ISYE 3232 Syllabus

Stochastic Manufacturing and Service Systems, 3.000 credits

Course Information

Instructor: Kamran Paynabar (kamran.paynabar@isye.gatech.edu)
Course Prefix and Number: ISYE 3232
Term: Summer 2026

General Information

Course 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.

Prerequisites

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

Course Goals and 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

Course Requirements & Grading

Graded Component	Weight
Midterm Exam 1 (TBD)	30%
Midterm Exam 2 (TBD)	30%
Final Exam (TBD)	30%
Class participation and assignments	10%

Grading Scale

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 http://registrar.gatech.edu/info/grading-system for more information about the grading system at Georgia Tech.]

Course Text and Materials

Goldratt, Eliyahu M., and Jeff Cox. "The Goal: A Process of Ongoing Improvement. Third Revised Edn." (2014). Optional

You should have a calculator capable of doing matrix calculations (e.g., TI-83, TI-84) for exams.

Limited Generative AI Use Permitted and Assignment Dependent

Per GaTech's Honor Code, you may not submit any work generated by an 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 these 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.

Academic and Research Honesty/Integrity Statement

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 the Student Code of Conduct and the Academic Honor Code, especially Appendix A: Graduate Addendum to the Academic Honor Code.
Students are expected to perform research in an ethical and responsible manner. All Doctoral and Master's Thesis students are required to take the Responsible Conduct of Research training, and it is expected that students abide by the principles taught in that training while performing research for this thesis course.
Allegations of scientific or scholarly misconduct are handled in accordance with the procedures outlined by the Policy for Responding to Allegations of Scientific or Other Scholarly Misconduct.

More Information

Course Website and Other Classroom Management Tools

We will use Canvas as our course website. On Canvas, you will find the material related to the class, discussions, and any announcements.

Additional Materials/Resources

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

[**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, Introduction to Operations Research, 10th Ed., McGraw Hill, 2014. (ISBN: 9781259162985)

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

More Support for Course Texts and Materials:

Throughout the semester, we may be using software such as MATLAB and/or R. Any commercial software required for the course will be available through the computer labs on campus.

https://www.isye.gatech.edu/about/school/computing/computer-labs

Campus Resources for Students

These are resources on campus that are available to students:

- **Free tutoring for this class** is provided by the **ISyE Tutoring Center**, Monday through Thursday, 6pm to 9pm, in the studio in ISyE Main. Please find the tutoring schedule at https://www.gtiise.org/tutoring.
- **Free 1-to-1 tutoring** for this class is also provided by the Georgia Tech Center for Academic Success. Appointments can be made on success.gatech.edu.
- **The Counseling Center:** https://counseling.gatech.edu/ The Counseling Center educates students for life by providing a variety of services and programs that are consistent and consonant with the strategic plan goals of the Institution and the Division of Student Life. Services include short-term individual counseling, group counseling, couples counseling, testing and assessment, crisis intervention, referral services, as well as outreach programming, and consultation for faculty and staff, family and friends of Georgia Tech students. All counseling services are confidential and free of charge for eligible students. The Counseling Center provides brief or short-term therapy for a variety of presenting issues.
- **The Center for Assessment, Referral, and Education (CARE):** https://care.gatech.edu/ CARE is the primary resource for mental health support at Georgia Tech.
- **The Division of Student Life**: https://studentlife.gatech.edu/content/get-help-now The Office of the Vice President for Student Life and Dean of Students provides a number of services to assist students with medical and personal emergencies.