

MATH 3235 Syllabus

Probability Theory, Section L, 3 Credits

Fall 2026

Instructor Information

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General Course Information

Description

This upper-division course provides a rigorous foundation in the core principles of both discrete and continuous probability theory. The curriculum begins by establishing the formal probability framework, encompassing conditional probability, Bayes' theorem, and the mechanics of independent events. Building upon these fundamentals, the coursework transitions into the study of random variables and joint distributions. Emphasis is placed on extracting meaningful characteristics from these models, focusing heavily on calculating and interpreting expectations, variance, and covariance.

The latter portion of the course shifts toward the critical study of asymptotic behavior and limit theorems. Students will examine the distinct notions of convergence in probability and convergence in distribution. These analytical concepts are then applied to establish and understand the field's most fundamental asymptotic results: the Law of Large Numbers and the Central Limit Theorem. Time permitting, various additional topics will be covered, e.g.: finer statistical properties such as Large Deviations estimates; and an introduction to the theory of finite-state Markov chains.

These topics span parts A and B of our course's primary textbook, *Grimmett and Welsh*.

Course Learning Outcomes

Upon successful completion of this course, you should be able to:

- *Apply the fundamental frameworks of probability—including conditional probability, Bayes' theorem, and event independence—to rigorously model and solve discrete and continuous systems.*

- *Calculate and interpret core characteristics of random variables and joint distributions, specifically focusing on expectations, variance, and covariance.*
- *Distinguish between convergence in probability and convergence in distribution, and use these concepts to evaluate asymptotic behavior.*
- *Utilize the Law of Large Numbers and the Central Limit Theorem to analyze limit behaviors of random variables.*

Required Course Materials

The textbooks listed below are not required, strictly speaking, but owning personal copies of them, especially the primary text Grimmett & Welsh, will be highly useful during this course.

The primary textbook of the course is **Probability, an Introduction** by Grimmett and Welsh. I use the 2nd edition.

A useful auxiliary resource for this class is **A First Course in Probability Theory** by Ross, 8th edition.

Grading Policy:

Your final grade average out of 100 is a weighted combination of in-class Quiz, Homework and Exam grades (one midterm and the final), according to the following scheme: 30% Homework, 20% Quizzes, 20% Midterm, and 30% Final. The letter grade – A, B, C, D or F – is determined as usual: an average of 90 or higher is an A, 80 or higher is a B, 70 or higher is a C, 60 or higher is a D, and below 60 is an F. I do not curve grades.

Description of Graded Components

Homework serves as both practice of concepts learned in class and as personal at-home learning exercises. Homeworks will be submitted to Gradescope, where a rubric for each problem will be listed. Regrade requests for homeworks will be handled in Gradescope, and must be made within one week of the homework being returned. The lowest homework grade will be dropped. I do not answer questions pertaining to homework the day the homework is due.

Quizzes are short (10-15 minute) in-class assessments assigned periodically throughout the semester, with precise quiz dates listed on Canvas by the first class session of the semester. The lowest quiz grade will be dropped. If you are unable to attend one of the quiz sessions due to an approved absence (e.g., athletic event, career fair, interview, illness, religious exercise), that missed quiz will count as your dropped quiz. If you are unable to attend two or more of the quiz sessions, reach out to me ASAP via email and we will work something out.

Midterm and final exams are summative in-class closed-book assessments of your learning. In particular, the final assesses all material learned in the course, with a bias towards material from the latter half of the semester. The dates of the midterm and final will be set by the first class session – it is your responsibility to ensure your schedule is clear and you will be able to attend each exam, and if you have an approved conflict (see description of Quizzes), reach out to me the first week of class and we will arrange a makeup. Aside from that, I will only grant makeup exams for excused absences due to family or medical emergencies.

Course Policies

Attendance and/or Participation

Aside from quizzes, midterms and exams, attendance is optional but highly recommended. I will endeavor to record every class session, but I cannot guarantee it will work every time.

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.

Core IMPACTS

[Core IMPACTS](#) is the University System of Georgia's General Education curriculum. If you are teaching a course that counts towards Core IMPACTS, you should include a syllabus statement about the Core area and associated [career competencies](#). [This resource](#) developed by the Center for Excellence in Teaching and Learning and Online Education at Georgia State University includes template syllabus statements for each of the Core IMPACTS areas that you may adapt for your course.

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.