungsi parabola, lingkaran atau elips./ <i>Equations, inequalities, graphs of functions of a parabola, circle or ellipse</i></li> <li>• Bilangan kompleks dan bentuk polarnya./ <i>Complex numbers and their polar coordinates.</i></li> <li>• Kekontinuan fungsi dan turunannya. / <i>Continuity of functions and their derivatives.</i></li> <li>• Integral dan Theorema Fundamental Kalkulus. / <i>Integral and Fundamental Theorems of Calculus.</i></li> </ul>
<p><b>Pustaka:</b></p> <p><b>References:</b></p>	<p><b>Utama/Main:</b></p> <ol style="list-style-type: none"> <li>1. Tim Dosen Jurusan Matematika ITS, <i>Diktat Matematika 1</i> , Edisi ke-5 Jurusan Matematika ITS, 2020</li> <li>2. Anton, H. dkk, <i>Calculus</i>, 10-th edition, John Wiley &amp; Sons, New York, 2012</li> </ol> <p><b>Pendukung / Supporting:</b></p>

	<ol style="list-style-type: none"> <li>1. Kreyzig, E, <i>Advanced Engineering Mathematics</i>, 10-th edition, John Wiley &amp; Sons, Singapore, 2011</li> <li>2. Purcell, J, E, Rigdon, S., E., <i>Calculus</i>, 9-th edition, Prentice-Hall, New Jersey, 2006</li> <li>3. James Stewart, <i>Calculus</i>, ed.7, Brooks/Cole-Cengage Learning, Canada, 2012</li> </ol>							
<b>Dosen Pengampu:</b> <i>Lecturers:</i>								
<b>Matakuliah syarat:</b> <i>Prerequisite</i>	-							
mgg/ Week	Kemampuan akhir tiap tahapan belajar (Sub-CPMK) / <i>Final ability of each learning stage (LLO)</i>	Penilaian / <i>Assessment</i>		Bantuan Pembelajaran; Metode Pembelajaran; Penugasan Mahasiswa; [ <i>Estimasi Waktu</i> ] / <i>Form of Learning; Learning Method; Student Assignment; [ Estimated Time</i> ]		Materi Pembelajaran [ <i>Pustaka</i> ] / <i>Learning Material [Reference]</i>	Bobot Penilaian / <i>Assessment Load (%)</i>	
		Indikator / <i>Indicator</i>	Kriteria & Teknik / <i>Criteria &amp; Techniques</i>	Tatap Muka / <i>In-class (5)</i>	Daring / <i>Online (6)</i>			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
1-2	Pengantar Kuliah <i>Introduction of Learning</i>	<b>Motivasi belajar, menyampaikan RPS, aturan perkuliahan dan sistem penilaian macam Evaluasi dan Prosentase masing masing evaluasi, Buku Ajar / sumber pustaka</b>  <i>Learning motivation, delivering learning plan, lectures rules and assessment systems such as evaluation and percentage of each evaluation, textbooks / library sources</i>						
	Mahasiswa mampu menerapkan persamaan atau pertidaksamaan serta grafik fungsi persamaan Linear.	Ketepatan menyelesaikan persamaan atau pertidaksamaan dan mensketsa persamaan linear.	<b>Tugas 1 :</b> Latihan soal tentang sistem bilangan, nilai mutlak, grafik persamaan dan garis, persamaan linear.	Kuliah, latihan soal-soal serta memberikan soal tugas [TM : 3x2x 50"] [BM : 3x2 x 60"] [PT : 3 x2x 60"]	Kuliah, latihan soal-soal serta memberikan soal tugas melalui synchronous / asynchronous di MyITS Classroom.	Sistem bilangan real, nilai mutlak, grafik persamaan dan garis, persamaan linear [1] Matematika 1, Bab 1, Hal. 1 – 18		



	<p><i>Students are able to apply equalities or inequalities as well as graphs of Linear Equation functions.</i></p>	<p><i>The precision of solving equations or inequalities and sketching out linear equations.</i></p>	<p><b>Task 1 :</b> <i>Exercises on the real number systems, absolute values, graphs of equations and lines, linear equations.</i></p>	<p><i>Tutorial activities, exercises and provide assignment .</i> [FF : 3 x2x 50"] [SA : 3 x 2x60"] [SS : 3 x 2x 60"]</p>	<p><i>Tutorial activities, exercises and provide assignment via synchronous / asynchronous in MyITS Classroom.</i></p>	<p><i>Real number system, absolute value, graph equations, lines, linear equations</i> [1] Mathematics 1, Chapter 1, pp. 1 – 18</p>	
