ISYE 2027 Probability with Applications - Fall 2026

Instructor information

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Course information

In this course, the students will learn the basic tools used in developing and analyzing probabilistic models with their applications.

Prerequisites Math 2550 (Introduction to Multivariable Calculus) or Math 2551 (Multivariable Calculus) with concurrency. (ISyE recommends against taking Math 2550 and ISyE 2027 with concurrency.)

Course Outcomes At the end of the course you should be able to

- Grasp which distributions might be appropriate in modeling a particular situation.
- Understand measures of a distribution's location and spread.
- Model and analyze problems at a level of the newsvendor problem or the travel time for carousels and miniloads.
- Understand the role of probability in decision making.
- Understand how randomness affects system behavior and performance.
- Compute probabilities and moments such as the expected value and variance of random variables and combinations/functions of random variables.
- Understand relationships among multiple random quantities.
- Be able to use the central limit theorem to approximate probabilities related to sums of i.i.d. random variables. Know how much probability is within 1, 2 and 3 standard deviations of the mean of a normal distribution.

Required Course Materials

Required Textbook F. M. Dekking, C. Kraaikamp, H. P. Lopuha¨a, and L. E. Meester, *A Modern Introduction to Probability and Statistics: Understanding Why and How,* Springer, London, 2005.

An electronic copy of the textbook is available for free via the Georgia Tech library at `library.gatech.edu`.

Grading Policy

The weights used for grade assignment will be

Assignment type	Weight
Attendance and participation:	5%
Homework:	15%
Midterm exam 1:	20%
Midterm exam 2:	25%
Final	35%

Thresholds for letter grade assignment are as follows.

Letter grade	Percentage range
A:	89.5% ≤ total grade ≤ 100%
B:	79.5%≤ total grade <89.5%
C	69.5%≤ total grade <79.5%
D	59.5%≤ total grade <69.5%
F	0%≤ total grade <59.5%

Participation/Attendance In-person attendance is required, and taken based on participation in in-class activities. In general, participation is evaluated on effort, not correctness. In some circumstances where unlimited submissions are available, participation is evaluated on correctness. Occasionally, a participation assignment will be completed outside of class.

Homework Ten to twelve homework assignments will be given during the semester. Homework is graded for correctness, with partial credit awarded for partial answers (e.g. work shown) or to account for minor errors. One homework assignment will be due on the last day of class.

Exams Two midterm exams and a final exam will be given during the semester. Exams are graded for correctness, with partial credit awarded for partial answers (e.g. work shown) or to account for minor errors.

Course policies

Attendance In-person attendance and participation is required. Three unexcused absences are dropped.

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.

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.

Collaboration, Group Work, and Use of Generative AI You are allowed to talk to other students in class about homework assignments, but any work you turn in must be written yourself. Exams are to be your own work. All exams are closed-book and closed-notes.

Generative AI In general, use of Generative AI and of any previous semester course materials, such as homework, projects, and any other coursework, are prohibited in this course. Using these materials will be considered a direct violation of academic policy and will be dealt with in accordance with the GT Academic Honor Code. **When in doubt regarding what constitutes a violation, do not guess the answer and post on Piazza for clarifications**.

Extensions, late assignments, and re-scheduled/missed exams Once per semester, a student can use a 24-hour extension on a homework assignment. Any homework assignments turned in past 24 hours (or a second time during the semester) will not be accepted. Makeup exams are only offered for institute-approved reasons. Contact the instructor within the first two weeks of the semester if dates of exams conflict with a religious observance.