IE 324 SIMULATION
SPRING 2021

IMPORTANT: Due to the ongoing pandemic, any change in the university policies about conducting classes and examinations will result an update on the topics covered and grading assessments including their percentages. **All effort will be made to make these changes as smooth as possible.**

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 but this might change during the semester.

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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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 Project	20 %
Homework Assignments	5 %
Final Exam	40 %

FZ Requirement: Failure to submit the Part 2 (Modeling Part) of the project will result in an FZ grade.

Open-Book Policy: 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, each section will have a lab assignment during the lab hours.

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

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.

Course Outline **(Subject to change as we progress into the course, will be announced if changed)**

WEEK	LECTURE	LAB WORK	HW/Project
Jan 25	Introduction to Simulation		
Feb 1	Event Scheduling/Time Advance Algorithm Simulation by Hand		
Feb 8	Input Modeling	Lab 1 – Simulation by Hand	
Feb 15	Input Modeling	Lab 2 – Simulation Examples	HW 1 Due
Feb 22	Random Number Generation	Lab 3 – Input Modeling	
Mar 1	Random Variate Generation	Lab 4 – Random Number Generation	
Mar 8	Random Variate Generation	Lab 5 – Random Variate Generation – Arena	
Mar 15	Introduction to Arena		
Mar 22	Arena Basic Modeling		HW 2 Due Project Assigned
Mar 29	Arena Detailed Modeling	Lab 6 – Arena	HW 3 Due
Apr 5	Arena Detailed Modeling		Project Part 1 Due
Apr 12	Further Modeling with Arena	Lab 7 – Arena	
Apr 19	Output Analysis		HW 4 Due
Apr 26	Output Analysis, Verification/Validation		Project Part 2 Due
May 3	Comparing Alternative Configurations Optimization via Simulation	Lab 8 – Output Analysis	
May 10	Review		
May 17			Project Part 3 Due