[ISyE 6650] Syllabus

[Probabilistic Models Syllabus, OAN, and 3 Credits]

[Summer 2026]

Instructor Information

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General Course Information

Description

This course will introduce you to basic techniques for modeling and analyzing industrial systems in the presence of uncertainty.

Manufacturing & service systems typically have random components to their behavior such as the demand for products and services. We will learn useful quantitative methods for analyzing, designing, and operating stochastic systems particularly manufacturing and service systems. Much of our attention will be focused on understanding, managing and reducing variability for inventory, production, and service systems.

Course Learning Outcomes

Once completed, the students should have the following capabilities:

1. Formulate situations in practice into analytically solvable probability models.
2. Analyze the formulated probability models and use them for decision making.
3. Interpret the results of the analysis in a non-technical way.
4. Explain the assumptions underlying these models and the effects on the modeling process when these assumptions do not hold.
5. Explain the limitations of probabilistic operations research as applied to problems in industry or government.

Required Course Materials

12th edition of *Introduction to Probability Models* by Sheldon Ross (ISBN-10: 9351073831, ISBN-13: 978-9351073833). An electronic copy of the textbook is available for free via the Georgia Tech library at *library.gatech.edu*.

Grading Policy:

Grading Type	Description of Graded Assignments	% Grade
Knowledge Check	A short quiz after each week	15%
Homework	Individual homework assignments	20%
Midterm Exam	Online canvas exam	30%
Final Exam	Online canvas exam	35%

Assignments:

Assignment	**Release Date**	**Due Date**	**Weight**
Knowledge Check	Monday 12:01 AM of each module's release week	Saturday 11:59 PM of each module's release week (except 1st week)	15%
Homework	Monday 12:01 AM of each module's release week	Wednesday 11:59 PM of the following week from each module's release week	20%
Midterm Exam	June 22, Monday, 12:01AM	June 27, Saturday, 11:59 PM	30%
Final Exam	Aug 2, Sunday, 12:01 AM	Aug 6, Thursday, 11:59 PM	35%

The times listed above are subject to change so please check back often. Please convert from Eastern Time to your local time zone using a Time Zone Converter.

Description of Graded Components

Knowledge Check: This is a short Canvas quiz that you will take after you finish watching all lesson videos for each module. The first four Knowledge Checks will be conducted with **Honorlock** so that you get used to Honorlock. For some questions, you will be asked to show your work on a hard copy of scratch paper. Then you should **scan and upload** the scratch paper to the Canvas within 5 minutes after you complete your knowledge check.

You can take each quiz twice, and we will consider only the highest score. The Canvas will automatically grade your quiz based on correctness upon submission. Then we will manually regrade your quiz, taking into account **your scratch paper.** If your answer is correct but you don't submit your work for the questions whose work is asked, then you will receive 0 points for the problems. For any questions that require entering a numerical answer, always enter up to the **fourth** digit after the decimal place (e.g., 12.3456) if the number is non-terminating.

Each knowledge check is due Saturday 11:59 PM EST of the same week when each module is released. **We do not accept any late submissions**. However, if you need a short extension, please contact the teaching staff as soon as possible. At the end of the semester, we will **drop the two lowest scores**.

Homework: Homework will be assigned each week when a module is released. Thus, we have a total of 13 homework assignments. These assignments are individual and should be submitted electronically in pdf format to the Canvas. At the end of the semester, we will **drop the two lowest scores**. In general, we do not accept late submissions, but if you need a little extra time to finish an assignment, please contact the teaching staff for an extension. Or you can drop it so that it is counted toward the two lowest scores.

- We cannot accept a late submission after the homework solution is released.
- It is your responsibility to ensure that you submit the correct files containing all your work. Submit early and check the files are submitted. Incorrect submissions get zero credit even if you present files with a time stamp.
- You do not need to type your work (most students submit scans of their handwritten work).
- On some assignments, selected problems may be graded. You may discuss your assignments with professors, TAs, fellow students, and others. However, you are expected to write up your solutions to individual homework on your own and to understand your solution.
- If some homework involves coding, then copy and paste the code and outputs into an editor and convert it as a pdf file.
- Sending homework assignments, whether early, on time, or late directly to the professors is not permitted and will not be accepted.
- If there are technical issues, please notify the help desk and the teaching staff immediately.

