ISYE 3232 Syllabus

Course Name: Stochastic Manufacturing & Service Systems
Section: M17
Credits: 3
Term: Fall 2026

Instructor Information

Instructor	**Email**
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General Course Information

Description

Manufacturing & service systems typically have random components to their behavior such as the demand for products and services. We will learn quantitative methods which are useful in 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

The goal of this course is to provide an overview of methods and modeling techniques used to design, analyze, and manage a manufacturing or service system with uncertainty.

- Describe the role of uncertainty in manufacturing and service systems
- Analyze and manage uncertainty in systems dealing with perishable items
- Quantify the waiting time, length of the queue, and utilization in queueing systems
- Analyze and manage uncertainty in systems using predictions of potential future outcomes
- Effectively work as a member of a team to analyze the role of uncertainty in a system and communicate the findings

Required Course Materials

- Goldratt, Eliyahu M., and Jeff Cox. "*The Goal: A Process of Ongoing Improvement.*" Third Revised Edition.
- You should have a calculator capable of doing matrix calculations (e.g., TI-83/TI-84/TI-89) for exams.

Grading Policy

Graded Component	*Weight*
Midterm Exam 1	22.5%
Midterm Exam 2	22.5%
Final Exam	30%
Team Assignments	15%
Individual Homework Assignments	10%

Your final grade will be assigned as a letter grade according to the following scale:

A	>=90%
B	80-89%
C	70-79%
D	60-69%
F	0-59%

According to policy, grades at Georgia Tech are interpreted as follows:

A	Excellent (4 quality points per credit hour)
B	Good (3 quality points per credit hour)
C	Satisfactory (2 quality points per credit hour)
D	Passing (1 quality point per credit hour)
F	Failure (0 quality points per credit hour)

(See here for more information about the grading system at Georgia Tech.)

Description of Graded Components

Exams

- Midterm Exam 1: in class, closed book, closed notes (a formula sheet will be provided)
- Midterm Exam 2: in class, closed book, closed notes (a formula sheet will be provided)
- Final Exam: in class, closed book, closed notes (a formula sheet will be provided)

Individual homework assignments

Individual homework assignments will be assigned regularly; their due dates will be posted on Canvas.

- You may discuss your homework assignments with the professor, TAs, fellow students, and others. However, you are expected to write up your solutions to individual homework on your own.
- Using, in any manner, solutions to homework assignments given as part of this course in previous semesters to prepare solutions for current assignments is a violation of the student honor code for ISYE 3232.
- You should submit your homework assignments as a PDF file via Canvas/Gradescope. You are responsible for ensuring that your homework solutions are easily read by the graders, that all pages of your solution are included in the submission, and that no part of the solution was cut off during the upload to Canvas. Corrupted files will receive zero credit; again, it is your responsibility to ensure that any file uploaded to Canvas is readable to the instructor team. If you used software to generate your solutions, you must submit your code or Excel sheets. The grading team will not consider missing pages, cut off images, or illegible work when grading. To save your homework as a PDF file, you may do this by embedding several pictures into a Word file and then saving as a PDF file. Alternatively, you can use a document scanner application on a smartphone to convert photos into a PDF file.
- Some homework assignments will involve R, MATLAB or Excel. These are available through the Georgia Tech Virtual Lab.
- Homework assignments will be graded by the Teaching Assistants. Not all assignments may be graded, and only selected problems will be graded on each assignment. Some assignments may be graded for completion only. Students are responsible for assessing their own work by consulting the posted solutions.
- You are allowed to drop your two lowest homework scores.

Team assignments

There will be several team assignments focused around two simulation games focused on “Littlefield Technologies”. Several of the team assignments will involve how well your team manages a simulated factory, which are described in materials that will be posted on the Canvas site for the course section. Teams should be comprised of 4-5 students.

- *Littlefield Preparation Assignment* (10% of Team Assignments grade)
  The purpose of this assignment is to prepare your team to work together for the Littlefield Simulation Game.
- *Littlefield Simulation 1* (40% of Team Assignments grade):

You will write and submit a report based on your team's strategy and performance during the first round.

- *Littlefield Simulation 2* (40% of Team Assignments grade):
  You will write and submit a report based on your team's strategy and performance during the second round.
- *Team Debrief and Peer Review* (10% of Team Assignments grade):
  You will write a reflection about your experience working on your team. You will evaluate your contributions and your teammates' contributions to your team's performance. In turn, your contributions to your group will be evaluated by your peers and may be used to adjust the group's grade to reflect the contributions of individuals.

USG Required Course Policies

Attendance and/or Participation

Class attendance is not required but strongly encouraged. You are encouraged to actively participate in this class by asking questions and contributing during "in-class activities," which are small group activities.

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 an 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

Not applicable.

Additional Georgia Tech Required Policies

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services 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 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 the instructor and that the instructor will have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, you are encouraged to remain committed to the ideals of Georgia Tech while in this class.

Optional Course Expectations, Policies, and Resources

Pre- &/or Co-Requisites

ISYE 2027, MATH 3215, or MATH 3225 (including knowledge of conditional probabilities, density and distribution functions, expectation, conditional expectation, laws of large numbers, central limit theorem, and Poisson Processes)

Additional Materials and Resources

The following are optional textbooks that may be useful for this course:

[**DP**] Dai, Jim, and Hyunwoo Park. *Stochastic Manufacturing & Service Systems*. 2011. [pdf available on Canvas]

[**FVF**] Feldman, Richard M., and Ciriaco Valdez-Flores. *Applied probability and stochastic processes*. Springer Science & Business Media, 2009. [Available online through the Georgia Tech Library]

[HL] F.S. Hillier and J.G. Lieberman, Introduction to Operations Research, 10th Ed., McGraw Hill, 2014. (ISBN: 9781259162985)

[**Ross**] Ross, S.M., Introduction to Probability Models, 11th Ed, Elsevier, 2014.

