



**INSTITUT TEKNOLOGI SEPULUH NOPEMBER
FACULTY OF SCIENCE AND DATA ANALYTICS
DEPARTMENT OF STATISTICS
STATISTICS UNDERGRADUATE PROGRAM**

Course	Course Name	:	Advanced Mathematics
	Course Code	:	SS234312
	Credit	:	4 SKS
	Semester	:	III

COURSE DESCRIPTION

Advanced mathematics is one of the basic subjects which is part of the field of study in mathematics. The goal of studying advanced mathematics is to master the concept of complex number systems, ordinary differential equations, functions of several variables, maximum, minimum, coordinate systems and folding integrals as well as applications in statistical methods so that students will have learning experience to think critically and be able to make the right decisions. about the use of the concept in statistical applications. The learning strategies used are discussions, practice questions, and assignments.

PROGRAM LEARNING OUTCOME

- PLO-4 Able to apply science and mathematics to support the understanding of statistical methods.
 PLO-5 Able to apply statistical theory to statistical methods.

COURSE LEARNING OUTCOME

- CLO.1 Mastering mathematical concepts and able to solve problems consisting of: sets of complex numbers, ordinary differential equations (PD), separate variables, functions of several variables, gradient calculations, total differentials, implicit functions, maximum, minimum, and their application in parameter estimation (maximum likelihood estimation or ordinary least square)
 CLO.2 Mastering concepts and being able to solve problems in multivariable functions (including cylindrical coordinates and spherical coordinates) using partial differential and double integral, variable transformation, their application in integral Gamma functions, and optimization problems in closed form functions.
 CLO.3 Mastering the concept of advanced differential equations and able to determine solutions to problems of homogeneous PD, extract PD, integrating factor, first degree linear PD, Bernoulli PD, and its applications
 CLO.4 Able to analyze the relationship between these mathematical concepts with mathematical statistical theory and corresponding statistical methods

MAIN SUBJECT

1. Set of complex number systems and applications in statistics
2. Ordinary differential equation (PDB), separate variables, homogeneous PD, extract PD, integrating factor, first degree linear PD, Bernoulli PD, applications in statistics
3. Functions of several variables: gradient calculation, total differential, implicit function, applications in statistics

4. Functions of several variables: maximum, minimum, application in statistics
5. Folding integrals in Cartesian coordinate systems and applications in statistics
6. Fold integrals in polar coordinates and applications in statistics

PREREQUISITE

Calculus II

REFERENCES

1. Anton, H., 1999. Calculus with analytic Geomery. 6th edition. Singapore: John Wiley dan Sons, Inc.
2. Erwin KreysZigh, 1983. Advanced Engineering Mathematics. 7th edition.
3. Purcell., 2000. Kalkulus dan Geometri Analsis. jilid I dan II.
4. Purcell, J.E. and Rignon., 2000. Calculus. 8th edition. Prentice Hall.
5. Salas SL, Hille e, 1982. Calculus of One and Several Variables.4th edition. New York: Jhon Wiley.