Exams: The midterm and the final will be open during their scheduled dates, and you can take it anytime during the open period. Each exam is 120 minutes long. They are formatted as Canvas quizzes with **Honorlock.** You can have/use a hard copy of formula sheet (a.k.a. cheat sheet) with any number of pages; printing out the course material for your reference during the exam is also allowed. Only one electronic device is allowed for the exam, and the device's screen must remain on the quiz page throughout the entire duration; otherwise, Honorlock will raise a red flag. Therefore, it is important your reference material is in a hard copy.

You will need your calculator to answer some of the questions in each exam. You are allowed to use any type of calculator and its features for the exam.

You must show your work on scratch paper (not an electronic device but hard copy paper), and scan and upload the scratch work to the Canvas within 5 minutes after you are done with an exam. Use the pdf format only (no heic format please). Double check if the scratch work is successfully uploaded. For partial points, try to show as much work as possible. A correct numerical answer without work will receive a zero point.

In general, we don't provide any make-up exam. In case of an emergency, you should **contact the Dean of Students (not the instructor) immediately**. Only with a recommendation from the Office of the Dean of Students will we discuss which options you can have.

Grading Scale

- A is guaranteed if you are within the top 40% of the section or your overall score is 90 or above.
- B *or higher* is guaranteed if you are within the top 80% of the section or your overall score is 80 or above.
- C *or higher* is guaranteed if your overall score is 55 or above.

Course Policies

Attendance and/or Participation

This is an online asynchronous course and therefore, there is no attendance requirement. That said, all students are expected to watch all lecture videos and complete assignments to successfully complete the course.

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review Georgia Tech's Honor Code and the student Code of Conduct.

Any student suspected of cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Core IMPACTS

Core IMPACTS is the University System of Georgia's General Education curriculum. If you are teaching a course that counts towards Core IMPACTS, you should include a syllabus statement about the Core area and associated career competencies. This resource developed by the Center

for Excellence in Teaching and Learning and Online Education at Georgia State University includes template syllabus statements for each of the Core IMPACTS areas that you may adapt for your course.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

Pre- &/or Co-Requisites

Basic algebra and calculus are prerequisites for this class. You can use https://www.wolframalpha.com/ or the first set of codes in our Python Colab link for class examples and homework assignments. Even if you cannot manually derive a numerical answer or a final expression for a problem, it should be fine as long as you can do it using WolframAlpha or Python. However, exams will require some minimum levels of algebra, such as solving linear equations with one or two variables, and calculus, including single or double integration of simple equations, such as ax^b+c, axy, or ax+by.

Check Homework0, which serves as a quick test to assess whether your preparation for algebra and calculus is sufficient. As long as you can get numerical answers by hand, Wolframalpha, or Python, you should be fine.

Previous exposure to probabilistic models or stochastic processes is not a prerequisite for this course. However, any exposure to probability at the level of ISyE 2027 will be helpful to successfully finish the course.

Additional Course Policies

Grading and Feedback

Regrade for homework and exams is obtained by submitting a written explanation (via email) to the teaching staff. For regrade, submit a written explanation (via email) *within 3 days of when the results were released*. Regrade will only be discussed *after* submitting the work in this manner.

It is strongly recommended that you do not ask for a regrade on the basis of partial point distribution. As we apply the same rubric and partial point distribution, it is impossible to change the partial point distribution for one student.

