

IE 324 SIMULATION

FALL 2023

IMPORTANT NOTES: IF YOU ARE SHOWING ANY SYMPTOMS, WEAR A MASK!

The simulation software **ARENA** can only be installed to Windows computers. This means Mac users should either have their computers a Dual-Boot, or they will need an emulator software (like parallels). You are welcome to use the BCC Computer Labs.

Course Description: Use of simulation as a decision tool. The design and analysis of simulation models. The use of simulation for estimation, comparison of policies, and optimization. Emphasis is primarily on applications in the areas of production management. Topics include principle of simulation modeling, software, general-purpose computer simulation languages, and statistical analysis of simulation input and output data.

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Teaching Assistants	Batuhan Çelik – batuhan.celik@bilkent.edu.tr

Course Web Page: <https://courses.ie.bilkent.edu.tr/ie324>

Required Text Books:

- Banks, J., Carson, J. S., Nelson, B. L., and Nicol, D. M., Discrete-Event System Simulation, 2013, Pearson
- Kelton, W. D., Sadowski, R. P., and Zupick, N. B., Simulation with Arena, 6th Ed., McGraw Hill, 2015

Required Software:

- Arena version 14.5 (Install this version ONLY! Do not download the latest version online! This version will be made available to you by the TAs)

Recommended Text Books:

- Seila, A., Ceric, V., Tadikamalla, P., Applied Simulation Modeling, Duxbury, 2003
- Law, A. M., Simulation Modeling and Analysis, 4th Ed., McGraw Hill, 2006
- Fishman, G. S., Discrete-Event Simulation: Modeling, Programming, and Analysis, Springer, 2001
- Rosetti, M. D., Simulation Modeling and Arena, Wiley, 2009

Grading:

Midterm	35 %
Arena Quiz	13 %
Arena Project	12 %
Homework Assignments	5 %
Final Exam	35 %

FZ Requirement: No FZ requirement.

Open-Book Policy: Arena Quiz will be **OPEN BOOK (Simulation with Arena ONLY)** and **OPEN NOTES**. However, the midterm and final exam will be **CLOSED BOOKS** and **CLOSED NOTES**. Necessary statistical tables and formulas will be provided.

Group Policy: Your project will be done in groups of maximum 3 students.

Lab Assignments: In certain weeks, announced in advance, each section will have a lab assignment during the lab hours.

Homework Assignments: Homework assignments will be given and graded based on effort.

Attendance: Attendance will be taken during the lecture and lab hours but will NOT be counted in part towards the course grade. However, it is highly recommended to attend to the lectures and labs.

Makeup Policy: A make-up examination for the midterm will only be given under highly unusual circumstances (such as serious health or family problems). The student should contact the instructor as early as possible and provide the instructor with proper documentation (such as a medical note certified by Bilkent University's Health Center). **There is no make-up for quizzes.**

Classroom Policy: Every student is expected to respect the instructor's right to teach and other students' right to learn. Any behavior which distracts or disturbs the other students or the instructor, or disrupts class in any way is unacceptable and will not be tolerated. Any student engaging in inappropriate behavior will be asked to leave. Such behavior might also reflect negatively on the course grade of the student.

Tentative Course Outline

WEEK	LECTURE	LAB WORK	HW/Project
Sep 18	Introduction to Simulation, Simulation Exercise Event Scheduling/Time Advance Algorithm		
Sep 25	Simulation by Hand, Input Modeling	Lab 1 – Simulation by Hand	
Oct 2	Input Modeling	Lab 2 – Simulation Examples	
Oct 9	Input Modeling, Random Number Generation	Lab 3 – Input Modeling	HW 1 Due
Oct 16	Random Number and Random Variate Generation		
Oct 23	Random Variate Generation, Introduction to Arena	Lab 4 – Random Number and Variate Generation, Intro. to Arena	
Oct 30	Arena Basic Modeling		HW 2 Due Project Assigned
Nov 6	Arena Detailed Modeling	Lab 5 – Arena	HW 3 Due
Nov 13	Arena Detailed Modeling		Project Part 1 Due
Nov 20	Further Modeling with Arena	Lab 6 – Arena	
Nov 27	Output Analysis		HW 4 Due
Dec 4	Output Analysis, Verification/Validation		Project Part 2 Due
Dec 11	Comparing Alternative Configurations		
Dec 18	Comparing Alternative Configurations Optimization via Simulation	Lab 7 – Output Analysis	