<p><b>Asistensi 1 / 1<sup>st</sup> Assistance</b> Latihan soal-soal [TM : 1x2 x 50"] Practice- Exercises [FF : 1x2 x 50"]</p>							
3	<p>Mahasiswa mampu mengaplikasikan bentuk peubah kompleks dalam bentuk polar serta menarik akar-akar persamaannya.</p> <p><i>Students are able to apply complex variable forms in polar form and get the roots of the equation.</i></p>	<p>Ketepatan menyelesaikan: operasi peubah kompleks dan bentuk polar serta menarik akar-akar persamaan peubah kompleks.</p> <p><i>Accuracy to solving: the operation of complex variables and their polar forms and get the roots of complex variable equations.</i></p>	<p><b>Tugas 2:</b> Latihan soal tentang bilangan kompleks dan teorema De Moivre.</p> <p><b>Kuis 1</b></p> <p><b>Task 2:</b> <i>Exercises on complex numbers and the De Moivre theorem</i></p> <p><b>Quiz 1</b></p>	<p>Kuliah, latihan soal-soal serta memberikan soal tugas [TM : 2x2 x 50"] [BM : 2x2 x 60"] [PT : 2x2x 60"]</p> <p><i>Tutorial activities, exercises and provide assignment .</i> [FF : 2 x 2x 50"] [SA : 2x2 x 60"] [SS : 2x2 x 60"]</p>	<p>Kuliah, latihan soal-soal serta memberikan soal tugas melalui synchronous / asynchronous <a href="#">di MyITS Classroom.</a></p> <p><i>Tutorial activities, exercises and provide assignment via synchronous / asynchronous in MyITS Classroom.</i></p>	<p>Bilangan kompleks dan Teorema De Moivre</p> <p>[1] Matematika 1, Bab 2, Hal. 19 – 30</p> <p><i>Complex numbers and De Moivre's Theorem</i> [1] Mathematics 1, Chapter 2, pp. 19 – 30</p>	

4	Mahasiswa mampu menyelesaikan operasi matriks dan menentukan invers matriks dengan menggunakan OBE	Ketepatan menyelesaikan operasi matriks dan menentukan invers matriks dengan menggunakan OBE	<b>Tugas 3:</b> Latihan Soal tentang matriks dan operasinya, operasi baris elementer, matriks invers.	Kuliah, latihan soal-soal serta memberikan soal tugas [TM : 1x2 x 50"] [BM : 1x2 x 60"] [PT : 1x2 x 60"]	Kuliah, latihan soal-soal serta memberikan soal tugas melalui synchronous / asynchronous <a href="#">di MyITS Classroom.</a>	Matriks dan operasinya, operasi baris elementer dan matriks invers [1] Matematika 1, Subbab 3.1 dan 3.2, hal: 31 – 42	
	<i>Students are able to solve matrix operations and determine the inverse of a matrix using OBE</i>	<i>The accuracy of solving matrix operations and determining the inverse of the matrix using OBE</i>	<b>Task 3:</b> <i>Exercises about matrices and their operations, elementary row operations, invers matrices.</i>	<i>Tutorial activities, exercises and provide assignment .</i> [FF : 1x2 x 50"] [SA : 1x2x 60"] [SS : 1x2 x 60"]	<i>Tutorial activities, exercises and provide assignment via synchronous / asynchronous in MyITS Classroom.</i>	<i>Matrices and their operations, elementary row operations and inverse matrices</i> [1]Mathematics 1, Sections 3.1 and 3.2, pp. 31 – 42	
<b>ASISTENSI KE 2 / 2<sup>nd</sup> Assistance</b> Latihan soal-soal [TM : 1x2 x 50"] Practice- Exercises [FF : 1x2 x 50"]							
