

Foundations of Higher Mathematics

Math 310

Fall 2018

Instructor

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Class Meetings

Monday, Wednesday, Friday 10:25 AM – 11:30 AM
Seminary Hall 210

Office Hours

Monday, Tuesday, Wednesday 1:15 PM – 2:30 PM
or by appointment

Textbook and Course Outline

Book of Proof, 2nd Edition, by Richard Hammack

Chapter 1: Sets
Chapter 2: Logic
Chapters 4–9: Proof Techniques
Chapter 10: Mathematical Induction
Chapter 11: Relations
Chapter 12: Functions
Chapter 13: Cardinality

Our goal is to cover all of these chapters, or at least the fundamental concepts of each chapter. One exception is that we will skip Chapter 3: Counting.

Our textbook is available at the Drew bookstore and also is available ***free-of-charge online*** at the following address:

<http://www.people.vcu.edu/~rhammack/BookOfProof/BookOfProof.pdf>

Course Description

This course serves as a transition from calculus to the more abstract reasoning needed in advanced math courses. The emphasis of the course is on understanding and applying definitions and theorems, recognizing and constructing valid arguments, and communicating mathematical ideas both orally and in writing. Topics include basic logic and set theory, cardinality and counting, and elementary topics from analysis and algebra.

Prerequisite

Math 151: Calculus II

Student Learning Outcomes

During this course, students will:

- Appreciate the importance of *definitions* in mathematics
- Use analytical and critical thinking to clearly determine what a mathematical statement says—namely, what it takes as given, and what it claims is true as its conclusion
- Use the basics of logic and set theory, as well as analytical and critical thinking, to clearly recognize and construct sound mathematical arguments of the following types: direct proof, proof by contrapositive, proof by contradiction, proof by induction, proof by cases, disproof by counterexample
- Summarize and synthesize ideas and information from source materials;
- Communicate mathematical ideas through appropriate exposition using the style and conventions of the discipline;
- Communicate mathematical ideas orally both in informal (as in group work with other students) and formal (as in a formal presentation) settings.

Grading

40% Homework
20% In-Class Midterm Exam, Friday, October 20
30% Final Exam
10% Class participation

Homework

Homework will be assigned most weeks, and you will be given one week to complete it. You are encouraged to work in groups, but each student must turn in his or her own work. You will be allowed to turn in at most two homework assignments late. Any late assignment is due at the beginning of the next class, and you need not give any explanation to your instructor regarding why it was late.

Your homework grade will be based on your reasoning as well as the written communication of your results. Learning how to write clear, precise, mathematical proofs is a skill that we will develop throughout Math 310, and one that will be crucial for most other upper-level math courses.

Exams

There will be one in-class midterm exam on Friday, October 19. There will be a final exam scheduled during the week from December 10 through December 14; this exam will have an in-class component as well as a take-home component.

If you are unable to make an exam, it is your responsibility to notify your instructor at least 24 hours prior to the exam and arrange a make-up time.

Attendance

We expect that you will attend class every day. Repeated absences will negatively affect your mathematical understanding and, ultimately, your final grade. Regular attendance will enhance your comprehension of mathematical concepts, and will help you solving your homework and being productive on exams.

Academic Integrity

All students are required to uphold the highest academic standards. Any case of academic dishonesty will be dealt with according to the guidelines and procedures outlined in Drew University's "Standards of Academic Integrity: Guidelines and Principles." A copy of this document can be accessed on the CLA Dean's U-KNOW space by clicking on "Academic Integrity Standards."

Academic Accommodations

Students who wish to disclose a disability for the first time are instructed to contact Accessibility Resources, Brothers College, 119B; 973-408-3962. Although disclosure may take place at any time during the semester, students are encouraged to do so early in the semester, because, in general, accommodations are not implemented retroactively. For additional information, visit : <https://www.drew.edu/center-academic-excellence/about-us/accessibility-resources/>

Returning Students with Approved Accommodations: Requests for previously approved accommodations for the current semester should be sent to Accessibility Resources ideally within the first two weeks of class. This allows the office sufficient lead time to process the request.

Please call 973-408-3962 , email disabilityserv@drew.edu , or complete the accommodations request at:

<https://www.drew.edu/center-academic-excellence/about-us/accessibility-resources/forms/>