

IE 413 Fall 2020

Stochastic Modeling, Analysis and Simulation

Syllabus

Instructors:

Prof. Siggı Olafsson (stochastic modeling), 3018 Black, 294-8908, olafsson@iastate.edu: virtual office hours Mon and Wed, 11-noon

Prof. Cameron MacKenzie (simulation), 3029 Black, 294-6283, camacken@iastate.edu: virtual office hours Tue and Thurs, 10-11 am

TA: Hanisha Vemireddy, hanisha@iastate.edu: office hours TBD

Lectures: All lectures will be posted on Canvas as videos. The outline of topics covered in this semester is posted on Canvas under Modules.

Labs: 1: Tue 2:10 – 3 p.m., 2: Tue 3:10 – 4 p.m., 3: Thu 2:10 – 3 p.m., 4: Thu 3:10 – 4 p.m., 5: Mon 7:45 – 8:35 a.m., 6: Wed 7:45 – 8:35 a.m., 7: Fri 7:45 – 8:35 a.m. in Black 0028

Course Objectives: Upon successful completion of this course, students will:

- Understand the basic concepts of stochastic processes; particularly, discrete and continuous time Markov chains including Poisson processes
- Understand the basic concepts and applications of queueing theory
- Understand the key concepts of discrete event system simulation
- Be able to build and use probabilistic and computer simulation models to evaluate system performance and select from among design alternatives.

Relation to Program Outcomes:

The relevant ABET student outcomes for this course are:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
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
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
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

Please note that one or more of the outcomes listed above may be assessed in this class.

Text: There is no required textbook for this course. The optional textbook for this course is *Simulation Modeling and Analysis*, 5th edition by Averill Law.

Software:

- Simio (www.simio.com): Available in IMSE computer labs and for personal laptops
- R: Download from the R-Project (<https://www.r-project.org>). Make sure you also download R Studio (<https://rstudio.com/products/rstudio/>). Also available in all of the IMSE computer labs.
- Excel

Assessments:

3 exams. Exam 1 will be **Friday, September 25**. Exam 2 will be **Friday, October 23**. You will need to take exams 1 and 2 on the specified date between 9 a.m. and 5 p.m. You will access and submit each exam via Canvas, and you will have 1 hour to complete the exam. Exam 3 will be during the finals week (November 21-25) with the exact date and format to be determined.

6 homework assignments (2 assignments per exam period).

Lab assignments (approximately 9 lab assignments). Details about lab assignments will be provided on Canvas

A simulation project will be due Friday, November 20. You will be able to work on the project in groups of 2-4 students based on the lab seating assignments.

Grade Composition:

Exams	45%
Homework	25%
Labs	20%
Project	10%

Expectations and Policies:

- All lectures will be posted on Canvas on a weekly basis. Each student is responsible for downloading course material, watching the lectures, and taking notes based on the lecture. Unless stated otherwise, you are not required to have watched the lecture before coming to lab.
- If you have a question about a lecture, homework assignment, or lab assignment, post your question on the Canvas Discussion Board. A question will usually be addressed within 1 business day of its posting.
- If you have a private question, email the instructor(s) or the TA.
- Check your email and Canvas at least every other day for course related information. Especially given the uniqueness of this semester and the lack of class-wide lectures, we may need to adjust the structure of the course and assignments. We will communicate any changes by posting Announcements on the Canvas page.
- Attendance in lab is mandatory. You must sit in your assigned seat for each lab period. Unfortunately, because of Covid-19 and space restrictions, you cannot attend a lab session other than the one for which you are registered.
- Some labs will require you to watch some teaching videos before coming to lab. These will be clearly identified on Canvas.
- In order to help prevent the spread of Covid-19 and other illnesses, please follow all university guidelines.

- Assignments should be completed and submitted using Canvas by the due date. Late submissions will be penalized by deducting 10% of the grade for every 24 hours that it is late.
- We do not believe in “extra credit” – please do not ask for alternative/additional assignments.

Academic Honesty: The IMSE Department expects that all students will be honest in their actions and communications. Individuals suspected of committing academic dishonesty will be reported to the Dean of Students Office as per University policy. For more information regarding Academic Misconduct see <http://www.dso.iastate.edu/ja/academic/misconduct.html>.

Professionalism: The IMSE Department expects that all students will behave in a professional manner during all interactions with fellow students, faculty, and staff. Treating others with respect and having constructive communications are examples of being professional. Expectations for this course include:

- Arrive to class on time and do not leave, or prepare to leave, early.
- Attend every class and lab session unless extenuating circumstances (illness, emergency, out-of-town job interview) occur.
- Come to class prepared to actively listen and participate, having completed reading and other assignments.
- Turn off cell phones, MP3 players, etc., during class.
- Do not read newspapers, work crossword puzzles, etc., during class.

Accessibility Statement: Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. Students requesting accommodations for a documented disability are required to work directly with staff in Student Accessibility Services (SAS) to establish eligibility and learn about related processes before accommodations will be identified. After eligibility is established, SAS staff will create and issue a Notification Letter for each course listing approved reasonable accommodations. This document will be made available to the student and instructor either electronically or in hard-copy every semester. Students and instructors are encouraged to review contents of the Notification Letters as early in the semester as possible to identify a specific, timely plan to deliver/receive the indicated accommodations. Reasonable accommodations are not retroactive in nature and are not intended to be an unfair advantage. Additional information or assistance is available online at www.sas.dso.iastate.edu, by contacting SAS staff by email at accessibility@iastate.edu, or by calling 515-294-7220. Student Accessibility Services is a unit in the Dean of Students Office located at 1076 Student Services Building.

Discrimination and Harassment: Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment. Any student who has concerns about such behavior should contact me, [Student Assistance](#) at 515-294-1020 or email dso-sas@iastate.edu, or the [Office of Equal Opportunity and Compliance](#) at 515-294-7612.

Religious Accommodation: If an academic or work requirement conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be in writing, and I will review the request. You may also seek assistance from the [Dean of Students Office](#) or the [Office of Equal Opportunity and Compliance](#).