Computer Hardware and Software

- High-speed Internet connection
- Laptop or desktop computer with a **minimum** of a 2 GHz processor and 2 GB of RAM
- Windows for PC computers OR Mac iOS for Apple computers.
- Complete Microsoft Office Suite or comparable and ability to use Adobe PDF software (install, download, open and convert)
- Latest versions of Mozilla Firefox, Chrome and/or Safari browsers

Technology Skills

- Navigating a computer operating system, launching, and quitting applications, connecting to the Internet, using a web browser to search the World Wide Web, downloading, saving, and uploading files, and sending and replying to email.
- MS Word, MS PowerPoint, and MS Excel
- Python programming

Onboarding Quiz and Proctoring Information

All Georgia Tech online degree and certificate students are required to complete the Onboarding Quiz with Honorlock in the first week of the course. Honorlock is utilized for student identity verification and to ensure academic integrity. Honorlock provides student identity verification via facial and ID photos. You may also be asked to scan the room around you. The Onboarding Quiz is needed to help make sure that your identity is verified and that your system is set up to work with Honorlock online proctoring tool. You are required to complete this quiz early in the semester to avoid problems when taking proctored exams.

Technology Help Guidelines

30-Minute Rule: When you encounter struggles with technology, give yourself 30 minutes to 'figure it out.' If you cannot, then post a message to the discussion board; your peers may have suggestions to assist you. You are also directed to contact the Helpdesk 24/7.

When posting or sending email requesting help with technology issues, whether to the Helpdesk, message board, or me use the following guidelines:

- Include a descriptive title for the subject field that includes 1) the name of course 2) the issue. Do NOT just simply type "Help" into the subject field or leave it blank.
- List the steps or describe the circumstance that preceded the technical issue or error. Include the exact wording of the error message.
- When possible, always include a screenshot(s) demonstrating the technical issue or error message.

- Also include what you have already tried to remedy the issue (rebooting, trying a different browser, etc.).

Communication Policy

- Please use the ED discussion board to ask any questions related to Knowledge Check, homework assignments, exams, and course materials. However, Do NOT submit posts of a personal nature to the discussion board. For such questions, please privately email the instructor.
- Email will be checked at least twice per day Monday through Friday; Saturday and Sunday, email is checked once per day. During the week, I will try to respond to all emails within 24 hours; on weekends and holidays, allow up to 48 hours. If you don't hear from the teaching staff within the time frame stated, then please send the teaching staff a reminder.
- The teaching staff (mainly TAs) will check the ED discussion board twice per day Monday through Friday; Saturday and Sunday, the teaching staff will check the discussion board once per day. But there may be a delay due to TAs' availability.
- Virtual office hours will be held using Zoom. The weekly schedule of the Virtual Office hours will be announced once the semester starts.
- For questions related to technology, the Digital Learning Support team at https://b.gatech.edu/digitallearningsupport for assistance. You can also reach the Canvas Hotline by phone at 1(877) 259-8498 or by email at support@instructure.com.

Online Student Conduct and (N)etiquette

Although it is not expected to be a problem in a graduate-level class, students are asked to behave in the discussions and other class interactions professionally and civilly. If you are in doubt, do not post it! Instructors reserve the right to remove any postings deemed inappropriate, unprofessional, or otherwise distracting from the course.

University Use of Electronic Email

A university-assigned student e-mail account is the official university means of communication with all students at Georgia Institute of Technology. Students are responsible for all information sent to them via their university-assigned e-mail account. If a student chooses to forward information to their university e-mail account, he or she is responsible for all information, including attachments, sent to any other e-mail account. To stay current with university information, students are expected to check their official university e-mail account and other electronic communications on a frequent and consistent basis. Recognizing that some communications may be time-critical, the university recommends that electronic communications be checked minimally twice a week.

Collaboration & Group Work

Knowledge Check and exams are individual, and you are not allowed to collaborate with colleagues. You are not allowed to use software such as Excel and Python for Knowledge Check and exams. You should not post questions on an open website such as Chegg, CourseHero etc. and ask others to solve the questions.

For homework assignments, you can discuss the problems with your colleagues, TAs, and the instructor. You can also use any materials you find on the Internet. However, you must write your work on your own instead of copying.

Copyright

Among the materials that may be protected by copyright law are the lectures, notes, and other material presented in class or as part of the course. Always assume the materials presented by an instructor are protected by copyright unless the instructor has stated otherwise.