

Math 215 - Introduction to Advanced Mathematics

Syllabus

Fall 2017

1 Course Information

Instructor:	Alex Cameron
Email:	acamer4@uic.edu
Office:	SEO 626
Webpage:	math.uic.edu/~acamer4/math215.html
Meeting Time:	MWF 9-10
Meeting Location:	Addams Hall 302
Office Hours:	Mondays 10-11 (in SEO 430), 2-4 (in SEO 626) or by appointment
Recommended Textbook:	<i>An Introduction to Mathematical Reasoning</i> by Peter Eccles
Prerequisites:	Grade of C or better in Math 181 and approval of the department

2 Course Objectives

1. The students will be able to read and write mathematical proofs and will understand the basic logical framework that makes up any area of abstract mathematics: definitions, theorems, conjectures, lemmas, and proofs.
2. The students will understand and be able to use certain abstract concepts fundamental to every area of mathematics including but not limited to sets, functions, number systems, and equivalence relations.
3. The students will be exposed to several important areas of abstract mathematics.

3 Course Outline

I am organizing this course into a series of five mini-courses each dealing with a topic from a different important area of mathematics: Set Theory, Combinatorics, Number Theory,

Algebra, and Analysis. These topics will all be introductory in nature - the kinds of things that you might see in the first week of an undergraduate course devoted to each subject.

While there is a good deal of overlap between some of these topics (for instance sets and functions are more or less fundamental to everything else), they can mostly be treated independently. So if a student finds one topic particularly distasteful, then they will only need to wait it out for a little while until we begin something entirely new.

These mini-courses will be bookended and interspersed with more formal instruction on mathematical proof. The following order of the areas covered in the course is tentative only:

1. Statements and Proofs Part I
2. Sets and Functions
3. Graph Theory
4. The Euclidean Algorithm and Modular Arithmetic
5. Groups
6. Analysis (TBD)
7. Statements and Proofs Part II

4 Problem Sets and Quiz-Exams

Each topic above covered (other than Statements and Proofs Part I) will begin with the distribution of a Problem Set and will end with a Quiz-Exam. This means there will be 6 Problem Sets and 6 Quiz-Exams.

The Problem Sets will **NOT** be turned in for a grade. Instead, each Quiz-Exam will consist of five problems - three taken directly from the Problem Set and two new problems. Each problem will be worth an equal number of points.

Make up Quiz-Exams will only be given for relatively important and documented reasons (religious holiday, major surgery, etc).

Students are beyond encouraged to work together on the Problem Sets, and should come to class prepared to discuss them.

5 Final Grade

The student's final grade in the course will be the unweighted average of the student's 6 Quiz-Exams scores with the following major caveat:

At the end of the semester, each student may choose to take a comprehensive Final Exam (on **Tuesday, December 12th from 10:30-12:30**). Their score on this will replace

up to three Quiz-Exam scores lower than the Final Exam score when calculating the final grade. So the Final Exam will count for anywhere between zero to fifty percent of the final grade. Note that taking the Final Exam is optional - there is no penalty for not taking it, the student simply receives the average of the Quiz-Exam scores.

Letter grades are assigned on the following scale:

A	85-100
B	75-84
C	65-74
D	50-64
F	0-49

6 Academic Honesty

All UIC students are required to maintain the standards of academic integrity described in the *Guidelines Regarding Academic Integrity*. Any violation of these standards will be handled in accordance with the Student Disciplinary Policy.

While students are encouraged to work together on the Problem Sets, memorizing the words of someone else's solution to write down as an answer on a Quiz-Exam without understanding much of the solution is strictly forbidden! I reserve the right to give a zero score to any student's Quiz-Exam for which the wording of the answers is substantially the same as another student's, especially if the same wording can be found on the internet.

7 Disabilities Statement

Students with disabilities must inform the instructor of the need for accommodations. Those who require accommodations for access and participation in this course must be registered with the Disability Resource Center. Please contact ODS at 312/413-2183 (voice) or 312/413-0123 (TTY).