

ESI 4523: Industrial Systems Simulation
Section 3164 (Class #: 23865)
Department of Industrial and System Engineering
UNIVERSITY of FLORIDA
Fall 2025

Class Time and Location:

T Period 9 (4:05 – 4:55 pm), WEIL 0270
R Period 5-6 (11:45 am – 1:40 pm), LIT 0237

Instructor: Xiang Zhong, Ph.D.
Associate Professor, ISE

Office Location: 482 Weil Hall

Office Hours: Thursday 3:00 pm – 4:00 pm (Zoom)

Grader Office Hours: TBD (Zoom)

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Grader: Audrey Ide
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Grader: Dakota Leonard
E-mail: dakota.leonard@ufl.edu

COURSE CATALOG DESCRIPTION:

Credits: 3; Computer programming aspects of digital simulation. Simulation methodology and languages. Design and analysis of simulation experiments as well as applications to solutions of industrial and service system problems.

COURSE PRE-REQUISITES AND CO-REQUISITES:

COP 2271 or COP2273 or COP 2332C, and ESI3215C all with minimum grades of C.

COURSE OBJECTIVES:

This 3-credit course intends to introduce you some basic techniques for modeling and simulating industrial systems in the presence of uncertainty. You will gain experience in

- Understand the major capabilities and limitations of simulation
- Formulating an appropriate simulation model for a system
- Implementing the model as a computer program
- Evaluating the output of the model

REQUIRED SOFTWARE

- **You must have a laptop to sign up for this course.** The laptop is necessary for the in-class exercises, homework assignments, and term project.
- **Simio (Simulation Software)**
 - Option 1: The Simio Academic RPS Edition is available at no cost on UF Apps (apps.ufl.edu).
 - Option 2: The Simio Student Version is only for students taking a class and is available for a nominal fee (US \$25 for 1 year unlimited access to a \$10,000 product). You can expect more details in a course announcement.

REQUIRED MATERIALS

- Smith, J.S., Sturrock, D.T., & Kelton, W.D. (2018). *Simio and Simulation: Modeling, Analysis, and Applications* (Vol. 5). Simio, LLC. (<https://www.simio.com/publications/Simio-and-Simulation-Modeling-Analysis-Applications-Edition-05/>; option for \$29 full-color ebook)

PROFESSIONAL COMPONENT (ABET):

This is a course with significant design content. Throughout the semester, students will complete a team project expected to meet specific design criteria.

RELATION TO PROGRAM OUTCOMES (ABET):

Outcome	Coverage*
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	Medium
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	Medium
3. An ability to communicate effectively with a range of audiences	Low
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	Low
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	High
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	High
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	

*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not part of the course.

EXAMS (40%)

There will be two exams. Exam 1 will cover Modules 1-4 and any supplementary material presented during this time frame. Exam 2 will cover Modules 5-9 and any supplementary material presented during this time frame.

There will not be a final exam; however, the final exam block is noted on the syllabus schedule as an emergency back-up.

Exam 1: Thursday, Oct 2	11:45 AM - 1:40 PM
Exam 2: Thursday, Nov 20	11:45 AM - 1:40 PM

LABS (20%)

There will be 4 in-class labs and each will be **followed by a lab homework assignment**. The course instructor and TA will walk you through the lab materials and you will be able to ask questions and work together to solve the problems. The resulting homework will be an individual assignment due 5-7 days later (check CANVAS for specific deadlines).

IN-CLASS ASSIGNMENTS (20%)

Other assignments may be given periodically to reinforce course content covered. There are different mechanisms that will result in graded content:

- 1) Canvas questions may be used for in-class participation and knowledge checks.
- 2) Attendance will be taken during labs, presentations, etc.
- 3) Graded quizzes from the video assignments.

These grades will be tallied and account for 20% of the final course grade.

Not all assignments will be graded. Instead, one or more problems may be randomly selected and graded. All work is assumed to be individual work unless the specific assignment denotes a group activity.

PROJECT (20%)

There will be a team-based term project worth of 20% of the final course grade. Each team will consist of 4-5 students. The goal of the project is to extend material covered in class to a real-world or research problem ideal for simulation. Each team will have the option of:

- 1) Choosing their own topic and research questions.
- 2) Completing a project assigned by the course instructor. Project descriptions and data will be provided upon request.
- 3) Competing in the Simio Simulation Competition. <https://www.simio.com/academics/student-competition/> (Fall 2025)

Project Deadlines

Project Introduced	Tue, Sept 16	N/A
Title Abstract	Fri, Sept 26	1 page title/abstract
Mid-Term Report	Thur, Oct 30	5-page progress report
Mid-Term Peer Evaluations	Thur, Oct 30	1-2 page peer evaluations
Project Presentations	Tue, Dec 2	Presentations + Q&A
Final Report	Mon, Dec 8	Written report
Final Peer Evaluations	Mon, Dec 8	1-2 page peer evaluations

GRADES:

Grading Evaluation:

Assignment	Percentage of Final Grade
In-Class Assignments (non-Lab)	20%
Lab Grades	20%
Exam 1	20%
Exam 2	20%
Group Project	20%
<i>Total</i>	<i>100%</i>

Grading Scale:

Percent	Grade	Grade Points
93.0 - 100.0	A	4.00
90.0 - 92.9	A-	3.67
87.0 - 89.9	B+	3.33
83.0 - 86.9	B	3.00
80.0 - 82.9	B-	2.67
77.0 - 79.9	C+	2.33
73.0 - 76.9	C	2.00
70.0 - 72.9	C-	1.67
67.0 - 69.9	D+	1.33
63.0 - 66.9	D	1.00
60.0 - 62.9	D-	0.67
0 - 59.9	S	0.00

“A C is required to pass this course. A C- is NOT a passing grade.”