5	Mahasiswa mampu menyelesaikan sistem persamaan linear dan menentukan determinan.	Ketepatan memperoleh menyelesaikan sistem persamaan linier dan menentukan determinan.	<b>Tugas 4:</b> Latihan soal tentang sistem persamaan linear, determinan, minor, kofaktor dan aturan Cramer .	Kuliah, latihan soal-soal serta memberikan soal tugas [TM : 2x2 x 50"] [BM : 2x2x 60"] [PT : 2x2x 60"]	Kuliah, latihan soal-soal serta memberikan soal tugas melalui synchronous / asynchronous <a href="#">di MyITS Classroom.</a>	Sistem persamaan linear, determinan, minor, kofaktor dan aturan Cramer. [1] Matematika 1, Subbab 3.3-3.5, hal: 42 – 63	
	<i>Students are able to solve systems of linear</i>	<i>The accuracy of obtaining solving a system of linear</i>	<b>Task 4:</b>	<i>Tutorial activities, exercises and</i>	<i>Tutorial activities, exercises and provide</i>	<i>systems of linear equations,</i>	

	<i>equations and determine determinants.</i>	<i>equations and determining the determinant.</i>	<i>Exercices on questions about systems of linear equations, determinants, minor, cofactors and Cramer's rule.</i>	<i>provide assignment . [FF : 2x2x 50"] [SA : 2x2x 60"] [SS : 2x2 x 60"]</i>	<i>assignment via synchronous / asynchronous in MyITS Classroom.</i>	<i>determinants, minor, cofactors and Cramer's rule.  [1] Mathematics 1, Sections 3.3-3.5, pp: 42 – 63</i>	
6	Mahasiswa mampu menentukan nilai eigen dan vektor eigen.  <i>Students are able to determine eigenvalues and eigenvectors.</i>	Ketepatan menemukan nilai eigen dan vektor eigen dari suatu matriks.  <i>The accuracy of finding eigenvalues and eigenvectors of a matrix.</i>	<b>Tugas 5:</b> Latihan soal tentang nilai eigen dan vektor eigen  <b>Kuis 2</b>  <b>Task 5:</b> <i>Eercises on eigenvalues and eigenvectors</i>  <b>Quiz 2</b>	Kuliah, latihan soal-soal serta memberikan soal tugas [TM : 1x2 x 50"] [BM : 1x2 x 60"] [PT : 1x2 x 60"]  <i>Tutorial activities, exercises and provide assignment . [FF : 1x2 x 50"] [SA : 1x2 x 60"] [SS : 1x2 x 60"]</i>	Kuliah, latihan soal-soal serta memberikan soal tugas melalui synchronous / asyncornous <a href="#">di MyITS Classroom.</a>  <i>Tutorial activities, exercises and provide assignment via synchronous / asynchronous in MyITS Classroom.</i>	Nilai eigen dan vektor eigen.  [1] Matematika 1, Subbab 3.6, hal: 63 – 67  <i>Eigenvalues and eigenvectors.  [1] Mathematics 1, Section 3.6, pp: 63 – 67</i>	
<b>ASISTENSI KE 3 / 3th Assistance</b> Latihan soal-soal [TM : 1x 2 x 50"] Practice- Exercises [FF : 1x 2 x 50"]							
7	• Mahasiswa mampu menyelesaikan	• Ketepatan menghitung operasi pada fungsi.	<b>Tugas 6:</b> Latihan soal tentang definisi dan notasi fungsi, operasi pada fungsi.	Kuliah, latihan soal-soal serta memberikan soal tugas	Kuliah, latihan soal-soal serta memberikan soal tugas melalui	• Function definition and notation, operations on functions	

	<p>operasi pada fungsi.</p> <ul style="list-style-type: none"> <li>Mahasiswa mampu mampu mensketsa grafik fungsi dan mencari fungsi Invers.</li> <li><i>Students are able to complete operations on functions and are able to sketch graph of functions.</i></li> <li><i>Students are able to understand the properties of the function graph and look for the inverse function.</i></li> </ul>	<ul style="list-style-type: none"> <li>Ketepatan mampu mensketsa grafik fungsi dan memperoleh Fungsi Invers.</li> <li><i>Precise calculating operations on functions and capable of sketching graph of functions.</i></li> <li><i>The precision of applying the Properties of the function graph and obtaining the Inverse Function.