SIE 431/531
Simulation Modeling and Analysis
Spring 2026

Class hours: MWF 10:00 – 10:50 a.m.
Instructor: Prof. Wei Lin
Email: whlin@arizona.edu
Office hour: by appointment.

Purpose: This course is designed to develop student's ability to *model* and *analyze* real *systems* using *discrete event simulation*. Through this course, the student will understand the power and characteristics of discrete event simulation modeling. During the course, the student will get experience in: (1) formulating an appropriate simulation model for a system, (2) implementing the model as a computer program, and (3) evaluating the output of the model.

Course structure: The course is offered in the flipped classroom mode. In that case, some lectures that are traditionally done in class will be pre-recorded and distributed before class. Homework, usually done at home in the traditional mode, will be done in-class in various forms.

Textbook:
Simulation with Arena, W. David Kelton, et al, 7th edition, McGraw-Hill, Boston, MA, 2024

Site for the Course Material: Arena software (ARENA 2022 version 16.2) and book examples can be downloaded from
https://www.rockwellautomation.com/en-us/products/software/arena-simulation/buying-options/download.html
please download the software before the first day of the class

Topics to be covered:
1. Basic concepts of simulation (definitions and types of simulations)
2. Mechanism of discrete event simulation
3. Steady state analysis: rate diagram and non-terminating simulation system
4. Random number generation
5. Input data analysis (input distribution modeling)
6. Simulation modeling using Arena package
7. Review of probability and statistics
8. Simulation output analysis
9. Monte Carlo simulation
10. Verification and validation of simulation models
11. Other simulation approaches (Time driven simulations).

Work Required:
1. Exams: There will be two midterms.
2. Homework: Homework will be assigned on a regular basis.
3. Final project: Final project will be performed as groups. Further information on the project will be provided in a separate handout in the middle of the semester.

Homework Policy:
1. Homework will be assigned on a regular basis.
2. Homework needs to be completed independently unless otherwise notified.
3. All homework needs to be submitted to D2L Dropbox.
4. Each homework set counts 10 points. A maximum of 6 points will be given for late homework. Homework will not be accepted after the solution is discussed.
5. For all homework that involves ARENA models, please submit: 1) the .doe file; 2) a brief summary (less than a page) of the result, including a screenshot of the ARENA model. Please do not submit the output report generated by ARENA towards the end of the simulation.
6. For homework problems with hand calculation, please show all the intermediate results.

Grading Scheme

Grading (SIE 431 on campus and yuma: Section: 001 and 010):
1. Homework: 10%
2. Midterm Exam 1: 25%
3. Midterm Exam 2: 30%
4. Term project: 25%
5. Quiz: 10% (three quizzes with the lowest scores will be dropped)

Grading (SIE 531 on campus: Section: 001):
1. Homework: 10%
2. Midterm Exam 1: 20%
3. Midterm Exam 2: 30%
4. Term project: 30%
5. Quiz: 10% (three quizzes with the lowest scores will be dropped)

Grading (SIE 431/531 online: Sections:025, 110, 210, 410):
1. Homework: 15%
2. Midterm Exam 1: 25%
3. Midterm Exam 2: 25%
4. Term project: 35%

Inclusive Excellence:
Inclusive Excellence is a fundamental part of the University of Arizona's strategic plan and culture. As part of this initiative, the institution embraces and practices diversity and inclusiveness. These values are expected, respected and welcomed in this course. This course supports elective gender pronoun use and self-identification; rosters indicating such choices will be updated throughout the semester, upon student request. As the course includes group work and in-class discussion, it is vitally important for us to create an educational environment of inclusion and mutual respect.

Classroom Behavior Policy
To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at

hand and not on extraneous activities (i.e. texting, chatting, reading a newspaper, making phone calls, web surfing, etc). Students are asked to refrain from disruptive conversations with people sitting around them during lecture. Students observed engaging in disruptive activity will be asked to cease this behavior. Those who continue to disrupt the class will be asked to leave lecture or discussion and may be reported to the Dean of Students.

Threatening Behavior Policy
The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to one's self. See: http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students.

AI Policy:
The use of AI tools for this class is permitted and encouraged.

Accessibility and Accommodations
Our goal in this classroom is that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please let me know immediately so that we can discuss options. You are also welcome to contact Disability Resources (520-621-3268) to establish reasonable accommodations. For additional information on Disability Resources and reasonable accommodations, please visit http://drc.arizona.edu/. If you have reasonable accommodations, please plan to meet with me by appointment or during office hours to discuss accommodations and how my course requirements and activities may impact your ability to fully participate. Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

Code of Academic Integrity
Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See: http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity.

UA Nondiscrimination and Anti-Harassment Policy
The University is committed to creating and maintaining an environment free of discrimination, http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy

Subject to Change Statement
Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.