SILABUS MATA KULIAH MATEMATIKA

<table>
<tr><td rowspan="5">IDENTITAS MATA KULIAH

<i>Course Identity</i></td><td>Nama Mata Kuliah</td><td>:</td><td>KALKULUS 1</td></tr>
<tr><td><i>Course name</i></td><td>:</td><td><i>Calculus I</i></td></tr>
<tr><td>Kode MK</td><td>:</td><td>SM234101</td></tr>
<tr><td><i>Code</i></td><td>:</td><td><i>SM234101</i></td></tr>
<tr><td>Kredit</td><td>:</td><td>3 SKS</td></tr>
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	Credit	:	*3 SKS*
	Semester	:	**I**
	Semester		
	Rencana Tatap Muka	:	**16 minggu (32 pertemuan tatap muka)**
	Meeting Plan		*16 weeks (32 meetings)*

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<tr><td rowspan="2">DESKRIPSI MATA KULIAH

<i>Course Description</i></td><td>

Dalam Mata Kuliah ini mahasiswa akan mempelajari pokok bahasan pokok bahasan sebagai berikut:

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.
2. Konsep dasar bilangan kompleks: penjumlahan, perkalian, hasil bagi, bentuk polar bilangan kompeks beserta operasi aljabarnya dan penarikan akar persamaan dalam sistem bilangan kompleks.
3. Konsep dasar aljabar matrik, sifat-sifat determinan, operasi baris elementer, sistem persamaan linier dan masalah nilai eigen atau vector eigen.
4. Konsep-konsep fungsi, limit: domain, range, fungsi linier, kuadratik dan trigonometri atau transcendent, grafik fungsi, limit fungsi dan kontinuitas.
5. Diferensial/turunan: definisi turunan, aturan-aturan diferensisasi (untuk fungsi polynomial, trigonometri, tramsendent), aturan rantai dan turunan fungsi implisit.
6. Aplikasi Turunan: laju-laju berkaitan, interval naik-turun, kecekungan, sketsa grafik yang mempunyai asimtot dan puncak, nilai ekstrema dan aplikasi masalah optimasi.
7. Integral tak-tentu: turunan dan anti turunan , Theorema Fundamental Kalkulus.

In this course, students will learn the following subjects:
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.*
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.*
3. *The basic concept of matrix algebra, determinant properties, elementary line operations, systems of linear equations and the problem of eigenvalues or eigenvectors.*
4. *The concepts of function, limit: domain, range, linear, quadratic and trigonometric or transcendent function, function graph, limit function and continuity.*
5. *Differential / derivative: definition of derivatives, referenced rules (for polynomial, trigonometric, tramsendent functions), chain rules and implicit derivatives of functions.*
6. *Derivative Applications: corresponding rates, increment interval, slope, graph sketch having asymptotes and peaks, extrema values and application of optimization problems.*
7. *Indefinite integral: Derivative and anti-derivative, Fundamental Theorems of Calculus.*

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CAPAIAN PEMBELAJARAN LULUSAN YANG DIBEBANKAN MATA KULIAH *Learning Outcome*	1. Mahasiswa mampu mengidentifikasi dan menjelaskan pondasi matematika yang meliputi murni, terapan dan dasar-dasar komputasi (CPL 1) 2. Mahasiswa mampu menyelesaikan permasalahan sederhana dan praktis dengan mengaplikasikan pernyataan matematika dasar, metode dan komputasi (CPL 2) 1. *Students are able to identify and explain foundations of mathematics that include pure, applied, and the basic of computing*

	2. *Students are able to solve simple and practical problems by applying basic mathematical statements, methods and computations*
CAPAIAN PEMBELAJARAN MATA KULIAH *Course Learning Outcome*	1. Mahasiswa mampu menerapkan persamaan atau pertidaksamaan serta grafik fungsi Persamaan Linear. 2. Mahasiswa mampu mengaplikasikan bentuk peubah kompleks dalam bentuk polar serta menarik akar-akar persamaannya. 3. Mahasiswa mampu menerapkan konsep matriks untuk menyelesaikan sistem persamaan linier dan menentukan nilai eigen. 4. Mahasiswa mampu menentukan kekontinuan fungsi dan turunanannya. 5. Mahasiswa mampu menerapkan integral melalui teorema fundamental kalkulus. 1. *Students are able to apply equalities or inequalities as well as graphs of Linear Equation functions.* 2. *Students are able to apply complex variable forms in polar form and get the roots of the equation.* 3. *Students are able to apply matrix concepts to solve a linear equation system and determine the eigen value.* 4. *Students are able to determine the continuity of functions and their derivatives.* 5. *Students are able to apply integrals through the fundamental theorem of calculus.*
POKOK BAHASAN *Content*	• Matrik dan Determinan. / *Matrix and Determinant* • Persamaan, pertidaksamaan, grafik fungsi parabola, lingkaran atau elips./ *Equations, inequalities, graphs of functions of a parabola, circle or ellipse* • Bilangan kompleks dan bentuk polarnya./ *Complex numbers and their polar coordinates.* • Kekontinuan fungsi dan turunanya. / *Continuity of functions and their derivatives.* • Integral dan Theorema Fundamental Kalkulus. / *Integral and Fundamental Theorems of Calculus.*
PRASYARAT *Prerequisite*	-
PUSTAKA *References*	1. Tim Dosen Jurusan Matematika ITS, *Diktat Matematika 1* , Edisi ke-5 Jurusan Matematika ITS, 2020 2. Anton, H. dkk, *Calculus,* 10-th edition, John Wiley & Sons, New York, 2012 3. Kreyzig, E, *Advanced Engineering Mathematics*, 10-th edition, John Wiley & Sons, Singapore, 2011 4. Purcell, J, E, Rigdon, S., E., *Calculus,* 9-th edition, Prentice-Hall, New Jersey, 2006 5. James Stewart , *Calculus*, ed.7, Brooks/cole-Cengage Learning, Canada,2012