



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

Course	Course Name	:	Simulation Technique
	Course Code	:	SS234521
	Credit	:	3 SKS
	Semester	:	V

COURSE DESCRIPTION

Simulation technique is computational course. After attending this course, students will have the competence to create a valid simulator with the real system being emulated. The learning strategy applied in this lecture is an explanation of the understanding of the system and some examples. Students play an active role to (i) be able to determine the number and variety of system simulation inputs as well as create random number generation programs and random variables and applied into statistical models in accordance with the simulation inputs of the real system to be made the simulator; and (ii) able to test the validity of random number generator representatives of the simulator input. The end of this lecture students can:(i) combine/ interact several input generator simulators to build a real simulator system and test its validity; (ii) utilize random number generators and variables to estimate distribution parameters and simple statistical models; (iii) use the simulator to experiment with determine the optimum condition of the real system.

PROGRAM LEARNING OUTCOME

- PLO-2 Able to study and utilize science and technology in order to apply it to certain areas of expertise, and be able to make appropriate decisions from the results of their own work or group work in the form of final project reports or other forms of learning activities whose output is equivalent to the Final Project through logical, critical thinking , systematic and innovative.
- PLO-3 Able to manage self-learning and develop oneself as a personal lifelong learner to compete at national and international levels, to make a real contribution to solving problems by implementing information and communication technology and paying attention to the principles of sustainability and understanding technology-based entrepreneurship.
- PLO-5 Able to apply statistical theory in statistical methods
- PLO-6 Able to design, collect, and perform data management with the right methodology
- PLO-7 Able to use modern computing devices to solve statistical problems
- PLO-8 Able to use computing techniques to solve statistical problems
- PLO-10 Able to apply business, industrial, economic, social, health or environmental statistical methods to real problems

COURSE LEARNING OUTCOME	
CLO.1	Able to explain the use of Simulation Engineering concepts and procedures specifically in several fields
CLO.2	Able to analyze data with appropriate statistical methods and interpret them using Simulation Techniques
CLO.3	Able to identify, formulate, and solve statistical problems in various applied fields in the field of Simulation Engineering
CLO.4	Able to use computational techniques and modern computer equipment needed in the field of Simulation Engineering
CLO.5	Having knowledge about current and upcoming issues related to Simulation Techniques
CLO.6	Able to motivate yourself to think creatively, work together in interdisciplinary & multidisciplinary teams, and communicate effectively
CLO.7	Capable of lifelong learning coupled with responsibility and professional ethics
MAIN SUBJECT	
<ol style="list-style-type: none"> 1. Introduction to Systems Modeling, Simulation Engineering Framework 2. Discrete Even Simulation M/M/1, M/M/2, and Inventory 3. Statistical Models and Selection of Simulator Input Models as Input Models in Simulation Techniques 4. Generation of Random Numbers (PBR) and Random Variables (PVR); DDL (Data Definition Language) 5. Making Simulators 6. Simulator Output Analysis 7. Simulator Validation 8. Building Alternative Systems 9. Simulator System Optimization 	
PREREQUISITE	
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REFERENCES	
<ol style="list-style-type: none"> 1. Law, A. M., 2015. Simulation Modelling and Analysis. 5th edition. McGraw Hill. 2. Banks, J., Carson II, J. S., Nelson, B. L., dan Nicol, D. M. 2014. Discrete-Event System Simulation. Pearson, England 3. Brailsford, S., Churilov, L., dan Dangerfield, B, 2014. Discrete-event simulation and system dynamics for management decision making. John Wiley & Sons, West Sussex, United Kingdom 	