



# MODULE HANDBOOK MATHEMATICAL MODELING OF SYSTEMS

**BACHELOR DEGREE PROGRAM  
DEPARTMENT OF MATHEMATICS  
FACULTY OF SCIENCE AND DATA ANALYTICS  
INSTITUT TEKNOLOGI SEPULUH NOPEMBER**

# MODULE HANDBOOK

## MATHEMATICAL MODELING OF SYSTEMS

Module name	<b>Mathematical Modeling of Systems</b>	
Module level	Undergraduate	
Code	KM184731	
Course (if applicable)	Mathematical Modeling of Systems	
Semester	Fall (Ganjil)	
Person responsible for the module	Prof. Dr. Basuki Widodo, MSc.	
Lecturer	Prof. Dr. Basuki Widodo, MSc.	
Language	Indonesia and English	
Relation to curriculum	Undergraduate degree program, <b>elective</b> , 7 <sup>th</sup> semester.	
Type of teaching, contact hours	Lectures, <60 students	
Workload	<ol style="list-style-type: none"> <li>1. Lectures : 3 x 50 = 150 minutes per week.</li> <li>2. Exercises and Assignments : 3 x 60 = 180 minutes (3 hours) per week.</li> <li>3. Private learning : 3 x 60 = 180 minutes (3 hours) per week.</li> </ol>	
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 PLOs	<p>Course Learning Outcome (CLO) after completing this module,</p> <p>CLO-1 Students are able to study new topics of analysis and algebra</p> <p>CLO-2 Students are able to understand and deliver material from related papers / papers in the form of presentations</p>	
Content	<p>This course discusses methods (techniques) for making simulation models of a system using computers and methods of analyzing the output / simulation results. In order for the model to be built to mimic the real conditions, it is necessary to provide an understanding of the basic concepts of modeling which include the components and organization of the model, an understanding of variables and parameters; Understanding of the approach to model building that includes data exploration and data confirmation; and examples of</p>	

	simple model simulations to relatively complex model simulations such as queuing system model simulations, inventory system model simulations, and relatively complex system model simulations; In addition, it also needs to be given about the method of constructing random numbers and testing the probability distribution
Study and examination requirements and forms of examination	<ul style="list-style-type: none"> <li>• In-class exercises</li> <li>• Assignment 1, 2</li> <li>• Mid-term examination</li> <li>• Final examination</li> </ul>
Media employed	LCD, whiteboard, websites (myITS Classroom), zoom.
Reading lists	<p>Main :</p> <ol style="list-style-type: none"> <li>1. Byron S. Gottfried, Ph.D.; ELEMENTS OF STOCHASTIC PROCESS SIMULATION; Prentice Hall, Inc. Englewood Cliffs New Jersey 07632 year: 1984</li> <li>2. Hugh J. Watson, Ph.D. Computer simulation in business Copyright @ 1981 by John Willey&amp;Sons, Inc. year 1987.</li> <li>3. Averill M. Law, W. David Kelton: SIMULATION MODELING AND ANALYSIS: Mc.Graw-Hill Inc. 1991.</li> </ol> <p>Supporting :</p> <ol style="list-style-type: none"> <li>1. Johansson, R., "System Modelling and Identification", Prentice Hall International, New York, USA, 1993.</li> <li>2. Bellomo, N. dan Preziosi, L., "Modelling Mathematical Methods and Scientific Computing", CRC Press, Italy, 1995</li> </ol>

