ISyE3770 Syllabus – Fall 2026

Statistics and Applications, 3 credits, M17
Mondays and Wednesdays, 5:00 to 6:15 pm
George Tower, Room 0803

Instructor Information

Instructor
Flavio Sanson Fogliatto

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Drop-in Hours & Location
Friday, 13:00-15:00
George Tower, Room 1011A

Teaching Assistant(s)
TBD
TBD

Email

Drop-in Hours & Location
Same as above.

General Course Information

Catalog Description

Introduction to probability, probability distributions, point estimation, confidence intervals, hypothesis testing, linear regression, and analysis of variance.

Description

This course provides essential statistical tools for making informed decisions under uncertainty. Topics include probability, probability distributions, point estimation, confidence intervals, hypothesis testing, linear regression, and analysis of variance. The course emphasizes practical application through real-world examples from manufacturing, healthcare, and technology. Students learn to collect data, quantify uncertainty, distinguish real effects from random variation, and build predictive models, developing the statistical thinking and data analysis skills necessary for effective problem-solving and decision-making.

Pre- &/or Co-Requisites

MATH 2551 or MATH 2550 AND MATH 1554 or MATH 1553

Course Goals and Learning Outcomes

Statistical methods enable professionals to make reliable decisions based on data despite inherent variability in systems and measurements. This course equips students with both the conceptual understanding and practical skills needed to analyze data, quantify uncertainty, and approach problems using statistical thinking.

Upon successful completion of this course, students will be able to:

- Design data collection strategies and create effective visual representations of data
- Apply probability concepts to quantify uncertainty and model random phenomena in complex systems
- Conduct hypothesis tests and construct confidence intervals for informed decision-making
- Select appropriate statistical methods based on data type
- Build and interpret regression models for prediction and process optimization
- Use statistical software to analyze data and interpret results
- Draw sound conclusions from experiments while understanding underlying assumptions and limitations
- Communicate statistical findings effectively to diverse audiences

Course Requirements & Grading

Assignment	Date and time		Deliverable	Weight
Homework		See Schedule	Submission on Canvas	20%
Midterm Exam	10/19	5:00PM-6:15PM	Hand-written solutions to exam questions	35%
Final Exam	12/11	6:00PM-8:50PM	Hand-written solutions to exam questions	45%

Extra Credit Opportunities

Limited extra credit opportunities may be offered throughout the semester through in-class activities, such as brief problem-solving exercises, participation tasks, or review sessions. These opportunities are designed to reinforce course concepts and support exam preparation. Because lectures are not recorded and attendance is not required, some extra credit activities may only be available during class meetings and may not be reproducible outside of class. Students are responsible for staying informed about these opportunities and for obtaining any missed material if they are not in attendance.

Description of Graded Components

Homework Assignments

- *Purpose:* Homework assignments are designed to help students master the statistical methods presented in class through active practice. Assignments may include conceptual questions, manual calculations, and applied problems. Some assignments will require students to (i) apply statistical techniques to real datasets, (ii) use statistical software to perform analyses, (iii) interpret results, and (iv) draw appropriate conclusions from data, while others will focus on analytical reasoning without the use of software. By working through these problems, students develop hands-on skills and statistical reasoning necessary to make informed, data-based decisions in professional practice. Assignments correspond to sections of the textbook chapters covered in class and are due as indicated in the Course Schedule via Canvas submission. No late homework will be accepted. In addition, homework assignments may be prepared either electronically using text-editing software of the student's choice or by hand. Handwritten submissions must be neat, legible, and easy to read.
- *Task:* Homework assignments typically consist of up to 10 exercises drawn from the textbook chapter sections covered in class. Problems may include a mix of hand calculations, statistical software applications, data interpretation, and short written explanations. Students are expected to show their work clearly, provide appropriate justification for their answers, and use statistical software (e.g., R, Python, Excel, Minitab) where indicated. Responses should be complete and professionally formatted.
- *Criteria for Success:* Successful homework submissions demonstrate: (i) correct application of statistical methods to solve problems; (ii) clear and organized work showing calculations and reasoning; (iii) proper interpretation of statistical results in context; (iv) accurate use of statistical software with appropriate output included; (v) effective communication of findings using proper statistical terminology; and (vi) completeness with all exercises attempted and fully answered. Assignments are graded on both correctness and clarity of presentation.

Midterm and Final Exams

- *Purpose:* Midterm and Final Exams assess students' mastery of statistical concepts, problem-solving abilities, and capacity to apply methods to new situations. They evaluate understanding of fundamental principles, computational proficiency, interpretation skills, and statistical reasoning developed throughout the course.
- *Task:* The course includes one in-person midterm exam and one in-person final exam, administered during scheduled class times. All exams are cumulative, covering material from the beginning of the

semester through the exam date, as statistical concepts build progressively throughout the course. Students may bring one reference sheet (8.5" × 11", both sides) for the Midterm Exam, and two sheets for the Final; these may contain any formulas, notes, or examples. Exams are closed book. Statistical tables and charts will be provided by the instructor if needed. Most exam questions are based on homework assignments and lecture material. Only scientific calculators are permitted during exams. Graphing calculators, calculators with Computer Algebra Systems (CAS), calculators with internet or wireless connectivity, AI-enabled calculators, and devices capable of storing or displaying notes or documents are not allowed. Exam details, including emphasized topics and format, will be announced via Canvas approximately one week before each exam. Printed exams will be distributed in class, and graded exams will be returned through Canvas.