More information on UF grading policy may be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

TENTATIVE SCHEDULE

Week	Dates	Topics	Remark
1	Aug 21	Module 1: Introduction to Simulation	
2	Aug 26, 28	Module 2: Stat/Prob/Queue Review	
3	Sept 2,4	Module 3: Fundamentals of Simulation	
4	Sept 9,11	Module 3; Lab 1 (T)	
5	Sept 16, 18	Module 4: First Simio Models	Project Details Announced
6	Sept 23, 25	Module 4: First Simio Model; Lab 2 (T)	Title/Abstract Due
7	Sept 30, Oct 2	Exam Review; Exam 1 (T) ;	
8	Oct 7,9	Module 5 Advanced Simio Models	
9	Oct 14, 16	Module 5: Advanced Simio Models;	
10	Oct 21, 23	Module 6: Input Analysis; Lab 3 (T)	
11	Oct 28, 30	Module 7: Model Data;	Mid-Term Report Due; Mid-Term Peer Evaluations Due
12	Nov 4,6	Module 8: Animation and Entity Movement; Lab 4 (T)	
13	Nov 13	Module 9: Advanced Modeling with Simio	
14	Nov 18, 20	Exam Review, Exam 2 (T) ;	
15	Dec 2	Project Work Week; Project Presentations	Final Presentation Due
16	FINALS WEEK		Final Report, Peer Evaluations Due

CLASS ATTENDANCE AND RULES:

- Attendance is required and expected. Attendance will be denoted on the course website as *optional* for some dates of the course.
- Excused absences must be consistent with university policies in the Undergraduate Catalog and require appropriate documentation. (<https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>)
- University and Departmental guidelines will be applied to categorize excused and unexcused absences.
 - Students unable should notify the instructor of excused absences via email **IN ADVANCE** of the planned absence; in emergency situations the notification should occur **BEFORE THE NEXT SCHEDULED LECTURE**.
 - Regardless of whether an absence is excused or unexcused, students are responsible for any coursework missed as a result of the absence. As most assignments will be posted in advance, students should have sufficient time to complete and submit these assignments in spite of excused activities/absences, unless otherwise discussed and approved by the professor. For excused absences, students are expected to be aware of all announcements made in class and know all previously covered material when attending the following class.
- Class Rules:
 - Avoid surfing the internet, texting, using phone/tablet apps, and checking e-mail during class to prevent distracting yourself.

COURSE COMMUNICATION:

- Important communication from the course instructor will be posted on the CANVAS “Announcements” page.
- Canvas messaging is the preferred method of communication for the instructor. Please give the instructor **48 hours** (2 business days) to respond to questions. You are highly encouraged to “bump” the messages to the instructor’s attention if you have not received a response within 48 hours.

LATE ASSIGNMENTS AND EXAM MAKE-UP POLICY

Late homework assignments will be accepted for **24 hours** after the due date with a **20% deduction**.

In general, there will be no makeup exams given. However, a student is permitted to make up a missed exam without penalty if he/she has a conflict between an exam/quiz and a scheduled University-approved activity (please do not ask for a make-up exam to attend a job interview). A student needing a make-up exam due to schedule conflicts must notify the instructor at least one week before the day the exam is scheduled for.

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Click here to read the university attendance policies:

<https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>

You are expected to be present without exception and to plan any travel around these dates accordingly. Medical emergencies are of course excluded if accompanied by a doctor's note. A note indicating that you were seen at the health center the day of the exam is not sufficient documentation of a medically excused absence from an exam. The note must say that you were medically unable to take the exam. If you fail to take the exam on the assigned day and do not have a valid excuse, there will be no make-up exam and you will be given a zero (0) on the exam. Employment interviews, employer events, weddings, vacations, etc. are not excused absences.

If a student wants to argue their grade, they must do so within the first week of the grade posted.

COURSE EVALUATION:

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.ua.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluer.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.ua.ufl.edu/public-results/>.

STUDENTS REQUIRING ACCOMODATIONS:

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

In-Class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by

a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

University Honesty Policy:

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://sccr.dso.ufl.edu/process/student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

COMMITMENT TO A SAFE AND INCLUSIVE LEARNING ENVIRONMENT:

The Herbert Wertheim College of Engineering values varied perspectives and lived experiences within our community and is committed to supporting the University’s core values, including the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information, and veteran status.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- HWCoe Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

SOFTWARE USE:

Every student is expected to have access to a computer and/or tablet with Simio simulation software.

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

STUDENT PRIVACY:

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <https://registrar.ufl.edu/ferpa.html>

CAMPUS RESOURCES:

Health and Wellness

U Matter, We Care:

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: <https://counseling.ufl.edu>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.
<https://lss.at.ufl.edu/help.shtml>.

Career Connections Center, Reitz Union, 392-1601. Career assistance and counseling;
<https://career.ufl.edu>.

Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.
<https://teachingcenter.ufl.edu/>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.
<https://writing.ufl.edu/writing-studio/>.

Student Complaints Campus: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>; <https://care.dso.ufl.edu>.

On-Line Students Complaints: <https://distance.ufl.edu/getting-help/>; <https://distance.ufl.edu/state-authorization-status/#student-complaint>.