</i></li> </ul>	<p><b>Tugas 7:</b> Latihan Soal tentang grafik fungsi dan fungsi invers</p> <p><b>Task 6:</b> <i>Exercise on the definition and notation of functions, operations on functions and graph sketches of functions</i></p> <p><b>Task 7:</b> <i>Exercises on the properties of the graph of functions and inverse functions</i></p>	<p>[TM : 2x2 x 50"] [BM : 2x2 x 60"] [PT : 2x2 x 60"]</p> <p><i>Tutorial activities, exercises and provide assignment .</i> [FF : 2x2 x 50"] [SA : 2x2x 60"] [SS : 2x2 x 60"]</p>	<p>synchronous / asynchronous <a href="#">di MyITS Classroom.</a></p> <p><i>Tutorial activities, exercises and provide assignment via synchronous / asynchronous in MyITS Classroom.</i></p>	<p>[1] Mathematics 1, Sections 4.1 and 4.2, hal: 69 – 80</p> <ul style="list-style-type: none"> <li>Grafik fungsi, sifat-sifat grafik fungsi dan fungsi invers.</li> </ul> <p>[1] Matematika 1, Subbab 4.3-4.5, hal: 80 – 100</p> <ul style="list-style-type: none"> <li><i>Function operations and graph of functions</i> [1] Mathematics 1, Sections 4.1-4.2, pp: 69 – 80</li> <li><i>Graph properties of functions and Inverse Functions.</i> [1] Mathematics 1, Sections 4.3-4.5, page: 80-100</li> </ul>	
8	EVALUASI KE-3	EVALUASI TENGAH SEMESTER	Ketajaman menyelesaikan soal soal yang terkait dengan bilangan, fungsi, limit dan kekontinuan suatu fungsi. <b>TES TERTULIS</b>	TERJADWAL Ujian tertulis Waktu: 100 "	TERJADWAL Daring asinkronus Waktu: 90"		25

	<b>3th Evaluation</b>	<b>MIDTERM EXAM</b>	<b>Sharpness in solving problems related to the number, function, limit and continuity of a function. WRITTEN TEST</b>	<b>SCHEDULED Written examination Time: 100 "</b>	<b>SCHEDULED Asynchronous Time: 90"</b>		
9	<p>Mahasiswa mampu menghitung Limit fungsi dan limit tak hingga.</p> <p><i>Students are able to calculate the function limit</i></p>	<p>Ketepatan menghitung Limit fungsi dan limit tak hingga.</p> <p><i>The accuracy of calculating the Limit function and the infinite limit.</i></p>	<p><b>Tugas 8:</b> Latihan soal tentang perhitungan limit dan limit tak-hingga.</p> <p><b>Task 8:</b> <i>Exercises about limit notation and calculation</i></p>	<p>Kuliah, latihan soal-soal serta memberikan soal tugas [TM : 2x2 x 50"] [BM : 2x2 x 60"] [PT : 2x2 x 60"]</p> <p><i>Tutorial activities, exercises and provide assignment .</i> [FF : 2x2 x 50"] [SA : 2x2 x 60"] [SS : 2x2 x 60"]</p>	<p>Kuliah, latihan soal-soal serta memberikan soal tugas melalui synchronous / asynchronous <a href="#">di MyITS Classroom.</a></p> <p><i>Tutorial activities, exercises and provide assignment via synchronous / asynchronous in MyITS Classroom.</i></p>	<p>Pengantar notasi limit, penghitungan limits, limit di tak-hingga.</p> <p>[1] Matematika 1, Subbab 5.1-5.3, hal: 101 - 124</p> <p><i>Introduction to limit notation, calculating limits, limit at infinity.</i> [1] <i>Mathematics 1, Sections 5.1-5.3, page: 101-124</i></p>	
10	<p>Mahasiswa mampu menentukan kekontinuan fungsi.</p>	<p>Ketepatan menentukan kekontinuan fungsi .</p>	<p><b>Tugas 9:</b> Latihan soal tentang kekontinuan</p>	<p>Kuliah, latihan soal-soal serta memberikan soal tugas [TM : 1x2 x 50"] [BM : 1x2 x 60"] [PT : 1x2 x 60"]</p>	<p>Kuliah, latihan soal-soal serta memberikan soal tugas melalui synchronous / asynchronous <a href="#">di MyITS Classroom.</a></p>	<p>Kekontinuan fungsi.</p> <p>[1] Matematika 1, Subbab 5.4, hal: 124 – 134</p>	

