

# Introduction to Higher Mathematics (Math 3200)

Spring 2014

## Technicalities

**Instructor:** Dr. Clayton Shonkwiler (clayton@math.uga.edu)

**Office:** Boyd 436

**Course web page:** <http://www.math.uga.edu/~clayton/teaching/m3200s14/>

**Text:** *Mathematical Proofs: A Transition to Higher Mathematics*, by Gary Chartrand, Albert D. Polimeni, and Ping Zhang.

**Time/Location:** 10:10–11:00 MWF, Boyd 304.

**Office Hours:** Wednesday 1:00–2:00, Thursday 2:00–3:00, and by appointment.

## Summary of the Course

While introductory mathematics courses like calculus are primarily computational in nature, advanced courses like abstract algebra and real analysis are proof-based. This course is the gateway to advanced mathematics courses. The goal of this course is to teach students to think and communicate in rigorous mathematical style, developing the necessary language, grammar, and modes of thinking necessary to succeed in advanced mathematics courses.

The course will be quite different from the mathematics courses you have taken in the past. It will no longer be enough to be able to use a technique that someone told you or to apply a theorem to solve a problem; now you need to be able to understand and generate the proofs of theorems and other mathematical statements and to communicate in acceptable mathematical style. Since you will have to think and communicate in entirely new ways, you are likely to find it quite challenging but also (hopefully!) somewhat exhilarating.

## Homework

Homework will be collected approximately weekly. Assignments will be posted to the course web-page as well as to eLC.

Homework is an important part of any math class, as it is impossible to *learn* mathematics without actually *doing* mathematics. Homework is especially important in this class, because the main goal of the course is to learn how to communicate mathematics effectively.

I strongly encourage you to work on solving homework problems with your fellow classmates. However, the work you turn in must reflect your own knowledge and understanding and not that of anyone else. Therefore, you *must* write up your solutions by yourself.

After each assignment is turned in, students will go to the board to present solutions to a few of the problems, and the class will provide feedback and constructive criticism. You are expected to participate in both parts of this process.

## Exams

There will be three midterm exams and a final. The midterms will be 50 minute in-class exams and are tentatively scheduled for February 7, March 7, and April 16. The final exam will occur in Boyd 304 (our regular classroom) from 8:00–11:00 AM on Monday, May 5.

I do not give make-up exams. Please let me know as soon as possible if you have a conflict with one of the test dates.

## Grading

Your final grade in the course will be determined by:

**Homework and Class Participation:** 25% (lowest homework score dropped)

**Exams:** 15% each

**Final Exam (comprehensive):** 30%

Here's how the grading process works. First, I compute an overall course grade for you on a scale of 0–100 by combining your exam and homework grades using the weights above. For example, if you have scores of 75%, 80%, and 60% on the three midterms, 85% on the final, and 90% on the homework and class participation, I would compute this score as

$$\underbrace{0.75 \times 15 + 0.80 \times 15 + 0.60 \times 15}_{\text{midterm exams}} + \underbrace{0.85 \times 30}_{\text{final}} + \underbrace{0.90 \times 25}_{\text{homework}} = 80.25.$$

After computing this score, I rank everybody in the class in order by their score and assign cutoffs for 'A', 'B', 'C', and 'D'. Generally these are somewhat lower than the traditional 90, 80, 70, and 60. When setting the cutoff I consider the students immediately above and below the line and try to take into account improvement and other circumstances. That being said, the list is never, ever reordered. Regardless of other circumstances, a better score in the class should always earn at least as good a letter grade. Ultimately, I can only grade the course based on what's in your written work.

Scores will be maintained in eLC (<https://uga.view.usg.edu>); please check occasionally to make sure your scores have been entered correctly.

In order to receive a grade of "WP" before the first exam, you must have received at least 50% of the homework points available by the date of withdrawal. After the first exam, this policy will remain in force for a two week grace period; after that, you must have received at least 50% of the homework points *and* 50% of the points on the first exam to receive a "WP".

## Attendance

You are expected to attend class every day, to participate in class, to read the textbook, and to do the homework. If you incur an excessive number of unexcused absences (i.e., more than four), you may be withdrawn from the course at the discretion of the instructor.

## Academic Honesty

As a University of Georgia student, you have agreed to abide by the University's academic honesty policy, "A Culture of Honesty", and by the Student Honor Code. All academic work must meet the standards described in "A Culture of Honesty", which can be found at <http://www.uga.edu/honesty>. Lack of knowledge of the academic honesty policy is *not* a viable explanation for a violation. Questions related to coursework and the academic honesty policy should be discussed with the instructor.

You are encouraged to *discuss* homework problems with your classmates, but the work you turn in must be your own, and in particular you should write up your final solutions independently.

## **Additional help**

If I were a perfect teacher, you could learn everything you need to know just by going to class. Unfortunately, I am not a perfect teacher, so there's a good chance that, at some point, you'll find yourself confused, stuck or otherwise frustrated by the material or the course. If you do, ask for help! Office hours are, of course, an excellent venue for this, but if you feel uncomfortable asking my help or if you find that my teaching style and your learning style simply don't mesh, there are many other resources available to you.

First and foremost, your fellow classmates are a great resource. Odds are that, for any question you have, there's someone in the class who can answer it, so don't be afraid to ask. Even the simple process of explaining why you're stuck to someone who is just as confused as you is often enough to make things clearer. Just be sure to return the favor when you get the chance to help someone else.

Second, the Miller Learning Center has tutoring in all subjects available by appointment Monday–Thursday evenings from 6:00–9:00 in MLC Rooms 351, 353, and 355; for more information, see <http://mlc.uga.edu/services/tutoring.html>. The Milledge Academic Center also has math tutoring during the day Monday–Friday in the Milledge Hall Learning Center Math Lab and Monday–Thursday evenings at different locations around campus as well as online; see <http://tutor.uga.edu/arc/tutoring/#drop-in-tutoring>.

Third, UGA's Division of Academic Enhancement coordinates individual tutoring by appointment. To connect with a tutor, you should visit the DAE's Tutoring by Appointment page: <http://tutor.uga.edu/arc/tutoring/#tutoring-by-appointment>.

Finally, the math department also maintains a list of recommended private tutors (typically graduate students and advanced undergraduates) on the Student Services page: [http://www.math.uga.edu/about\\_us/student\\_services.html](http://www.math.uga.edu/about_us/student_services.html).

If none of the above is suitable or practical, please let me know and I'll be happy to help you find additional resources.

## **Accommodations**

If you think you may need accommodations in this course due to the impact of a disability please meet with me privately as soon as possible. You should also contact the Disability Resource Center (<http://drc.uga.edu/>) to confirm your eligibility for appropriate accommodations. Doing so early in the semester will help prevent unnecessary inconvenience.

## **Copyright**

All of the course materials, including tests and exams, are copyright by the instructor, even if the © symbol does not appear on them. You may not upload or post copies of these materials to the web without my explicit written permission.

## **Disclaimer**

The course syllabus is a general plan for the course; deviations announced in class may be necessary.

## Anticipated Schedule

<b>Topic</b>	<b>Chapter</b>	<b>Weeks</b>
Sets	1	1
Logic	2	1.5
Proof Techniques	3–5	3
Induction and Conjecture	6–7	3
Equivalence Relations and Functions	8–9	4
Infinities	10	1.5