

Modeling and Simulation

- **Course number and name:**
CC 517 – Modeling and Simulation
- **Credits and contact hours**
Credits Hours: 3Hrs
Contact Hours: In Lecture 2Hrs, and In Tutorial 2Hrs
- **Instructor’s or course coordinator’s name**
Coordinator Name: Prof. Dr. Abdel Monem Wahdan
- **Text book, title, author, and year**
 - Averill M. Low & W. David Kelton, “Simulation Modeling and Analysis”, 3rd Ed, Mc Graw-Hill, 2000
 - Barry L. Nelson, “Stochastic Modeling: Analysis and Simulation”, Mc Graw-Hill, 1995
- **Specific course information**
 - a. **Catalog description**
Introduction - Probability - Random variables and distributions - Random Processes - Discrete and Continuous Markov Processes - Queuing systems - Stochastic Petri nets - Computer generation of random numbers - Simulation of an M/M/1 queuing system.
 - b. **Prerequisites or co-requisites**
Prerequisites: CC319
 - c. **Types of Course (required, elective, or selected elective course) in the program**
Elective Course
- **Specific goals for the course**
 - a. **Specific outcomes of instruction**

After the completion of this course the students will be able to:

	Course Learning Outcomes	SO
1	Emphasize basic principles of the field of Modeling and Simulation.	F
2	Understand models as tools to make predictions about the behavior of systems.	H
3	Acquiring the necessary conceptual and practical background for representing discrete and continuous random processes.	K
4	Highlight the different stages in building a discrete event simulation model and the architecture of simulation software.	K

Topics to be covered

- Introduction
- Probability, random variables and distributions
- The exponential and Poisson distributions
- Generation of random numbers and distributions
- Operational laws. Little law and its applications.
- Random processes, state transition diagrams.
- Discrete and Continuous Markov processes, steady state solutions.
- Queuing models – performance measures
- Applications
- Modeling with stochastic Petri nets
- Features of Simulation languages