

Math 251W: Foundations of Advanced Mathematics

Fall 2008

Instructor: Erin McNicholas email: emcnicho@willamette.edu
Office: Collins, Room 307 Phone: 503-370-6590
Office Hours: W 1:30-2:30pm or by appointment 1-2:30pm

Class Web Site: <http://www.willamette.edu/~emcnicho/courses/Foundations251W/M251W.html>

Class Listserv: math-251w-01@willamette.edu

Class Meetings: Class meets in Collins 306 every Monday and Wednesday from 2:30-4:00pm

Class Objectives

- Learn to Read, Understand, and Compose mathematical proofs
- Learn to distinguish valid arguments from invalid arguments
- Practice formulating, writing, and presenting logical arguments
- Strengthen our analytic and reasoning skills

In addition to these objectives, this course should introduce students to higher mathematics and give them a better understanding of what mathematical research entails.

Required Course Materials:

Chapter Zero, 2nd ed., by Carol Schumacher

Recommended Course Materials:

Proofs and Fundamentals, by Ethan Bloch

Course Grades:

Course grades will be based on a point system. Grade cut-offs will be determined at the end of the semester with the guarantee that:

- 90% of the points or more will be at least an A-
- 80% of the points or more will be at least a B-
- 70% of the points or more will be at least a C-
- And 60% of the points or more will be at least a D

Grades are based on five components

- Journal, In-Class Presentations, & Colloquium Talks (worth 100 points)

As students, you will be the driving force behind this class. Most of this class will consist of students presenting work to each other. You will be responsible for reading the text, filling in the missing exercises and proofs, and presenting your solutions to the class.

To organize your work and prepare you for class presentations, you will keep a journal of your work. Occasionally I will collect these journals to keep track of your progress. They are primarily for your use, not for my grading. However, since I will be using them to assess your preparedness for class, I need you to keep them fairly well organized. To this end, your journal should contain a table of contents, clearly labeling which pages correspond to each section of the text, and which contain your colloquium writ-ups.

Every student is expected to volunteer to present work from their journal to the class. Most of the time I will rely on volunteers to make presentations. This makes it possible for students to present the work about which they feel most confident. In this way, you don't need to solve every problem assigned during the semester. If you didn't get it, someone else probably did and you can learn from them. If no one in the class solved the problem, I will provide hints or give the class time to work it out together.

Even when not presenting, you have a responsibility to the class as an active listener. Student presentations are not meant to replace a seasoned, polished lecture that would be given by an experienced instructor. Students presenters are counting on their fellow students to help them by making clarifying suggestions and asking questions. If I feel there is a vague or incorrect point not caught by the class, I will feel free to ask questions of the audience members.

Students are expected to attend 2 of the Math Colloquium Talks given throughout the semester. These talks will be announced in class and a schedule can be found on the Math Department web site <http://www.willamette.edu/cia/math/colloquia/index.php>. To receive credit for going to the talk, students need to sign in and write a brief journal entry about the talk.

- Portfolio Proofs & Problems (worth 150 points)

Portfolio assignments must be generated using L^AT_EX. You may rewrite 2 portfolio assignments during the course of the semester to regain lost points.

- 1 Midterm (worth 100 points)
- 3 Group Exams (each worth 50 points)

Group Exams are done in groups of three, with each group member having a unique problem to work on. Group members proof-read each other's work and offer suggestions. Of the 50 points possible for each group exam, 40 will be based on your work and 10 will be based on your work proof-reading your team members' exams. Each team member is allowed one page, one-sided, of notes.

- 1 Cumulative Final Exam (worth 150 points)

For more information, see the handouts ‘Advice from Past Students to Future Students’ and ‘Group Tests’, available from the class web site under Class Handouts & Notes.

Missed Exam Policy:

Students must contact the instructor prior to the missed exam. In most cases, if the student has a valid excuse the grade on the final will be used to replace the missed exam score.

Class Attendance and Cell Phone Policy:

Daily attendance is expected from every student. Students who miss the first day may be administratively dropped from the course. Electronic devices such as cell phones, pagers, i-pods, etc. must be turned off during class meetings. If your cell phone goes off during class you will be responsible for bringing treats for the entire class at the next class meeting. Papers should not be read during class, though I applaud your efforts to stay abreast of current events and tackle the latest crossword or sudoku puzzle.

Academic Integrity:

In accordance with Willamette University CLA catalog: “Plagiarism and cheating are offenses against the integrity of the courses in which they occur and against the College community as a whole... Ignorance of what constitutes plagiarism shall not be considered a valid defense. If students are uncertain as to what constitutes plagiarism for a particular assignment, they should consult the instructor for clarification.” Cheating is unethical and I take it very seriously. The Deans Office will be notified if anyone is found cheating and appropriate sanctions will be given.

Student Responsibility:

Most of you already know this, but previous experience has shown that a friendly reminder is sometimes in order :). You are all adults and responsible for your own education. I will do everything in my power to help you learn. You should always feel free to stop by my office or make an appointment to meet with me. Please feel free to talk to me about the course or anything else that is on your mind. In addition to helping you with the material, I am happy to offer you advice about what future courses to take, summer opportunities, career opportunities in math, local restaurants, the latest movies, etc. You should always feel free to ask me, or other students, questions about the course material in class. Stop the presenter if you are confused and ask them to explain things again. I welcome student questions! Although I will do everything in my power to help you through this class, you are ultimately responsible for your grade. The following is a list of things I expect from you.

1. **PARTICIPATE.** This class depends more on your participation than any other math course you have taken to date. It is your responsibility to come to class with the reading done and the assigned problems and proofs attempted, if not completed. You need to volunteer from time to time to present solutions or proofs to the class. You need to critically evaluate the presentations of your peers and ask questions if parts are left unclear.
2. **THINK CRITICALLY.** Your goal in this class should be to understand the concepts and strengthen your mathematical reasoning and proof writing skills. At all times you should be asking yourself “Why are we doing this? How is this related to other topics I’ve learned? How would this apply to a concrete example?”

3. **ASK QUESTIONS & SEEK HELP!** Ask questions in class, after class, during office hours, whenever! If you are confused or having problems with a certain section of the material see me **AS SOON AS POSSIBLE**.
4. **DO THE ASSIGNMENTS.** Mathematics is not a spectator sport. I encourage you to work with your fellow students on homework assignments. Keep in mind that working together involves an equitable give and take of ideas, not one student copying from another. To ensure that your answers to portfolio assignments are not too similar, I recommend that if you work together on these assignments, you work only on outlining solutions. The final write-ups should be done on your own. Portfolio assignments for this class can be very time consuming. Not only do you have to master the technical aspects of proof writing and composing a logical argument, you have to write up your results using \LaTeX . You will use this mathematical typesetting program in your advanced mathematics courses, so it is well worth the time to learn in now.