	<i>Students are able to determine the continuity of functions.</i>	<i>The accuracy of determining the continuity of functions.</i>	<b>Task 9:</b> <i>Exercises about continuity.</i>	<i>Tutorial activities, exercises and provide assignment .</i> [FF : 1x2 x 50"] [SA : 1x2 x 60"] [SS : 1x2 x 60"]	<i>Tutorial activities, exercises and provide assignment via synchronous / asynchronous in MyITS Classroom.</i>	<i>Continuity.</i> [1] Mathematics 1, Section 5.4, pp: 124 – 134	
<b>ASISTENSI KE 4 / 4<sup>th</sup> Asistence</b> Latihan soal-soal [TM : 1x2 x 50"] Practice- Exercises [FF : 1x2 x 50"]							
11	<ul style="list-style-type: none"> <li>• Mahasiswa mampu menentukan Garis singgung dan laju perubahan serta menentukan turunan fungsi.</li> <li>• Mahasiswa mampu menentukan turunan dengan diferensial implisit.</li> </ul> <p><i>Students are able to determine tangent lines and rates of change and determine</i></p>	<ul style="list-style-type: none"> <li>• Ketepatan menentukan Garis singgung dan laju perubahan serta menentukan turunan fungsi.</li> <li>• Ketepatan menentukan Turunan dengan diferensial implisit.</li> </ul> <p><i>The precision determines the tangent lines and rates of change and determines the</i></p>	<p><b>Tugas 10:</b> Latihan soal tentang garis singgung dan laju perubahan, fungsi turunan.</p> <p><b>Tugas 11:</b> Latihan soal tentang diferensiasi, aturan rantai dan diferensiasi implisit</p> <p><b>Kuis 3</b></p> <p><b>Task 10:</b> <i>Exercises on tangent lines and rates of change, the derivative function.</i></p>	Kuliah, latihan soal-soal serta memberikan soal tugas [TM : 2x2 x 50"] [BM : 2x2 x 60"] [PT : 2x2 x 60"]	Kuliah, latihan soal-soal serta memberikan soal tugas melalui synchronous / asynchronous di <a href="#">MyITS Classroom</a> .	<ul style="list-style-type: none"> <li>• Garis singgung dan laju perubahan, fungsi turunan, diferensiasi. [1] Matematika 1, Subbab 6.1-6.3, hal: 135 – 155</li> <li>• Aturan rantai dan diferensiasi implisit. [1] Matematika 1, Subbab 6.4, hal: 156 – 164</li> <li>• <i>Tangent lines and rates of change, derivative function, differentiation.</i></li> </ul>	

	<p>derivative functions</p> <ul style="list-style-type: none"> <li>Students are able to determine derivatives with implicit differentials.</li> </ul>	<p>derivative of the function.</p> <ul style="list-style-type: none"> <li>Determine the accuracy of the derivative by implicit differential.</li> </ul>	<p><b>Task 11:</b> Exercises on differentiation, chain rule and implicit differentiation.</p> <p><b>Quiz 3</b></p>	[SS : 2x2 x 60"]		<p>[1] Mathematics 1, Sections 6.1-6.3, pp: 135-155</p> <ul style="list-style-type: none"> <li>Determine the derivative with implicit differential and analyze the graph of the function.</li> </ul> <p>[1] Mathematics 1, Section 6.4, page: 156 – 164</p>	
12	<p>Mahasiswa mampu Menyelesaikan laju-laju yang berkaitan</p> <p>Students are able to complete the rates associated with.</p>	<p>Ketepatan menghitung laju-laju yang berkaitan</p> <p>The accuracy of calculating the corresponding rates.</p>	<p><b>Tugas 12:</b> Latihan soal tentang laju – laju yang berkaitan.</p> <p><b>Task 12:</b> Exercises on the associated rates.</p>	<p>Kuliah, latihan soal-soal serta memberikan soal tugas [TM : 1x2 x 50"] [BM : 1x2 x 60"] [PT : 1x2 x 60"]</p> <p>Tutorial activities, exercises and provide assignment . [FF : 1x2 x 50"] [SA : 1x2 x 60"] [SS : 1x2 x 60"]</p>	<p>Kuliah, latihan soal-soal serta memberikan soal tugas melalui synchronous / asyncornous di MyITS Classroom.</p> <p>Tutorial activities, exercises and provide assignment via synchronous / asynchronous in MyITS Classroom.</p>	<p>Laju-laju yang berkaitan</p> <p>[1] Matematika 1, Subbab 7.1, hal: 165 – 174</p> <p>Related rates</p> <p>[1] Mathematics 1, Section 7.1, pp: 165 – 174</p>	
