Department of Mathematics
Institut Teknologi Sepuluh Nopember
email : matematika@its.ac.id – web : https://www.its.ac.id/matematika

Course	**Course Name**	**: Mathematics I**
	Course Code	**: KM184101**
	Credit	**: 3**
	Semester	**: 1**

Description of Course
This course equips students of matrix concepts, determinants and systems of linear equations of mathematical thinking concepts in solving engineering problems, modeling and others in engineering related to differential applications. The lecture material is more emphasized on the technique of solving real problems that can be formulated into the function of one independent variable. The lecture material includes: matrices and determinants, solving systems of linear equations, real number systems (sequence, absolute value), complex numbers and algebraic operations, polar complex numbers, functions and limits, derivatives and applications and integral unassigned.

Learning Outcome	
PLO 1	Able to interpret the basic concepts of mathematics and establish direct, indirect or induced mathematics proof
PLO 2	Able to identify simple problems, form mathematical models and solve them
PLO 3	Mastering standard methods in mathematics

PLO 4	Able to master the fundamental theory of mathematics including the concepts of sets, functions, differentials, integrals, geometry and structure of mathematics.
PLO 5	Able to identify problems, form mathematical models and solve them

Course Learning Outcome

1. Able to understand the matrix and its determinants and its properties and able to solve the system of linear equations, determine the value of Eigen and vector Eigen.
2. Able to understand the meaning of the system of real numbers, the decimal shapes of real numbers, real coordinates, sequence properties, the definition of absolute value, inequality, coordinate fields, lines, spacing of two points, circles, parabola
3. Able to understand complex numbers and operations of complex number algebra, polar complex number and root withdrawal of complex number equations.
4. Able to understand and calculate function limits and determine the continuity of simple function functions.
5. Students can decrease (differentiate) explicit or implicit functions, according to chain rules
6. Able to draw graphics, use derivative tests to determine extreme points, up / down, and dolphins and apply them to function optimization problems, Taylor / Maclaurin series and able to calculate the limit of tact form.
7. Able to resolve integrals using fundamental theorems of calculus

Main Subject

1. The basic concept of matrix algebra, the nature of determinants of elementary row operations and systems of linear equations and Linear Transformations and Eigenvalues, Eigen vectors
2. The basic concepts of real-number systems: the notions of real-number systems, the decimal-shapes of real numbers, real coordinates, sequence

properties, the definition of absolute values, inequalities, field coordinates, lines, spacing of two points, circles, parabolas

3. Sum, Multiplication, Results for, polar form complex number and its algebraic operations and root withdrawal of complex number equations.
4. Concepts of function, limit: Domain, range, linear, quadratic and trigonometric functions, and transcendent, function graph, function limit and continuity
5. Differentials / derivatives: derived definitions, Rules of classification (for polynomial functions, trigonometric, trancendence), chain rules and implicit function derivatives.
6. Derivative Application: The corresponding rates, rising intervals, concentrations, graphic depictions of asymptotes and peaks, extreme values and application of optimization problems, L'hopital theorem and Taylor / Maclaurin series.
7. Indefinite integral: Derivative and anti-derivative, indefinite integral, Linal integral indeterminate, Intangible intuitive base formulas, Int uncertain with substitutionproblems, vector Eigen

Prerequisites

Reference

1. Tim Dosen Jurusan Matematika ITS, *Buku Ajar Kalkulus I* , Edisi ke-5 Jurusan Matematika ITS, 2021
2. Anton, H. dkk, *Calculus,* 10-th edition, John Wiley & Sons, New York, 2012

Supporting Reference

1. Kreyzig, E, *Advanced Engineering Mathematics*, 10-th edition, John Wiley & Sons, Singapore, 2011
2. Purcell, J, E, Rigdon, S., E., *Calculus,* 9-th edition, Prentice-Hall, New Jersey, 2006
3. James Stewart , *Calculus*, ed.7, Brooks/cole-Cengage Learning, Canada,2012