IE 1083 – Simulation Modeling
Syllabus
Spring 2026

Instructor: Prof. Yang Liu
Credit Hours: 3
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Office Hours: Monday 4:30 PM - 5:30 PM, Tuesday 1:30 PM - 5:30 PM, Thursday 4:30 PM - 5:30 PM, or by appointment
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Lectures
Thursday, 1:50 PM - 4:25 PM
S204, SCUPI Building

Textbook Banks, Carson II, Nelson, Nicol, *Discrete-Event System Simulation*, 5th Edition, Pearson.

Course Description
This course is an introductory course which provides an overview of discrete-event simulation modeling. This course is designed for students who are majoring in industrial engineering. Specific topics include general principles, simulation software, statistical models, random number generation, input modeling, validation of simulation models, simulation of manufacturing system, materials handling system, and healthcare system.

Course Objective
1. Students will have knowledge of discrete-event system, technical skill to build a discrete-event system simulation model.
2. Students will have the ability to apply simulation to solve real-world problems in manufacturing, healthcare, logistics, etc.
3. Students will be able to use SIMUL8 software.

Applicable ABET Outcomes:

(a) An ability to apply knowledge of mathematics, science, and engineering
(b) An ability to analyze and interpret data
(c) An ability to identify, formulate, and solve engineering problems
(d) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Prerequisites IE 1070, IE 1071

Grading

Mid-term Exam	20%
Final Exam	35%
Project	20%
Homework	15%
Quiz	10%

Final grades:

Level	Letter Grade	Reported Numerical Score	Grade Points
Superior Performance	A	90 - 100	4.0
	A-	85 - 89	3.7
Meritorious Performance	B+	80 - 84	3.3
	B	76 - 79	3.0
	B-	73 - 75	2.7
Adequate Performance	C+	70 - 72	2.3
	C	66 - 69	2.0
	C-	63 - 65	1.7
Minimal Performance	D+	61 - 62	1.3
	D	60	1.0
Insufficient Performance (Failure)	F	< 60	0.0

Course Policies:

- Students are expected to come prepared for each lecture by reading the appropriate material prior to class
- Questions concerning the grading of homework assignments, project-related materials, or exams must be presented to the instructor or the TA within one week (7 calendar days) after the materials have been made available for return to the student
- Late assignments will **NOT** be accepted, and all assignments, projects, and examinations must be **completed/taken at the scheduled time**. No exceptions will be made unless there are truly extenuating circumstances
- Cheating or academic dishonesty in any form will result in a grade of F for the course; there will be no exceptions to this policy.
- Professional classroom demeanor is required; in particular, all cell phones and personal electronic devices must remain off or silent during the lecture.
- Do not conduct side conversations during the lecture as it is distracting to the lecturer and other students.

Email Policy Email will be responded as promptly as possible. For detailed technical questions, please talk to the instructor during office hour.

Project The project is designed to apply discrete-event system simulation knowledge to solve real-world problems. Detail description of the project will be provided during class. Project will be team-based. Evaluation of the project will be based on both the presentation and the written report.

Audio-Video Recording

To ensure the free and open discussion of ideas, students may not record classroom lectures, discussions, and activities without the advance written permission of the instructor, and any such recording properly approved in advance should be used solely for the student's private use.

Make-up exam Policy

Make-up exam grading is only to replace your final exam grading. Students who pass the course after the make-up exam will receive only a passing grade as the final grade.

Special Accommodations

If the student has a disability for which the student is or may be requesting an accommodation, the student is encouraged to contact the instructor.

Tentative Schedule

Week 1: Introduction to simulation
Week 2: Simulation software SIMUL8
Week 3: Simulation software SIMUL8
Week 4: General principles
Week 5: Statistical models in simulation
Week 6: Queueing models
Week 7: Random number generator
Week 8: Input modeling
Week 9: Mid-term Exam
Week 10: Verification, calibration, and validation of simulation models
Week 11: Arrivals of work items
Week 12: Estimation of absolute performance
Week 13: Simulation of healthcare system
Week 14: Simulation of manufacturing and material handling systems
Week 15: Simulation using other software tools
Week 16: Project presentation
Week 17: Final Exam