<p><b>ASISTENSI KE 5 / 5<sup>th</sup> Asistence</b> Latihan soal-soal [TM : 1x2 x 50"] Practice- Exercises [FF : 1x2 x 50"]</p>							

13	<ul style="list-style-type: none"> <li>• Mahasiswa mampu menentukan selang naik/turunnya fungsi dan kecekungannya dengan menggunakan uji turunan pertama dan kedua.</li> <li>• Mahasiswa mampu menentukan nilai maksimum/minimum fungsi serta mampu mensketsa grafik fungsi polinomial, rasional dan grafik yang lainnya.</li> </ul>	<ul style="list-style-type: none"> <li>• Ketepatan menentukan selang naik/turunnya fungsi dan kecekungannya dengan menggunakan uji turunan pertama dan kedua.</li> <li>• Ketepatan menentukan nilai maksimum/minimum fungsi serta mampu mensketsa grafik fungsi polinomial, rasional dan grafik yang lainnya.</li> </ul>	<p><b>Tugas 13:</b> Latihan soal tentang selang naik dan selang turun, kecekungan fungsi, ekstrim relatif, uji turunan pertama dan kedua.</p> <p><b>Tugas 14:</b> Latihan soal tentang grafik polinomial dan fungsi rasional, nilai maksimum atau minimum suatu fungsi.</p>	<p>Kuliah, latihan soal-soal serta memberikan soal tugas [TM : 2x2 x 50"] [BM : 2x2 x 60"] [PT : 2x2 x 60"]</p>	<p>Kuliah, latihan soal-soal serta memberikan soal tugas melalui synchronous / asynconous <a href="#">di MyITS Classroom.</a></p>	<ul style="list-style-type: none"> <li>• Selang naik dan selang turun, kecekungan fungsi, ekstrim relatif, uji turunan pertama dan kedua [1] Matematika 1, Subbab 7.2-7.3, hal: 174 – 190</li> <li>• Grafik polinomial dan fungsi rasional, nilai maksimum dan minimum suatu fungsi [1] Matematika 1, Subbab 7.4-7.5, hal: 191 - 211</li> </ul>	
	<ul style="list-style-type: none"> <li>• <i>Students are able to determine the increase / decrease interval of the function and its concave by using the first and second derivative tests.</i></li> <li>• <i>Students are able to determine the</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>The accuracy of determining the increase / decrease of the function's interval and its proportions using the first and second derivative tests.</i></li> <li>• <i>Accuracy in calculating the maximum / minimum value of functions and being</i></li> </ul>	<p><b>Task 13 :</b> <i>Exercises on the rise and fall intervals, the concavity of the function, the relative extremes, the first and second derivative tests.</i></p> <p><b>Task 14:</b> <i>Exercises on graphing polynomials and rational functions, the maximum</i></p>	<p><i>Tutorial activities, exercises and provide assignment .</i> [FF : 2x2 x 50"] [SA : 2x2 x 60"] [SS : 2x2 x 60"]</p>	<p><i>Tutorial activities, exercises and provide assignment via synchronous / asynchronous in MyITS Classroom.</i></p>	<ul style="list-style-type: none"> <li>• <i>Interval of the function, function concavity, relative extreme, first and second derivative test</i> [1] <i>Mathematics 1, Sections 7.2-7.3, pp: 165 – 190</i></li> </ul>	



	<i>maximum / minimum value of functions and are able to sketch polynomial, rational and other graphical graphs of functions.</i>	<i>able to sketch polynomial, rational and other graphical functions.</i>	<i>or minimum values of a function.</i>			<ul style="list-style-type: none"> <li><i>Graphs of polynomials and rational functions, maximum and minimum values of a function.</i></li> </ul> <i>[1] Mathematics 1, Sections 7.4-7.5, pp: 191 – 211</i>	
