

Instructor: Anna Haensch
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Office: 422 College Hall

Meeting times: T,H 10:50-12:05, 351 College Hall
Office Hours: W 10:00-12:00, 1:00-3:00 and by appt.

Course

The goal of *Math 250: Foundations of Higher Mathematics*, is to give an introduction to higher-level mathematics and to obtain a mastery of proof writing techniques including conditional, biconditional, contradiction, induction, set-theoretic, and existence and uniqueness proofs. Topics of mathematical content will include mathematical logic, sets, relations, functions, number systems, and countability. Prerequisite: Grade of C or better in Math 116.

Supplies

The text for this course is *Mathematical Reasoning: Writing and Proof*, Version 2.1, Ted Sundstrom, it is available online as a PDF at no cost.

Writing

The primary focus of this class is on learning to write mathematics well, particularly in proofs. This includes writing in complete, coherent sentences, using proper mathematical style and notation, and reasoning correctly. The subject of mathematical writing will be regularly discussed in class, with many suggestions and guidelines for you to use in your work; it is imperative that you pay close attention to the many details we will consider. The quality of your presentation and writing will be assessed in all of your graded papers. In particular, the Proof Portfolio will consist entirely of your writing, as well as *at least* 75% of each of Exams 1 and 2 and the Final. Therefore, *at least* one third of the assessment in this course will be based on writing assignments.

Grading

		Interval	Letter Grade
Participation	10%	[92.5 – 100]	A
Proof Portfolio	30%	[89.5 – 92.5)	A-
Exam 1	20%	[86.5 – 89.5)	B+
Exam 2	20%	[82.5 – 86.5)	B
Final Exam	20%	[79.5 – 82.5)	B-
		[76.5 – 79.5)	C+
		[69.5 – 76.5)	C
		[59.5 – 69.5)	D
		[0 – 59.5)	F

- **Participation:** Your participation grade will be determined in equal parts by your performance on daily preps, and your participation in in-class activities will count towards 10% of your final grade.
 - **Daily Preps:** On days we meet, you will have a preparatory assignment to complete that consists of reading up to a full section in our text, completing one or more preview activities (or possibly a

regular activity), answering some reading questions, or/and watching some short video(s). Each of these daily prep assignments will be graded on a scale of 5 points and marked primarily on effort and completeness. See the separate document on daily prep assignments for full details. Your lowest daily prep grade will be dropped.

- **In-Class Activities:** We will frequently engage in small group activities in class where you explore ideas, investigate conjectures, solve problems, and write proofs. This work won't be collected, but you will be expected to engage with your group and share your findings with the class.
- **Proof Portfolio:** Over the course of the semester you will develop a portfolio with proofs or disproofs of 10 conjectures demonstrating important writing, reasoning, and mathematical techniques. These 10 problems will be critiqued by me in draft form prior to final submission for rewriting. See the separate document on Proof Portfolios for full details. The weekly drafts and final proofs in their entirety will amount to 30% of your semester grade.
- **Exams:** Exams 1 and 2 will be scheduled one-third and two-thirds into the semester, respectively. The (non-cummulative) final exam will be given on Monday, May 6th, 1:30-3:30 pm in College Hall 351. **All exam questions will come directly from the Sundstrom text.**

Expectations

Attendance: Attendance is essential to your success, and I expect you to be present and on time each day we meet. You are responsible for all announcements made in class concerning material covered, assignments, changes in the syllabus, or anything else pertinent to the course.

Preparation: It is imperative that you work on a consistent basis. This applies both to the day-to-day work to prepare for class, as well as to more long term studying and writing on items like the portfolio project. You should expect to spend 2-3 hours outside of class for every hour spent in class. Math 250 demands at least this much time from you. You should plan to spend an average of *at least ten hours studying each week* and to do so in multiple one to two hour time blocks. You should also keep a well-organized record of all your study notes and completed problems for future reference. Please understand that a great deal of your learning in this course must occur on your own: it is your responsibility to read the text, do the problems, work on the portfolio, and seek help as needed.

Office Hours: I welcome and encourage students to come to my office hours alone or in small groups with prep assignments, in-class content, or portfolios questions. I am available during my office hours, and also any time you see that my door is open. You can ask me anything you like, but please come to my office prepared.

Academic Honesty: While it is expected, indeed encouraged, that you work together in class, it is essential that the work you submit for your Proof Portfolio be your own, see the separate sheet on Proof Portfolios for a full explanation of what this means. Evidence of plagiarism in an assignment will result in a grade of zero and possible action under the guidelines of the Duquesne student code. You are expected to show integrity in all your work, and to encourage your peers to do likewise. I reserve the right to discuss the nature of your work with you prior to assigning a grade on an assignment. **Notel:** *the proof portfolio is a completely independent exercise; no collaboration or use of external sources is permitted on it. In addition, throughout the course, you may not use the internet to find hints or solutions to exercises or portfolio problems.*

Using electronic tools in class: While we will may use mobile devices (tablets or laptops) for reading and writing purposes related to Math 250, I respectfully ask that you not use phones, laptops, or other electronic devices in class for any other purposes. Engaging with your cell phone during class is distracting

to you, to me, and to your fellow students. I will appreciate you respecting this request.

Makeup exams/assignments: There will be no makeup exams. If you miss an exam for a certifiable reason, other arrangements will be made. If you have to miss an exam, you **MUST** notify me beforehand (at least 1 hour before the exam is to begin). Otherwise the grade is zero. The final cannot be missed for any reason.

If you have significant extenuating circumstances that are making it difficult or impossible to meet key deadlines, please see me to discuss the situation and make possible arrangements.

Collegiate Spelling, Grammar, and Punctuation: As noted above, this is a course about writing almost as much as it is about mathematics. All students are expected to write at a collegiate level. This includes, but is not limited to, the use of correct spelling, punctuation, and grammar. On any test or assignment, excessive errors in this regard will result in appropriate deductions from your work. Papers not of collegiate quality in this regard may be returned unmarked.

Participation: In every class meeting, there will be significant opportunities for you to actively participate aloud. Through questions asked in all-class discussion, exercises individually or for teams of 2-3, discussion of homework problems, and more, you will be able to check and demonstrate your understanding in class. You must be up to date and prepared for class to participate effectively. I expect that everyone will share in this important aspect of our learning process.

Student Concerns: Any student with a disability or other special circumstances should make an appointment and discuss this with me. Moreover, it is the policy of Duquesne University to provide reasonable accommodations to students with documented disabilities. If you require accommodations in this class, please contact the Office of Disability Services in 309 Duquesne Union (412-396-6658) as soon as possible.