

Math 3670 - Probability and Statistics with Applications

Fall 2025

Dr. Alexandre Locquet

Catalog Description

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

Prerequisites

Completion of MATH 2401 or MATH 24X1 or MATH 2411 or MATH 2551 or MATH 2550 or MATH 2X51.

Textbook

- **Title:** *Introduction to Probability and Statistics for Engineers and Scientists*
- **Author:** Sheldon Ross
- **Publisher:** Academic Press (6th Edition)
- **Availability:** The book is available for free to Georgia Tech students here.

Instructor

- **Name:** Dr. Alexandre Locquet
- **Office:** Room 206
- **Communication:** Use the Canvas Inbox for all communication. Please do not use email. Typical response time: within 24 hours on weekdays.

Lecture Times

- **Days:** TBD
- **Time:** TBD
- **Location:** TBD.

Office Hours

- **Days:** TBD
- **Time:** TBD
- Appointments outside of these times can be arranged by request.

Grading Policy

Component	Weight
Homework	14%
Quiz 1	19%
Quiz 2	19%
Quiz 3	18%
Final Exam	30%
In-lecture Polling Bonus	3%
Attendance Bonus	1%

Grade Scale:

- **A:** $\geq 90\%$
- **B:** 80-90%
- **C:** 70-80%
- **D:** 60-70%
- **F:** $< 60\%$

Important Dates

Event	Date
Quiz 1	TBD
Quiz 2	TBD

Quiz 3	TBD
Final Exam	TBD

Quizzes and Final Exam

1. **Format:** In-person, closed-book, and closed-notes. The official formula sheet, provided on Canvas, is permitted. No other formula sheets are allowed.
2. **Calculator:** Allowed during quizzes and the final exam. Its memory should be cleared.
3. **Regrading Policy:** Requests must be made within one week of receiving a graded quiz.
4. **Missed Quizzes:**
 - Acceptable reasons (e.g., illness) must be documented. Must be approved by Dr. Voss, Dean of Students representative. Contact them for documentation. The quiz weight will transfer to the final exam.
 - Unexcused absences result in a score of zero with no weight transfer.
5. **Performance Transfer:** Students dissatisfied with one quiz score may request its weight to be transferred to the final exam. This must be requested in writing within one week of receiving the quiz. Only one quiz can be transferred, and the decision is irreversible.
6. **Potential Online Administration:** Quizzes and the final exam may be conducted online if necessary due to public health situations.

Homework

1. **Assignments:** 7 problem sets.
2. **Submission:** Submit electronically on Canvas as a single, legible PDF file.
3. **Grading:**
 - Full credit (2% per assignment): Submitted on time and all problems attempted.
 - Partial credit (1%): Submitted late (up to 2 days) or incomplete.
 - No credit: Submitted more than 2 days late or submitted up to 2 days late and incomplete.
4. **Excused Late Submissions:** Must be approved by Dr. Voss, Dean of Students representative. Contact them for documentation.

Attendance Policy

1. **Bonus:** Up to 1% bonus for attendance.
2. **Tracking:**
 - Attendance will be tracked via Point Solutions Technology or attendance sheets.
 - Students must install the **Point Solutions app** and set the region to “North/South America.”
3. **Criteria:**
 - 0-2 absences: 1% bonus.
 - 3+ absences: No bonus.

In-Lecture Polling

1. **Participation Bonus:** Bonus will be computed according to the following formula:
 $(\% \text{ of correct answers}) * (3\%)$.
2. **Missed Questions:** All unanswered questions (including absences) are counted as incorrect.
3. **Implementation:** Students must install the **Point Solutions app** and set the region to “North/South America.”
4. **Session ID:** gtl57160.

Final Exam Exemption Policy

A student may request in writing to have the weight of the final exam set to 0% if, by the last day of class, **all** of the following conditions are met:

1. Scores on all three quizzes are greater than 90%.
2. The homework score is 100%.
3. The attendance bonus of 1% is earned.
4. At least 85% of in-lecture polling questions are answered correctly.

Student-Faculty Expectations Agreement

At Georgia Tech, mutual respect, acknowledgment, and responsibility between students and faculty are essential. Details of these expectations can be found [here](#).

Honor Code

Students must adhere to the Georgia Tech Honor Code. Academic misconduct will be reported to the Dean of Students. Refer to the Honor Code [here](#).

Course-Instructor Opinion Survey (CIOS)

If 100% of students complete the CIOS survey, the class will receive a 0.5% bonus. Surveys are essential for improving the course and are highly encouraged.

Tentative Table of Contents

Chapter	Topics and Details
I. Probability Basics (Text-book: Chapter 3)	<ul style="list-style-type: none">• Introduction: Origin of uncertainty, Probability vs. Statistics• Basic Definitions• Sets and Set Operations• Axiomatic Definition of Probability: Special Case - Simple Sample Space• Conditional Probability: Probability of Event Intersections, Independence of Events• Bayes' Theorem• Counting Techniques: Permutations, Combinations

Chapter	Topics and Details
II. Random Variables	<ul style="list-style-type: none"> • Introduction and Basic Definitions • Probability Mass Function of Discrete RVs (Textbook: 4.1, 4.2) • Cumulative Distribution Function (Textbook: 4.1, 4.2) • Probability Density Function of Continuous RVs (Textbook: 4.1, 4.2) • Expectation and Variance (Textbook: 4.4, 4.5, 4.6): Expectation, Median, Variance, Moments • Famous Discrete Random Variables: Bernoulli, Binomial (Textbook: 5.1), Geometric, Poisson • Famous Continuous Random Variables: Uniform (Textbook: 5.4), Exponential (Textbook: 5.6), Normal (Textbook: 5.5) • Relatives of the Normal Distribution: Chi-Square, t-Distribution, F-Distribution
III. Pairs of Random Variables and Combinations	<ul style="list-style-type: none"> • Pairs of Random Variables: Discrete Case (Textbook: 4.3), Continuous Case (Textbook: 4.3), Independence (Textbook: 4.3), Covariance and Correlation (Textbook: 4.7) • Linear Combinations: Single RV, Multiple RVs (Textbook: 6.2), Central Limit Theorem (Textbook: 6.3)

Chapter	Topics and Details
IV. Statistics	<ul style="list-style-type: none"> • Descriptive Statistics (Textbook: 2): Data Grouping, Charts, Sample Statistics (Measures of Central Tendency and Spread, Textbook: 2.3) • Point Estimation (Textbook: 7): Introduction, Unbiased Estimator, Minimum-Variance Estimates • Confidence Intervals: Introduction (Textbook: 7.3), Population Mean (Variance Known and Unknown, Textbook: 7.3, 7.3.1), Difference of Means (Equal and Unequal Variances, Textbook: 7.4), Variance of a Normal Population (Textbook: 7.3.3) • Hypothesis Testing: Introduction (Textbook: 8.1, 8.2), Normal Mean Tests (Variance Known and Unknown, Textbook: 8.3.1, 8.3.2), Variance Tests (Textbook: 8.5), Tests for Differences in Means and Variances (Textbook: 8.4.1-8.4.3, 8.5.1)