# Course Syllabus
# ISYE 6739 – STATISTICAL METHODS - Summer 2026

**Professor**: Dr. David Goldsman, sman@gatech.edu

## Course Description

This course provides an introduction to probability and statistics, emphasizing applications in science and engineering.

## Prerequisites

We do not enforce prerequisites for this course, but it is recommended that students have taken some set theory and integral calculus.

## Course Outcomes

Upon successful completion of this course, students should be able to use the following concepts to model practical real-world phenomena:

- Module 1 (Probability Basics): Probability axioms; elementary combinatorics; definitions of conditional probability and independence; and Bayes Theorem.
- Module 2 (Random Variables): Probability mass and density functions; expected value, variance, and moments; probability inequalities; and functions of a random variable.
- Module 3 (Bivariate Random Variables): Joint distributions; marginal distributions; conditional distributions; conditional expectation with applications; covariance, correlation, and causation; and bivariate functions of random variables.
- Module 4 (Distributions): Library of discrete and continuous distributions; normal distribution and extensions; Central Limit Theorem; and generating random variables on a computer.
- Module 5 (Statistics Basics): Descriptive statistics; estimation techniques; and sampling distributions.
- Module 6 (Confidence Intervals): CIs for means; CIs for difference of two means; CIs for variances; CIs for ratio of two variances; and CIs for Bernoulli success probabilities.
- Module 7 (Hypothesis Tests): Potential errors encountered in hypothesis testing; tests for means; tests for difference of two means; tests for variances; tests for ratio of two variances; tests for Bernoulli success probabilities; and goodness-of-fit tests.
- Module 8 (Regression): Least squares estimation; standard errors and properties; significance and testing; confidence intervals; prediction intervals; coefficient of determination; diagnostics; basics of multiple linear regression.

## Required Course Materials

- All content and course materials can be accessed online.
- There is no required textbook for this course, though students can use my free textbook *A First Course in Probability and Statistics* that can be found on the course website.

## Technology/Software Requirements

- Internet connection (DSL, LAN, or cable connection desirable)
- R statistical software (free download; see cran.r-project.org)
- Adobe Acrobat PDF reader (free download; see https://get.adobe.com/reader/)

## Grading Policy

Your course grade will be based upon my assessment of your understanding of the material covered throughout the semester. The weights used for grade assignment will be

| | |
|---|---|
| Homework | 10% |
| Project | 10% |
| Midterm Exam 1 | 25% |
| Midterm Exam 2 | 25% |
| Final Exam | 30% |

Thresholds for letter grade assignment are as follows.

| | |
|---|---|
| A* | 90 – 100% |
| B | 80 – 89% |
| C | 70 – 79% |
| D | 60 – 69% |
| F | below 60% |

*We will not award a course grade of A for any student having a project score < 70.

## Homework

There will be a homework assignment every week. Homework is meant to build both basic knowledge of the course material and deeper understanding.

## Project

There will be a team project towards the end of the semester. The project is meant to build research, presentation, and collaboration skills.

## Tests/Exams

Tests will be given three times during the semester, including a cumulative final exam that will be given during the final exam period for this course.

## Extensions, late assignments, and missed exams

These will be not be accepted.

## Attendance Policy

- This is a fully online course.
- Login on a regular basis to complete your work, so that you do not have to spend a lot of time reviewing and refreshing yourself regarding the content.

## 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 at \https://catalog.gatech.edu/policies/honor-code/ and the Student Code of Conduct at https://catalog.gatech.edu/rules/18/. 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.

## Use of Generative AI

In general, the 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, ask us for clarifications.

## Accommodations for Students with Disabilities and Special Circumstances

- If you have an issue requiring special accommodations, please make an appointment with the Office of Disability Services to discuss the appropriate procedures. Their website is http://disabilityservices.gatech.edu (404-894-2563).
- In some cases, religious observances or other events may conflict with scheduled class activities. In such situations students can be given an alternative means of meeting the academic requirement. Students must notify the instructor of any such conflicts, with the specific dates, within the first two weeks of classes.

## 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 at https://www.catalog.gatech.edu/rules/22/ articulate some basic expectations that we can have between us. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, we encourage you to remain committed to the ideals of Georgia Tech while in this class.