- *Makeup Policy*: Makeup exams are permitted only in cases of (i) serious illness with medical documentation, (ii) Institute-approved absences, (iii) absences recommended by the Dean's Office, or (iv) Georgia Tech Athletic Association conflicts with appropriate documentation. Students who qualify for a makeup exam must provide documentation as soon as possible. Students with special circumstances should notify the instructor immediately.
- *Regrade Policy*: Students are responsible for verifying the accuracy of their grades posted on Canvas. Regrade requests must be submitted within seven days of the assignment or exam being returned on Canvas. In such cases, the entire assignment or exam will be regraded, and the final score may increase or decrease. Students should consider this carefully before requesting a regrade.

Grading Scale

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

A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	0-59%

Course Materials

Course Text

Main Text: Montgomery, D.C. & Runger, G.C. *Applied Statistics and Probability for Engineers*, 6th or 7th Edition, Hoboken, NJ: Wiley.

Additional Optional Reference: Devore, J.L. (2016). *Probability and Statistics for Engineering and the Sciences*, 9th Edition, Boston, MA: Cengage Learning.

Books for this course are available through the Georgia Tech Library. All other course materials, including slides and homework assignments, will be available on Canvas.

Course Website and Other Classroom Management Tools

Canvas is the means to disseminate course information, provide resources, and submit assignments. Students are expected to check it weekly.

Course Policies, Expectations, & Guidelines

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 plagiarizing on an assignment will be reported to the Office of Student Integrity, which 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.

Attendance and/or Participation

Students are expected to review course materials before class. Assigned textbook sections should be read in advance, as class time will focus on discussion, interpretation, and application of these concepts to problem-solving.

Class attendance is encouraged but not mandatory. Lectures will not be recorded, and students are responsible for obtaining any missed material, announcements, or notes if they do not attend. While attendance itself is not directly graded, some in-class activities (e.g., problem-solving exercises, brief participation tasks, or review sessions) may carry small amounts of credit or provide guidance that is valuable for exams and assignments.

Students who attend regularly are likely to benefit from exposure to additional examples, explanations, and insights that are not fully captured in the posted materials.

All students are expected to conduct themselves professionally and contribute to a respectful learning environment when present.

Collaboration, Group Work, and Use of Generative AI

Most in-class activities will be completed individually or in pairs and are intended for practice and engagement. In-class activities will not be graded.

GenAI may only be used when explicitly allowed for a specific assignment, as discussed in class. In general, GenAI use is not allowed. You may, however, use AI tools to improve your writing or as a tutoring aid, such as creating step-by-step roadmaps to help approach exercises.

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

Students should observe the class schedule and respect the due dates of assignments. No late homework will be accepted.

All homework assignments should be submitted through Canvas as PDF. Assignments delivered via e-mail or links to download files will not be accepted. Students are responsible for ensuring that their file uploads are completed on time. They are also responsible for ensuring that files are not corrupted.

Inclement Weather and Digital Learning Days

With developments and improvements to digital instruction over the past few years, the Institute has developed policies to leverage digital learning as much as reasonably possible. The policy sets forth requirements, procedures, and responsibilities related to the scheduling of digital instruction and/or make-up classes due to the modification of campus operations, closing of campus, or the necessary closing of instructional spaces for any reason (including but not limited to emergencies, such as inclement weather, power outages, or other infrastructure failures).

Students should await communications from their instructor regarding delivery of their classes during that period based upon the 'Digital Learning Days for Modified Campus Operations Policy' (https://www.policylibrary.gatech.edu/academic-affairs/digital-learning-days-modified-campus-operations). Students should follow guidance and/or directions provided by the Office of the Vice President for Student Engagement and Well-Being regarding student activities, events, programs, and services.

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 Expec-

tations 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.

Student Use of Mobile Devices in the Classroom

Mobile devices and personal computers can be used to take notes and work on class assignments. Students should not use such devices for other purposes in class.

Additional Course Policies

Class activities should not be recorded in audio and/or video.

Campus Resources for Students

Undergraduate Student Academic Success Resources

Some campus resources that may be relevant to support your learning process:

- Georgia Tech Library https://library.gatech.edu/
- Communication Center https://communicationcenter.gatech.edu/
- Tutoring and Academic Services https://tutoring.gatech.edu/
- Center for Mental Health Care & Resources https://mentalhealth.gatech.edu/
- Division of Student Life https://studentlife.gatech.edu/

A complete list of resources for undergraduate students' academic success and information about advising can be found at Success at Tech. Students can attend scheduled supplemental review (PLUS) sessions, stop by Drop-In Tutoring, or schedule a one-on-one appointment through Knack. To explore what options work best for you, please visit us online at success.gatech.edu/tutoring, email us at tutoring@gatech.edu, or come see us at Clough Undergraduate Learning Commons, Suite 283.

