MODULE HANDBOOK
STOCHASTIC CALCULUS

MASTER DEGREE PROGRAM
DEPARTMENT OF MATHEMATICS
FACULTY OF SCIENCE AND DATA ANALYTICS

INSTITUT TEKNOLOGI SEPULUH NOPEMBER

MODULE HANDBOOK
STOCHASTIC CALCULUS

Module name	**Stochastic Calculus**
Module level	Master
Code	KM185222
Course (if applicable)	Stochastic Calculus
Semester	Spring (Genap)
Person responsible for the module	Endah R. M. Putri, S.Si., M.T., Ph.D.
Lecturer	Endah R. M. Putri, S.Si., M.T., Ph.D.
Language	Bahasa Indonesia and English
Relation to curriculum	Master degree program, **mandatory**, 2nd semester.
Type of teaching, contact hours	Lectures, <60 students
Workload	1. Lectures : 3 x 50 = 150 minutes per week. 2. Exercises and Assignments : 3 x 60 = 180 minutes (3 hours) per week. 3. Private learning : 3 x 60 = 180 minutes (3 hours) per week.
Credit points	3 credit points (sks)
Requirements according to the examination regulations	A student must have attended at least 80% of the lectures to sit in the exams.
Mandatory prerequisites	-
Learning outcomes and their corresponding ILOs	Course Learning Outcome (CLO) after completing this module, CLO-1 : Students are able to understand the basic concepts of opportunity CLO-2 : Students are able to understand the concept of discrete stochastic and martingale processes CLO-3 : Students are familiar with the Markov concept and its application CLO-4 : Students know the concepts of Brownian motion and martingale continuously CLO-5 : Students are familiar with Ito's calculus concept and its application in finance
Content	This course presents the concept of stochastic processes to

	understand modern financial theory. The topics presented include the basic concepts of probability, random variables, discrete and continuous distributions, and the Markov chain. Furthermore, the concept of Martingale, Brownian motion, and Ito's calculus that underlies modern financial theory is introduced
Study and examination requirements and forms of examination	• In-class exercises • Assignment 1, 2, 3 • Mid-term examination • Final examination
Media employed	LCD, whiteboard, websites (myITS Classroom), zoom.
Reading list	Main : 1. Syamsuddin, *"Matematika Keuangan*", Lecturer Notes 2. Brzezniak and Zastawniak, *"Basic Stochastic Processes",* Springer, 1999 3. Shreve, Steven, "*Stochastic Calculus for Finance, a Continuous Time Model*", Springer, 2004 Supporting : 1. Medina and Merino, *"Mathematical Finance and Probability, A Discrete Introduction",* Birkhauser Verlag, 2003 2. Kelbaner, FC, *"Introduction to Stochastics Calculus with Applications",* Imperial College Press, 2005