

FALL 2026

3 CREDIT HOURS

MATH 6337: Real Analysis I

Section A

Dr. Benjamin Jaye

Section	Meeting days	Time	Room
A	Monday and Wednesday	9:30–10:45 a.m.	Skiles 170

Instructor Information

Instructor	Dr. Benjamin Jaye
Email	bjaye3@gatech.edu
Office hours	See Canvas for an announcement during the first week

General Course Information

Description

Real analysis provides a theory of measure and integration robust enough to handle limiting processes beyond the reach of elementary calculus. This course develops the foundations of modern real analysis, with particular emphasis on Lebesgue measure and the Lebesgue integral.

Topics include:

- The construction of outer measure and Lebesgue measure.
- Measurable sets and measurable functions.
- The Lebesgue integral and its relationship with the Riemann integral.
- The fundamental convergence theorems for the Lebesgue integral.
- Product measures and Fubini's theorem.
- Differentiation of integrals and the Lebesgue Differentiation Theorem.
- Approximate identities and applications to Fourier analysis and partial differential equations.
- Selected topics in measure theory and differentiation.

Course Learning Outcomes

By the end of the course, students should be able to:

- Explain how Lebesgue measure and the Lebesgue integral are constructed, why they are needed, and how they extend Riemann integration.
- Apply the Monotone Convergence Theorem, Fatou's Lemma, and the Dominated Convergence Theorem.
- Work with product measures and apply Fubini's theorem.
- Apply the Lebesgue Differentiation Theorem to analyze the differentiation of integrals.
- Use approximate identities and explain selected applications in Fourier analysis and partial differential equations.

Required Course Materials

Richard L. Wheeden and Antoni Zygmund, *Measure and Integral: An Introduction to Real Analysis*.

Prerequisites

MATH 4317 or consent of the School.

Grading Policy

The final grade will be determined by the following weighted components.

Component	Weight
Weekly homework	15%
Two in-class midterms	60%
Four in-class quizzes	20%
Final project	5%
Total	100%

Description of Graded Components

Homework

Homework will be assigned weekly except during exam weeks. Assignments are due on Wednesdays at 11:59 p.m. and must be submitted as a single PDF through Canvas. Each assignment will contain five or six problems. Submit three problems for grading; these will be graded lightly, with feedback focused on any significant issues. The two lowest homework scores will be dropped from the homework average.

Quizzes

There will be four in-class quizzes. They will focus on a skill I find essential when using AI in day-to-day mathematical exploration: identifying and correcting errors. Homework problems in the style of the quizzes will be provided. The lowest quiz score will be dropped from the quiz average.

Midterms

There will be two in-class midterm exams. At least 50% of each exam will consist of questions based on homework assignments. Within the midterm category, the higher score will count for 75% and the lower score for 25%.

Final Project

The final project will be a report exploring a topic considered in class in greater depth. It will be worth 5% of the final grade and will be due after Thanksgiving; further details will be provided later in the semester.

Course Policies

Attendance and Participation

Attendance in class is an important component of the learning process and, therefore, I expect students to attend whenever possible. Make-up quizzes will be given only in cases of documented illness or university-approved travel. There will be no homework extensions, since the two lowest homework scores will be dropped. However, if a documented illness prevents an assignment from being completed, then additional homework assignments may be dropped from the homework average. In such cases, it is still important to work through the assignment, since the material may appear on a quiz or a midterm.

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, 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 email 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, acknowledgment, 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.