

IE 305 - Simulation

Spring 2022

Instructor

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Teaching / Learning Assistants

TBA

Office hours: TBA

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Course Logistics

	Section	Time - Location
Lecture	A	T 10.40 - 12.30 (FENS L045) R 10.40 - 11.30 (FENS L045)
	B	T 14.40 - 16.30 (FENS L045) R 11.40 - 12.30 (FENS L045)
Lab	A	M 13.40 - 15.30 (FENS G055 & G059)
	B	M 15.40 - 17.30 (FENS G055 & G059)

Zoom Link - <https://sabanciuniv.zoom.us/my/ezgi.turkseven> (temporary)

Course Description & Learning Outcomes

By the end of the semester, the students will learn:

- ▶ Principles of modeling, simulation, and analysis for discrete event systems.
- ▶ Techniques and tools to perform statistical analysis of both input and output data.
- ▶ The simulation software package Arena to build the simulation model

Textbooks

Simulation with Arena, W. David Kelton, Randall P. Sadowski, and David T. Sturrock, McGraw-Hill (preferably 6th edition)

Discrete-event System Simulation, Jerry Banks, John Carson, Barry L. Nelson and David Nicol, Prentice Hall (preferably 2nd edition)

Softwares

Arena is the main software package for this class. Instructions for how to install Arena can be found at: <https://mysu.sabanciuniv.edu/it/en/software/arena>

Event-Based Simulation and Input/Output Analysis computations will be performed using **Python**. The students are allowed to choose their software/environment to run their Python codes.

Tentative Outline

1. Introduction to Simulation
2. Event Based Simulation
3. Probability Review
4. A Guided Tour Through Arena
5. Modeling Basic Operations
6. Statistics Review
7. Input Analysis
8. Generating Random Numbers and Random Variates
9. Modeling Detailed Operations
10. Output Analysis

Course Assessment Measures

- ▶ **Exams (25% each):** There will be three exams in total, all of which will cover the previous 4-5 weeks approximately. Please see below for the exam policies.
- ▶ **Pre-lab assignments (5%):** Pre-lab assignments are simple and short assignments that the students are expected to complete every week before the lab hours. The content of these assignments will not be challenging. These assignments are only to encourage the students to listen to the previous week's lecture material before attending the labs. The lowest pre-lab assignment at the end of the semester will be dropped. There will not be any make-up assignments.
- ▶ **Post-lab assignments (10%):** Post-lab assignments are weekly assignments the students are expected to complete after attending the labs. The content of these assignments will be similar to the questions solved during labs. The purpose of these assignments is to encourage the students to actively participate during the lab hours. The lowest post-lab assignment at the end of the semester will be dropped. There will not be any make-up assignments.
- ▶ **Project (10%):** At the end of the semester, the students will complete a simulation project. It will include multiple topics we have covered in class: input analysis, computer simulation, output analysis. The students are expected to work in groups. The project will have multiple phases, all due towards the end of the semester. Further details of the project will be announced mid-semester.

The letter grades will be adjusted based on the performance of the class. Tentative cut-off points for the letter grades will be announced after the exams.

Course Policies

- ▶ **Class recordings:** Video recording of the live lectures, the slides used in the lectures, and the exercises used in the labs will be posted. However, lab sessions will not be recorded.
- ▶ **Laptops:** The students are expected to use their laptops in class and in labs throughout the semester. *(Make sure you have a laptop available with you when you come to class.)*
- ▶ **Make-up:** There will be only one make-up exam, which will take place during the finals week. The students need to provide an excuse (within the next 3 days after the exam) to be eligible to take the make-up exam.

Academic Integrity

By taking this course, each student agrees to abide by the academic integrity policy at Sabanci University. Violators of academic integrity will be subject to disciplinary action.