IDENTITAS MATA KULIAH ***Course Identity***	**Nama Mata Kuliah** ***Course name***	**:**	**Matematika** ***Mathematics***
	Kode MK ***Code***	**:**	**SM234151**
	Kredit ***Credit***	**:**	**3 SKS**
	Semester ***Semester***	**:**	**I/II**
	Rencana Tatap Muka ***Meeting Plan***	**:**	**16 minggu (32 pertemuan tatap muka)** ***16 weeks (32 meetings)***
DESKRIPSI MATA KULIAH *Course Description*	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 yang dapat diformulasikan ke dalam fungsi satu variabel bebas. Materi perkuliahan meliputi: matrik dan determinan, penyelesaian sistem persamaan linier, nilai Eigen dan vektor Eigen, sistim bilangan riil (keterurutan bilangan riil), fungsi dan gafik, derivatif dan aplikasinya, integral dan aplikasinya pada perhitungan luas bidang datar dan volume benda putar, geometri. *In this course, students will be given matrix concept, determinant and linear equation system, Mathematical thinking conception in order to solve manipulated problems, modelling, etc. in technique that relate to differential application. The course will be focusing on the technique to solve real problems that can be formulated to one independent variable function.* *In this course, student will learn matrix and determinant, linear equation system, Eigen value and Eigen vector, real number system (real number order), functions and graph, derivative and its application, integral and its application the area between curves and the volume of area revolution and geometry*		
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 konsep matriks untuk menyelesaikan sistem persamaan linier dan menentukan nilai eigen. 2. Mahasiswa mampu menerapkan persamaan atau petidaksamaan serta nilai mutlak 3. Mampu menggambar grafik fungsi polinomial dan fungsi transenden 4. Mampu mendefinisikan sinus, cosines, tangent, dan megaplikasikan kesamaan trigonometri dalam menyederhanakan/menyelesaikaan persamaan trigonometri 5. Mampu menurunkan (mendiferensialkan) fungsi explisit, menerapkan aturan rantai, turunan fungsi implisit serta mampu menentukan nilai maks/min untuk fungsi polynomial 6. Mampu menyelesaikan integral menggunakan teorema fundamental kalkulus dan rumus rumus dasar integrasi 7. Mampu menghitung luas bidang datar dan volume benda putar 8. Mampu memahami geometri *1. Students are able to apply matrix concepts to solve a linear equation system and determine the eigen value*		

	2. *Students are able to apply equations or inequalities and also absolute value.* 3. *Students are able to draw graphs of polynomial functions and transcendent functions.* 4. *Students are able to define sinus, cosines, tangent, and apply trigonometric equations in simplifying /solving trigonometric equations* 5. *Students are able to differentiate explicit functions, apply chain rules, derivative implicit functions, and are able to determine maximum/minimum value of the polynomial function* 6. *Students are able to solve integral using fundamental calculus theorem and basic integration equation* 7. *Students are able to calculate the area between curves and the volume of area revolution* 8. *Students are able to understand geometry*
POKOK BAHASAN ***Content***	1. Matriks: Konsep dasar aljabar matrik, menghitung determinan, invers matrik dengan matrik adjoint atau operasi baris elementer, dan penyelesaian sistem persamaan linier, menentukan nilai eigen dan vector eigen. 2. Sistem Bilangan Riil: Pengertian sistem bilangan riil, aritmatika, perpangkatan, persamaan dan pertidaksamaan. 3. Fungsi & Grafik: Domain, range, fungsi dasar Polinomial, Transenden: eksponensial , logaritma beserta sketsa grafiknya. 4. Trigonometri: Definisi Sinus , cosinus, tangen dan grafik fungsi trigonometri, kesamaan trigonometri , himpunan penyelesaian persamaan dalam bentur trigonometri. 5. Diferensial/ turunan: Definisi turunan, rumus dasar diferensisasi, aturan rantai, aplikasi maks/min pada fungsi polinomial 6. Integral: Definisi, sifat dasar integral tak tentu, rumus-rumus dasar int tak tentu, integral tak tentu dgn substitusi, integral parsial, integral tertentu dengan Teorema Fundamental Kalkulus_1. 7. Aplikasi Integral: Luas bidang datar, volume benda putar. 8. Geometri: sistim koordinat dua dimensi, garis garis sejajar atau tegak lurus, skala, titik tengah antara 2 titik, Phytagoras, jarak dua titik, skala, irusan kerucut, pencerminan, proyeksi dan sudut. 1. *Matrix: The basic concept of matrix algebra, calculating determinants, inverse matrices with adjoint matrices or elementary line operations, and solving systems of linear equations, determining eigenvalues and eigenvectors.* 2. *Real Number System: Understanding the real number system, arithmetic, power, equality and inequalities.* 3. *Functions & Graphs: Domain, range, basic functions Polynomial, Transcendent: exponential, logarithmic along with graph sketches.* 4. *Trigonometry: Definition of Sine, cosine, tangent and graph of trigonometric functions, trigonometric equations, set of solving equations in trigonometric collisions.* 5. *Differential/derivative: Definition of derivative, the derivative with respect to x, chain rule, max/min application to polynomial functions.* 6. *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.* 7. *Integral Application: The area between curves, the volume of the volume of area revolution.* 8. *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.*
PRASYARAT ***Prerequisite***	-
PUSTAKA ***References***	1. Tim Dosen - Matematika ITS, Buku Ajar Matematika I FADP, Edisi ke-1 Departemen Matematika ITS, 2018 2. Anton, H. dkk, Calculus, 10-th edition, John Wiley & Sons, New York, 2012. 3. Kreyzig, E, Advanced Engineering Mathematicsss, 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.