Student Well-being

At Georgia Tech, we are committed to 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 (student-resource-guide (gatech.edu). Additional resources on supporting student well-being, beyond the syllabus, are available through the Learning Well Initiative.

Course Schedule

Week/ Date	Class Topics	Preparation	Assignments Due
1 8/24	Course Introduction / Ch. 1	Montgomery & Runger – Ch. 1	-
1 8/26	Ch. 1 – The Role of Statistics in Engineering	Montgomery & Runger – Ch. 1	-
2 8/31	Ch. 2 – Probability	Montgomery & Runger – Ch. 2 – Sections 2.1 to 2.4	-
2 9/02	Ch. 2 – Probability	Montgomery & Runger – Ch. 2 – Sections 2.5 to 2.8	-
3 9/09	Ch. 2 - Probability	Montgomery & Runger – Ch. 2 – Section 2.9	-
4 9/14	Ch. 3 – Discrete Random Variables and Probability Distributions	Montgomery & Runger – Ch. 3 – Sections 3.1 to 3.3	Homework 1 submitted (9/14, Mon, 11:59 PM)
4 9/16	Ch. 3 – Discrete Random Variables and Probability Distributions	Montgomery & Runger – Ch. 3 – Sections 3.5 & 3.6	-
5 9/21	Ch. 3 – Discrete Random Variables and Probability Distributions (Recorded Asynchronous Lecture)	Montgomery & Runger – Ch. 3 – Section 3.8	-
5 9/23	Chs. 2 & 3 – Problem-Solving Recitation	Lecture slides from weeks 2 to 5	-
6 9/28	Ch. 4 – Continuous Random Variables and Probability Distributions	Montgomery & Runger – Ch. 4 – Sections 4.1 to 4.3 & 4.5 to 4.6	Homework 2 submitted (9/28, Mon, 11:59 PM)
6 9/30	Ch. 4 – Continuous Random Variables and Probability Distributions	Montgomery & Runger – Ch. 4 – Sections 4.4 & 4.7	-
7 10/07	Ch. 4 – Continuous Random Variables and Probability Distributions	Montgomery & Runger – Ch. 4 – Sections 4.9 to 4.10	-
8 10/12	Ch. 6 – Descriptive Statistics	Montgomery & Runger – Ch. 6 – Sections 6.1 & 6.3 to 6.7	Homework 3 submitted (10/12, Mon, 11:59 PM)
8 10/14	Review Class		-

Week/ Date	Class Topics	Preparation	Assignments Due
9 10/19	Midterm Exam		-
9 10/21	Ch. 7 – Point Estimators of Parameters and Sampling Distributions	Montgomery & Runger – Ch. 7 – Sections 7.1 & 7.2	Homework 4 submitted (10/21, Wed, 11:59 PM)
10 10/26	Ch. 7 – Point Estimators of Parameters and Sampling Distributions	Montgomery & Runger – Ch. 7 – Section 7.4.2	-
10 10/28	Ch. 8 – Statistical Intervals for a Single Sample	Montgomery & Runger – Ch. 8 – Sections 8.1.1 to 8.1.3, 8.2 & 8.3	-
11 11/02	Ch. 8 – Statistical Intervals for a Single Sample	Montgomery & Runger – Ch. 8 – Sections 8.4 & 8.7	Homework 5 submitted (11/02, Mon, 11:59PM)
11 11/04	Ch. 9 – Test of Hypothesis for a Single Sample	Montgomery & Runger – Ch. 9 – Sections 9.1, 9.2.1 & 9.2.2	-
12 11/09	Ch. 9 – Test of Hypothesis for a Single Sample	Montgomery & Runger – Ch. 9 – Sections 9.3, 9.4 & 9.5	Homework 6 submitted (11/09, Mon, 11:59PM)
12 11/11	Ch. 10 – Statistical Inference for Two Samples	Montgomery & Runger – Ch. 10 – Sections 10.2.1, 10.2.2, 10.3.1, 10.4, 10.6.1	-
13 11/23	Ch. 11 – Simple Linear Regression & ANOVA	Montgomery & Runger – Ch. 11 – Sections 11.2, 11.4, 11.7	Homework 7 submitted (11/23, Mon, 11:59PM)
14 11/30	Ch. 12 – Multiple Linear Regression	Montgomery & Runger – Ch. 12 – Sections 12.1.1, 12.2.1, 12.2.2, 12.5.1, 12.6.2 & 12.6.4	-
14 12/02	Ch. 12 – Multiple Linear Regression (Regression Challenge)	Montgomery & Runger – Ch. 12 – Sections 12.1.1, 12.2.1, 12.2.2, 12.5.1, 12.6.2 & 12.6.4	-
15 12/07	Review		Homework 8 submitted (12/07, Mon, 11:59PM)
15 12/09	Reading Period	-	-
16 12/11	Final Exam		6:00 – 8:50 PM