

Math 330-03: Number Systems, Spring 2020
MWF 11:20 – 12:50, WH-100B

Instructor: Jonathan Williams
Office: WH-208
Email: jwilliams@math.binghamton.edu
Website: <https://mycourses.binghamton.edu>

Office Hours: M 10 – 11 and Thurs 12:45 – 2:45. Alternatively, email me a few times you can meet, along with a good reason you can't come to the regular hours, and I will choose one.

Course description: The goal of this course is to learn about the central pursuit of mathematics: proof. The various number systems (integers, rational and real numbers) offer a convenient setting for making statements to prove. Even if you understand why something is true, you have not proved it until you have composed an argument someone else can understand. For this reason, we will concentrate on writing clear and complete proofs.

Text: The Art of Proof: Basic Training for Deeper Mathematics, by Beck and Geoghegan (ISBN 978-1-4419-7022-0). You will be responsible for any information discussed in class.

Homework (50% of your grade): Assigned at the end of most lectures. Due Monday the following week at the beginning of lecture, or any time (by email) on Monday for PDF submissions prepared using LaTeX. Collaboration is encouraged, though you must write and submit your work individually. To encourage collaboration and attendance, assignments will only be divulged by me during scheduled meeting times. If you miss it, you must ask your collaborators or come to office hours.

Midterm (25% of your grade): March 27 during class.

Final exam (25% of your grade): This exam is cumulative. Time and place TBA; see <http://bannertools.binghamton.edu/exams>.

Grading: Your homework will have the following scheme. You turn in an assignment on Monday. On Friday I will return your assignment, graded using the red line method outlined in the text. The following week, you may come to office hours to orally present corrections to problems in that assignment for full credit. You must have made a genuine attempt on a problem in order to present a correction.

Students who demonstrate proficiency in LaTeX during week n of class will get a bonus of

$$\left\lceil 5 \cdot \frac{17 - n}{16} \right\rceil$$

percentage points added to their final average.

Students tend to ask if I will curve grades, and the answer is no. I take the above grades and calculate a raw average out of 100. I then sort the resulting list of numbers from lowest to highest and choose a range for each letter grade. These ranges will not be more stringent than the standard 90-80-70-60 scale.

BOILERPLATE

Prerequisite: C or better in Math 222.

Academic integrity: It applies to this class.

Recording my lectures: Permission required.

Work expectation: This course is a 4-credit course, which means that in addition to the scheduled lectures/discussions, students are expected to do at least 9.5 hours of course-related work each week during the semester. This includes things like: completing assigned readings, participating in lab sessions, studying for tests and examinations, preparing written assignments, completing internship or clinical placement requirements, and other tasks that must be completed to earn credit in the course.

Learning objectives: Examples of things students should be able to do as a result of this course include:

- Prove statements using standard techniques such as direct proof, proof by contradiction, mathematical induction and using cases.
- Write understandable mathematical arguments.
- Assess the validity of mathematical arguments.
- Perform basic calculations in logic such as negation and simplification of statements.

Disability-related Equal Access Accommodations: Students needing accommodations to ensure their equitable access and participation in this course should notify the instructor with an Academic Accommodation Authorization from Binghamton University's Services for Students with Disabilities (SSD) office as soon as they're aware of their need for such arrangements. The office is located in University Union, 119. Please visit the SSD website (<https://binghamton.edu/ssd>) for more detailed information.