Collaboration, Group Work, and Acceptable Resources

Homework assignments are designed to develop your ability to understand, formulate, and solve problems. You are encouraged to work together when conceptualizing and analyzing the homework assignments. However, you are required to prepare your own solutions and perform the calculations yourself and turn in (for grading) your own analysis and write-up. Copying or rephrasing someone else's work is unacceptable. Further, copying someone else's work is a disservice to your own understanding of the material. There is a big difference between the ability to read and understand a solution and the ability to create and write one. You are allowed to use the materials listed in the syllabus in preparation of your homework responses. If you use material outside those listed in the syllabus, you should cite the material used.

The team assignments are a collaborative effort. Your group will submit one report for each assignment. Your contributions to your group will be evaluated by your peers and may be used to adjust the group's grade to reflect the contributions of individuals.

Collaboration and group work is encouraged for in-class activities. If you are unable to attend a live lecture, you may consult with classmates who did not attend the synchronous lecture and submit a solution that indicates which students you worked with. This solution must be generated independently of anyone that attended the synchronous lecture. Consulting with someone who attended the lecture to complete the solution is a violation of the honor code.

Collaboration is not allowed on midterm or final exams. Any collaboration on these graded components is a violation of the honor code.

Use of Generative AI

Limited use of Generative AI is permitted in this course on some assignments.

You may use generative AI programs to

- Explain definitions, restate homework problems, and suggest strategies for solving the problem
- Troubleshoot your attempt at the problem solution after you have already completed it. You must attempt a completed solution to the problems on your own first and only use AI to troubleshoot

Generative AI cannot be used to

- Generate full solutions

Assignments for which Generative AI is allowed with submission of an AI Usage Statement

- Homework Assignments (AI allowed with AI usage statement)
- Team Assignments (AI allowed with AI usage statement)

Assignments for which Generative AI is not allowed

- Midterm Exams
- Final Exam

If a Generative AI tool is allowed on an assignment and you use any such tool, you must be transparent and document how you used it in a required *AI Usage Statement* with each submission. The AI Usage Statement must include:

- Tool used and date of access
- The input (prompt) you provided
- A copy of the output
- A description of how you used or edited the AI-generated content

Per Georgia Tech's Honor Code, you may not submit any work generated by a Generative AI program as your own. Failure to follow these guidelines — including using Generative AI when it is not permitted or failing to disclose its use — may be considered a violation of Georgia Tech's academic integrity policies. When in doubt, always consult your instructor before using Generative AI.

You should be aware that the material generated by Generative AI programs may be inaccurate, incomplete, biased, or otherwise problematic. Also, the use of these tools may stifle your own independent thinking and creativity, which could hurt your performance on exams.

Extensions, Late Assignments, & Re-Scheduled/Missed Exams

Late assignments and extensions are not allowed. If you are unable to complete an assignment on time, you must use one of your dropped homework allowances for this purpose. Any submission received beyond the deadline posted on Canvas will be considered late. You are responsible to check that your assignment is downloadable by the instructor team; corrupted files will not be accepted.

We only accept notifications from Dean's office or institute Approved Absences; you can find the on-line request form here. Please inform the instructor of your approved absences timely. If the notification from Dean's office is at the instructor's discretion and your absence prevents you from completing assignments or tests, please discuss the accommodations with the instructor as soon as possible. Since it is difficult to create a different but fair test, and solutions to tests or assignments may have already been published, the accommodation will not necessarily be in the form of a makeup test or assignment.

Student Use of Mobile Devices in the Classroom

Research on learning shows that unexpected noises and movement automatically divert and capture people's attention, which means that one student's use of a mobile devices (laptops, cell phones, tablets, etc.) can distract another student and disrupt their ability to learn. In addition, students using mobile devices often become engaged in matters that are not related to the class they are attending. Further, research indicates that students taking notes on laptops tend to process less as they take notes, and the depth of their learning suffers.

Although students may use laptop and tablet devices, these devices should be used only for matters related to our class. For the reasons listed above, I encourage students to be mindful in terms of how using laptop and tablet devices may be impacting their own learning. Cell phones should be silenced and stored during classroom time.

Additional Course Policies

Recordings of Class Sessions and Required Permissions

Classes may not be recorded by students without the express consent of the instructor unless it is pursuant to an accommodation granted by the Office of Disability services. Students may not record or share the materials or recordings unless the instructor gives permission. Digitally proctored exams may require students to engage the video camera, but those recordings will not be shared with or disclosed to others without consent unless legally permitted.

Course website and other classroom management tools
Canvas will be used as the course website. All assignments should be submitted via Canvas (or Gradescope within Canvas).

Re-grade requests
If you think there has been an error in the grading of your assignment or exam, you have one week from the day it was returned to the class to submit it for a re-grade. When you submit a regrade request, you must provide a written explanation of the suspected grading mistake. Re-grading entails re-grading the entire assignment or exam; therefore, the re-grade process may result in your submission receiving a higher or a lower score after all of the problems have been reconsidered.

Campus Resources for Students and Student Well-Being

The following resources on campus are available to students:

- The Center for Academic Success provides a variety of valuable resources for students, including tutoring.
- The Center for Mental Health Care is the primary resource for mental health support at Georgia Tech.
- The Division of Student Life: The Office of the Vice President for Student Life and Dean of Students provides a number of services to assist students with academic, financial, medical, and personal emergencies.
- At Georgia Tech, we are concerned about your overall physical, social, and mental well-being. The Office of the Vice President for Student Engagement and Well-being. has been compiled and maintains a comprehensive list of wellness related resources.
- Additional resources on supporting student well-being are available through the Learning Well Initiative.