

IDENTITAS MATA KULIAH <i>Course Identity</i>	Nama Mata Kuliah : Matematika Course Name Mathematics
	Kode MK : SM234152 Code
	Kredit : 2 SKS Credit
	Semester : I/II Semester
	Rencana Tatap Muka : 16 minggu (32 pertemuan tatap muka) Meeting Plan 16 weeks (32 meetings)
DESKRIPSI MATA KULIAH <i>Course Description</i>	Mata kuliah ini membekali mahasiswa konsep matrik, deteminan dan sistem persamaan linier, konsep berpikir matematis dalam penyelesaian masalah-masalah rekayasa, pemodelan, dan lain-lain dalam keteknikan yang berkaitan dengan aplikasi diferensial. Materi perkuliahan lebih ditekankan pada teknik penyelesaian masalah-masalah riil. Materi perkuliahan meliputi: matrik dan determinan, penyelesaian sistem persamaan linier, nilai eigen dan vektor eigen, sistem bilangan real, fungsi dan grafik, derivatif dan aplikasinya, integral dan aplikasinya, barisan dan deret serta perhitungan yang terkait suku bunga. <i>In this course, students will be given matrix concept, determinant and linear equation system, mathematical thinking framework in order to solve engineering problems, modeling, etc. in technique that relate to differential application. The course will be focusing on the technique to solve real problems.</i> <i>In this course, students will learn: matrix and determinant, linear equation system, eigenvalue and eigenvector, real number system (real number order), functions and graph, derivative and its application, integral and its application, sequence and series especially related to interest rate.</i>
CAPAIAN PEMBELAJARAN LULUSAN YANG DIBEKANKAN MATA KULIAH <i>Learning Outcome</i>	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) <i>1. Students are able to identify and explain foundations of mathematics that include pure, applied, and the basic of computing</i> <i>2. Students are able to solve simple and practical problems by applying basic mathematical statements, methods and computations</i>
CAPAIAN PEMBELAJARAN MATA KULIAH <i>Course Learning Outcome</i>	1. Mahasiswa mampu menerapkan konsep-konsep matematika yang terkait matriks dan determinan, serta menentukan nilai eigen dan vektor eigen. 2. Mahasiswa mampu menerapkan persamaan atau petidaksamaan serta nilai mutlak. 3. Mahasiswa mampu mengaplikasikan fungsi polinomial, fungsi eksponensial pada fungsi permintaan dan penawaran. 4. Mahasiswa mampu menurunkan (mendiferensialkan) fungsi eksplisit, menerapkan aturan rantai, turunan fungsi implisit serta mampu menentukan nilai maks/min. 5. Mahasiswa mampu menerapkan dasar-dasar teknik integrasi, serta barisan dan deret. <i>1. Students are able to apply the basic concepts of mathematics related to matrices and determinants and are able to determine the eigenvalues and eigenvectors.</i> <i>2. Students are able to apply equations or inequalities and also absolute values.</i> <i>3. Students are able to apply polynomial and exponential functions for demand and supply functions.</i> <i>4. Students are able to differentiate the explicit functions, to apply chain rules, to find the implicit differentiation and also to find the maximum and minimum values.</i>

	5. <i>Students are able to apply the basics of integration technique and also sequence and series.</i>
POKOK BAHASAN Content	Dalam Mata Kuliah ini mahasiswa akan mempelajari Pokok bahasan pokok bahasan sebagai berikut: 1. Matrik, sifat-sifat determinan, operasi baris elementer, sistem persamaan linier dan masalah nilai eigen atau vector eigen. 2. Konsep dasar sistim bilangan real: Pengertian sistem bilangan real, bentuk desimal bilangan real, sistem koordinat , sifat urutan, pengertian nilai mutlak dan pertidaksamaan. 3. Fungsi, limit: Domain, range, fungsi linier-sederhana, grafik fungsi, fungsi permintaan dan penawaran. 4. Diferensial/turunan: Definisi turunan, aturan-aturan diferensiasi (untuk fungsi polynomial, trigonometri, transendent), aturan rantai dan turunan fungsi implisit. 5. Aplikasi turunan: Laju-laju berkaitan, interval naik-turun, kecekungan, sketsa grafik yang mempunyai asimtot dan puncak, nilai ekstrema dan aplikasi masalah optimasi. 6. Integral tak-tentu: Rumus dasar dan integral substitusi. 7. Barisan dan deret, Limit fungsi dalam suku bunga. <i>On this course, students will learn the following:</i> 1. <i>Matrix: the basic concept of matrix, elementary row operation, system of linear equation, eigenvalues and eigenvectors.</i> 2. <i>Real Number System: understanding the real number system, decimal form, coordinate system, ordering property, absolute value and inequality.</i> 3. <i>Functions & Limits: domain, range, linear functions</i> 4. <i>Trigonometry: Definition of Sine, cosine, tangent and graph of trigonometric functions, trigonometric equations, set of solving equations in trigonometric collisions.</i> 5. <i>Differential/derivative: Definition of derivative, the derivative with respect to x, chain rule, max/min application to polynomial functions.</i> 6. <i>Integral: Definition, the nature of the indefinite integral, the basic formulas of the indefinite int, the integral by substitution, the partial integral, the definite integral with the Fundamental Theorem Calculus_1.</i> 7. <i>Integral Application: The area between curve, the volume of the volume of area revolution.</i> 8. <i>Geometry: Two-dimensional coordinate system, parallel or perpendicular lines, scale, midpoint between 2 points, pythagorean, two-point distance, scale, conic alignment, reflection, projection and angle.</i>
PRASYARAT Prerequisite	-
PUSTAKA References	1. Tim Dosen Jurusan Matematika ITS, <i>Diktat Matematika 1</i> , Edisi ke-5 Jurusan Matematika ITS, 2020 2. Anton, H. dkk, <i>Calculus</i>, 10-th edition, John Wiley & Sons, New York, 2012 3. Kreyzig, E, <i>Advanced Engineering Mathematics</i>, 10-th edition, John Wiley & Sons, Singapore, 2011 4. Purcell, J, E, Rigdon, S., E., <i>Calculus</i>, 9-th edition, Prentice-Hall, New Jersey, 2006 5. James Stewart , <i>Calculus</i>, ed.7, Brooks/cole-Cengage Learning, Canada, 2012