

# MATH 6221 Syllabus

Prob Theory for Science & Engineering, Section A, 3 credit hours

Fall 2026

## Instructor Information

Instructor: Dr. Lacey

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## General Course Information

### Description

The main topics of the course will be

- Probability Spaces, Measures, and Abstract Integration
- Discrete and Continuous Random Variables
- Expectation and Variance of Random Variables
- Laws of Large Numbers and Convergence of Random Variables
- Central Limit Theorem and Characteristic Functions
- Large Deviations and Poisson Convergence
- Martingales and Conditional Expectation
- Markov Chains

And, our main text will be the standard one Grimmett & Stirzaker, *Probability and Random Processes*. There will be various supplements to the text.

### Course Learning Outcomes

Each topic listed above comes with a number of concepts, and Theorems. The course outcomes are to gain mastery of all of these topics. Mastery means understanding the definitions, giving basic examples of each core definition. Know the statement of principal Theorems, with key examples including those that indicate the breadth of application, as well as why the hypotheses are necessary. Further examples should illustrate why the conclusion can't be stronger.

### Prerequisites

No Prerequisites.

### Required Course Materials

And, our main text will be the standard one Grimmett & Stirzaker, *Probability and Random Processes*. There will be various supplements to the text.

## Grading Policy

Your grade will be determined by mastering the 8 course topics listed above. 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.

## Description of Graded Components

Mastery will be judged by:

1. In class exams, with 4 topics on each, two throughout the semester, dates approximately Sept 24 and Oct 29. (Exact dates to be determined by the start of the Semester.)
2. Oral Exams, defined below
3. A comprehensive final exam, during the scheduled final exam period.
4. Completion of daily worksheets

**Oral Exams** Oral quizzes are not required. You can take up to three oral quizzes. one before Sept 24, one between Sept 25 and Oct 29, and one after Oct 29 but before Final Instructional Days.

- You may choose up to 4 topics.
- You can retake topics.
- Each topic will be graded separately. You either pass (shown mastery) or not. The first question for each topic will be chosen from the homework questions. You must answer this 100
- The other questions will be questions you have not seen before, but I will provide sample questions on the website.
- You should certainly know all the definitions and theorems listed in the topic descriptions. "Knowing" means knowing the precise mathematical formulations, knowing examples and counterexamples, and knowing how to apply theorems or methods to unfamiliar problems.

**Daily Worksheets** Almost every class will have a worksheet, exploring the topics of the lecture material. There will be approximately 40 such sheets. Completion of worksheets, with up to 5 absences, will count as mastery of 1 topic.

## Course Policies

### Attendance and Participation

Completion of Daily Worksheets counts as attendance and participation grade.

### 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.