14	<p>Mahasiswa mampu menyelesaikan masalah yang berkaitan dengan persoalan-persoalan maksimum/minimum.</p> <p><i>Students are able to solve problems related to maximum / minimum problems.</i></p>	<p>Ketepatan menyelesaikan masalah yang berkaitan dengan persoalan-persoalan maksimum/minimum.</p> <p><i>Accuracy in solving problems related to maximum / minimum problems</i></p>	<p><b>Tugas 15:</b> Latihan soal tentang Aplikasi masalah maksimum atau minimum, teorema rolle dan teorema nilai rata-rata</p> <p><b>Task 15:</b> <i>Exercises on the application of the maximum or minimum problem, the rolle theorem and the mean value theorem</i></p>	<p>Kuliah, latihan soal-soal serta memberikan soal tugas [TM : 1x2 x 50"] [BM : 1x2 x 60"] [PT : 1x2 x 60"]</p> <p><i>Tutorial activities, exercises and provide assignment .</i> [FF : 1x2 x 50"] [SA : 1x2 x 60"] [SS : 1x2 x 60"]</p>	<p>Kuliah, latihan soal-soal serta memberikan soal tugas melalui synchronous / asyncornous <a href="#">di MyITS Classroom.</a></p> <p><i>Tutorial activities, exercises and provide assignment via synchronous / asynchronous in MyITS Classroom.</i></p>	<p>Aplikasi masalah maksimum dan minimum.</p> <p>[1] Matematika 1, Subbab 7.6, hal: 212 – 236</p> <p><i>Application of maximum and minimum problems .</i></p> <p>[1] Mathematics 1, Section 7.6,pp: 212 – 236</p>	
<p><b>ASISTENSI KE 6 / 6<sup>th</sup> Asistence</b>          Latihan soal-soal [TM : 1x2 x 50"]          Practice- Exercises [FF :1x 2 x 50"]</p>							

15	<ul style="list-style-type: none"> <li>• Mahasiswa mampu menentukan Anti turunan fungsi dan Luas sebagai limit jumlahan.</li> <li>• Mahasiswa mampu menentukan Turunan dengan menggunakan Teorema Fundamental Kalkulus I dan II .</li> </ul> <p>• <i>Students are able to determine the derivative of the function and area as the sum limit.</i></p> <p>• <i>Students are able to determine the derivative using the Fundamental Theorem of Calculus I and II.</i></p>	<ul style="list-style-type: none"> <li>• Ketepatan menentukan Anti turunan fungsi dan Luas sebagai limit jumlahan.</li> <li>• Ketepatan menentukan Turunan dengan menggunakan Teorema Fundamental Kalkulus I dan II .</li> </ul> <p>• <i>The precision of determining the derivative of function and Area as the sum limit.</i></p> <p>• <i>The accuracy of determining the derivative using the fundamental Theorem of Calculus I and II.</i></p>	<p><b>Tugas 16:</b> Latihan soal tentang anti turunan, integral tak tentu, integrasi dengan substitusi dan luas sebagai limit</p> <p><b>Tugas 17:</b> Latihan soal tentang integral tertentu, Teorema Fundamental Kalkulus I, integral tertentu dengan substitusi, hampiran jumlahan Riemann, Teorema Fundamental Kalkulus II</p> <p><b>Task 16:</b> <i>Exercise on anti-derivative, indefinite integral, integration with substitution and area as limit</i></p> <p><b>Task 17:</b> <i>Exercises on certain integrals, fundamental theorem of Calculus I, certain integrals with</i></p>	<p>Kuliah, latihan soal-soal serta memberikan soal tugas [TM : 2x2 x 50"] [BM : 2x2 x 60"] [PT : 2x2 x 60"]</p> <p><i>Tutorial activities, exercises and provide assignment .</i> [FF : 2x2 x 50"] [SA : 2x2 x 60"] [SS : 2x2x 60"]</p>	<p>Kuliah, latihan soal-soal serta memberikan soal tugas melalui synchronous / asynchronous <a href="#">di MyITS Classroom.</a></p> <p><i>Tutorial activities, exercises and provide assignment via synchronous / asynchronous in MyITS Classroom.</i></p>	<p>Integral.</p> <p>[1] Matematika 1, Bab 8, hal: 237 – 297</p> <p>Integral [1] Mathematics 1, Chapter 8, page: 237 – 297</p>	
