

MATH 4261 Syllabus

Mathematical Statistics I, Section A, AG, Q, 3 credit hours

Fall 2026

Instructor Information

Instructor: Dr. Lacey

Email: lacey@math.gatech.edu

Office: Skiles 241

Office Hours: T Th, 1:30-3pm, and by appointment

General Course Information

Description

Statistics is the core mathematical technique to quantify uncertainty of measurements, a core element of science, engineering, and daily life.

1. Elementary probability theory, Conditional probability, independence.
2. Random Variables, distribution functions, means, variances, and conditional distribution functions.
3. Multivariate Random Variables, distribution functions, conditional distribution functions, covariance.
4. Special distributions, Binomial, Exponential, Uniform, Normal, t, chi-square and F distributions
5. Convergence in probability, in distribution; The Central Limit Theorem. Delta Method; Moment generating functions.
6. Elementary Statistics: Point estimation, Confidence Intervals, Order Statistics.
7. Maximum Likelihood Estimation
8. Hypothesis Testing

Course Learning Outcomes

- Gain proficiency with basic examples of random variables.
- Gain familiarity of the limiting distributions of sums of random variables, when these limiting distributions hold, and obstructions to the limits holding.
- Gain a detailed understanding of point estimates, the methods to understand how uncertain they could be.
- An examination of the notion of hypothesis testing, and how to understand the their uses and limitations.

Prerequisites

MATH 3215 or MATH 3225 or MATH 3235 or MATH 3670 or MATH 3770 or ISyE 3770 or CEE 3700

Required Course Materials

Introduction to Mathematical Statistics, 7th edition by Hogg, Craig, and McKean

Grading Policy

Your grade will be determined by mastering the 8 course topics listed above. Mastery means correct solutions to two to three questions on a given mastery topic on one of the three exams. Grading is very simple: if you master all 8, you get an A; 6 or 7 a B; 4-5 a C; 2-3 a D; 0-1 an F.

Course grades are assigned on 90% above an A, 80% above a B, 70% above a C, 60% above D.

In Class Assignments Most lectures will have an in class assignment. This will be group work, done in class, to emphasize the concepts introduced in lecture. There will be about 40 such assignments.

Homework Regular Homework will be assigned, but not graded. Homework that is submitted will be reviewed by a grader. The grader will also hold office hours. At least one half of the each exams, described next, will be drawn from the homework. Modifications to the Homework questions will be made, to ensure that students understand the methods of solutions, as well as to accommodate the 75 minute testing period.

Midterm Exams & Final Exam

- Midterm 1: Approximately Sept 24, covering the first four topics.
- Midterm 2: Approximately Oct 29, covering all topics up until the test date.
- Final Exam: On the final exam date as established by the registrar. This will be a 75 minute exam, covering remaining topics of the course for which mastery needs to be demonstrated.

Description of Graded Components

All exams are 75 minute exams, completed without aid of electronic devices. Formula sheets will either be provided, or prepared by individual students. Exact policy to be determined later.

Course Policies

Attendance and Participation

Attendance is not required. Daily worksheets are the mechanism to keep up with the class, and explore the concepts in a supported environment.

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.

Extra Credit Opportunities

No Extra Credit Opportunities

Collaboration, Group Work, and Use of Generative AI

Group work is encouraged on in class assignments. Generative AI discouraged, except to verify answers. Generative AI, phones, and other devices are not allowed on in class exams.

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

For in-class assignments, 3 are automatically dropped. Full credit is given for approved Institute activities, religious observances, and exceptional circumstances, such as sudden illness.

A make-up exam, which are on Thursdays, can be given under the circumstances described above, if arranged before the following class period, on Tuesday.

A rescheduled final exam will result in an Incomplete grade, with the student required to write a make up final before the I is replaced.

Inclement Weather and Digital Learning Days

If the Institute moves to a Digital Learning Day, due to e.g. weather, a lecture and In Class Assignment will take place asynchronously, with details announced on canvas.

Student Use of Mobile Devices in the Classroom

Use of mobile devices is allowed, except on exam days.

Additional Course Policies

Regrading on midterms during the semester will be open for one week. Regrading for the exam during the final exam period will also be open, for at most one week, depending upon the time that final course grades must be announced.

Campus Resources for Students

Undergraduate Student Academic Success Resources

A list of resources for undergraduate students' academic success and information about advising can be found at Success at Tech

Graduate Student Academic and Professional Success Resources:

A list of resources for graduate students is given on the Office of Graduate and Postdoctoral Education website. Specific information for current graduate students includes

- Academic Resources such as the Communications Center, Language Institute, Library, Catalog, Registrar, resources for conducting research, Advocacy and Conflict Resolution resources, and how to manage unexpected situations that may impact your academic performance;
- Student Resources such as Campus Services, Child Care/Family programs, Health & Wellness, Career Services, and the Student Resource Guide; and
- Professional Development such as the programming from the Career Center and other professional development resources and events

Student Well-Being:

At Georgia Tech, we are concerned about your overall physical, social, and mental well-being. A comprehensive list of wellness related resources has been compiled and maintained by the Office of the Vice President for Student Engagement and Well-being.