

Digital Simulation Techniques

ESI 6529 Section 2179

Class Periods: T4 (11:45 am -12:35 am) R4-5 (11:45 am -1:40 pm)

Location: CSE E112

Academic Term: Spring 2020

Instructor:

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352-294-7716

Office Hours: Tuesday 1 pm to 3 pm, Weil 482

Course 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

COP 2271 Computer Programming For Engineers, *STA 4322* Introduction to Statistics Theory, and *ESI 4313* Operations Research 2 with minimum grades of C.

Course Objectives

This 3-credit course intends to introduce the 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

Materials and Supply Fees

None

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.
- For the class you will require access to the ARENA Software, and the student version is freely available through the following link: <https://www.arenasimulation.com/academic/students>

Required Textbooks

- Kelton, Sadowski, and Sturrock, "Simulation Using ARENA", 5th Edition, McGraw-Hill, ISBN 10: 0073376280 ISBN 13: 9780073376288

Recommended Reading

- Law, "Simulation Modeling and Analysis", 4th Edition, McGraw-Hill, ISBN-10: 0073294411 ISBN-13: 978-0073294414

Tentative Course Schedule

Week	Tues	Class Subject	Chapter	Thur	Class Subject	Chapter
1	1/7	Introduction	1	1/9	Monte Carlo Simulation	1/Handout
2	1/14	Basic Probability and Statistics	App B	1/16	Random Number Generation	12
3	1/21	Random Variable Generation	12	1/23	Simulation Concepts	2
4	1/28	Lab 1	Handout	1/30	Simulation Concepts	2
5	2/4	Simulation by Hand	2	2/6	Tour of Arena	3
6	2/11	Lab 2/ Review	Handout	2/13	Exam 1	
7	2/18	Basic Modeling Using Arena	4	2/20	Basic Modeling Using Arena	4
8	2/25	Lab 3	Handout	2/27	Input Analysis	4
10	3/10	Modeling Detailed Operations	4	3/12	Modeling Detailed Operations	5
11	3/17	Lab 4	Handout	3/19	Modeling Detailed Operations	5
12	3/24	Output Analysis	6	3/26	Output Analysis	6
13	3/31	Intermediate Modeling		4/2	Steady-State Analysis	7
14	4/7	Lab 5/ Review	Handout	4/9	Exam 2	
15	4/14	Variance Reduction Technique	12	4/16	<i>*Project - No Class*</i>	
16	4/21	Project Presentations		4/23	<i>Reading days - No Class</i>	
17	4/27	Project Report Due		4/30		

Attendance Policy, Class Expectations, and Make-Up Policy

- For on-campus students, attendance is required.
- Excused absences must be consistent with university policies in the Graduate Catalog and require appropriate documentation.
(<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>)
- 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.
- After the Spring break we will have a flipped classroom (light grey colored cells in the table). During the flipped portion of the class, on-campus students are still required to attend the lab.
- Late homework assignments will be accepted within 24 hours after the due date with a 25% 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. Excused absences are consistent with university policies in the undergraduate catalog (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>) and require appropriate documentation.

- 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.

Exams and Quizzes

Exams will be given in class on scheduled days. The Industrial & Systems Engineering Department will be using the UF Proctor U to administer exams online to our EDGE - off campus students. However, all on campus students will take their exam on campus in the classroom. Proctor U is a live online proctoring service that allows exam takers to complete their assessment at home while still ensuring the integrity of the exam for the institution. During the Proctor U process students will be monitored by proctors that will be able to see the students, and what they are doing during the exam. There will be no class during the scheduled class time that day. In-class quizzes will be given through Canvas following the announcement on the day of class.

ProctorU is an online proctoring service that allows you to take your exam from the comfort of your home. ProctorU is available 24/7, however you will need to schedule your proctoring session at least 72 hours in advance to avoid any on demand scheduling fees. Creating a ProctorU account is simple! All you will need to do is visit (<https://go.proctoru.com/session/new>) and select the "Test-Taker" option.

Please be sure to review the Exam Readiness Guide located at the following link to prepare yourself and your workspace for your appointment. (<https://www.proctoru.com/exam-readiness-guide>)

ProctorU encourages you to visit the Test It Out page to ensure you have the best possible testing experience. You will be able to test your equipment and connect ProctorU representative for tech support if needed. (<http://www.proctoru.com/testitout>)

In order to use ProctorU you will need to have a high-speed internet connection, a webcam (internal or external), a Windows or Mac Operating System, and a government issued photo ID.

ProctorU Student Support can be contacted via the LiveChat feature located at ProctorU.com, by email (help@proctoru.com) or by calling [855-772-8678](tel:855-772-8678).

Lab Sessions

Every other Tuesday will be an in-class lab. Following the lab materials, you will be able to ask questions and work together to solve the problems. It would be a good idea to attend the lab so that you will feel comfortable with homework questions.

Homework Assignments and Term Project

There will be five homework assignments. **They will be due the following week's Wednesday by 11:59 pm.** This is individual work. Term project is group work and effort report and peer evaluation are required.

Academic Integrity

Academic integrity requires that students take credit only for ideas and efforts that are their own. Students must not use unauthorized assistance, materials, information, or study aids in any assessments. Students must not use another person or his or her work as a substitute in taking assessments or completing homework or activities. Students must not take any credit for a team project unless the student has made a fair and substantial contribution to the group effort. Lastly, student must not intentionally or knowingly help or attempt to help another student to commit an act of academic misconduct.

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Homework (5)	20 each	20%
Exam 1	100	30%
Exam 2	100	30%
Group Project	100	20%
<i>Total</i>	<i>400</i>	<i>100%</i>

Grading Policy

Grade	Range	Grade Points
A	93-100	4.00
A-	90-92	3.67
B+	87-89	3.33
B	83-86	3.00
B-	80-82	2.67
C+	77-79	2.33
C	73-76	2.00
C-	70-72	1.67
D+	67-69	1.33
D	63-66	1.00
D-	60-62	0.67

*The weighted average will be rounded to the nearest integer.

More information on UF grading policy may be found at:

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

Students Requiring Accommodations

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

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://www.dso.ufl.edu/sccr/process/student-conduct-honor-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.

Software Use

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:

<http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html>

Commitment to a safe and inclusive learning environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination.

It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

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
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@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@ufl.edu

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

Campus Resources:

Health and Wellness

U Matter, We Care:

If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.

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

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 Resource Center, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.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://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.

On-Line Students Complaints: <http://www.distance.ufl.edu/student-complaint-process>.