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			<i>substitutions, Riemann sum approximation, the fundamental Theorem of Calculus II</i>				
16	<b>EVALUASI KE_5</b>  <i>5<sup>th</sup> Evaluation</i>	<b>EVALUASI AKHIR SEMESTER</b>  <i>Final Exam</i>	<b>Ketajaman menyelesaikan soal soal yang terkait dengan turunan dan anti turunan.</b> <b>TES TERTULIS</b> <i>Sharpness in solving problems related to derivatives and anti derivatives.</i> <b>WRITTEN TEST</b>	<b>TERJADWAL Ujian tertulis Waktu: 100"</b>  <b>SCHEDULED Written examination Time: 100"</b>	<b>TERJADWAL Daring asinkronus Waktu: 90"</b>  <b>SCHEDULED</b> <i>Written examination asynchronous my ITS classroom.</i> <i>Time: 90"</i>		<b>25</b>

**Catatan sesuai dengan SN Dikti Permendikbud No 3/2020:**

1. Capaian Pembelajaran Lulusan PRODI (CPL-PRODI) adalah kemampuan yang dimiliki oleh setiap lulusan PRODI yang merupakan internalisasi dari sikap, penguasaan pengetahuan dan ketrampilan sesuai dengan jenjang studinya yang diperoleh melalui proses pembelajaran.
2. CPL yang dibebankan pada mata kuliah adalah beberapa capaian pembelajaran lulusan program studi (CPL-PRODI) yang digunakan untuk pembentukan/pengembangan sebuah mata kuliah yang terdiri dari aspek sikap, ketrampilan umum, ketrampilan khusus dan pengetahuan.
3. CP Mata kuliah (CPMK) adalah kemampuan yang dijabarkan secara spesifik dari CPL yang dibebankan pada mata kuliah, dan bersifat spesifik terhadap bahan kajian atau materi pembelajaran mata kuliah tersebut.
4. Sub-CP Mata kuliah (Sub-CPMK) adalah kemampuan yang dijabarkan secara spesifik dari CPMK yang dapat diukur atau diamati dan merupakan kemampuan akhir yang direncanakan pada tiap tahap pembelajaran, dan bersifat spesifik terhadap materi pembelajaran mata kuliah tersebut.
5. Indikator penilaian kemampuan dalam proses maupun hasil belajar mahasiswa adalah pernyataan spesifik dan terukur yang mengidentifikasi kemampuan atau kinerja hasil belajar mahasiswa yang disertai bukti-bukti.
6. Kreteria Penilaian adalah patokan yang digunakan sebagai ukuran atau tolok ukur ketercapaian pembelajaran dalam penilaian berdasarkan indikator-indikator yang telah ditetapkan. Kreteria penilaian merupakan pedoman bagi penilai agar penilaian konsisten dan tidak bias. Kreteria dapat berupa kuantitatif ataupun kualitatif.
7. Teknik penilaian: tes dan non-tes.
8. Bentuk pembelajaran: Kuliah, Responsi, Tutorial, Seminar atau yang setara, Praktikum, Praktik Studio, Praktik Bengkel, Praktik Lapangan, Penelitian, Pengabdian Kepada Masyarakat dan/atau bentuk pembelajaran lain yang setara.

9. Metode Pembelajaran: *Small Group Discussion, Role-Play & Simulation, Discovery Learning, Self-Directed Learning, Cooperative Learning, Collaborative Learning, Contextual Learning, Project Based Learning*, dan metode lainnya yg setara.
10. Materi Pembelajaran adalah rincian atau uraian dari bahan kajian yg dapat disajikan dalam bentuk beberapa pokok dan sub-pokok bahasan.
11. Bobot penilaian adalah prosentasi penilaian terhadap setiap pencapaian sub-CPMK yang besarnya proposional dengan tingkat kesulitan pencapaian sub-CPMK tsb., dan totalnya 100%.
12. **TM**=Tatap Muka, **PT**=Penugasan Terstruktur, **BM**=Belajar Mandiri. / **FF** = *Face to Face*, **SA** = *Structured Assignment*, **SS** = *Self Study*