

## Course Overview

Until now you've probably associated mathematics with computation. After all, this is what you've largely done in your math courses. But a mathematician would tell you that mathematics concerns both computation and proof. This class is an introduction to this other half of mathematics.

Our goal is to introduce the techniques for working with abstract mathematical concepts and for proving theorems. We will cover elementary logic as well as the classical proof techniques (direct proofs, proofs by exhaustion, proofs by contrapositive, proofs by contradiction, and proofs by mathematical induction). Successful completion of the course will leave you with a foundation in advanced mathematical skills needed to approach advanced mathematics classes.

## Essential Information

Professor	David Maxwell
Office	Chapman 308C
Email	<a href="mailto:damaxwell@uaf.edu">damaxwell@uaf.edu</a>
Phone	474-1196
Web	<a href="http://www.math.uaf.edu/~maxwell">http://www.math.uaf.edu/~maxwell</a>
Texts	<b>The Art of Proof: Basic Training for Deeper Mathematics,</b> <i>Beck and Geoghegan</i>

## Prerequisites:

MATH F201 (possibly concurrently)

## Class Time

We will meet three times a week for one hour each session. Class time will usually be spent in formal lectures and sometimes in group work sessions.

Lecture Times  
MWF 2:15–3:15 Brooks 103

## Office Hours

I will schedule 3 hours a week of formal office hours. These times will be chosen after consulting with my classes. I will post the times on my website and outside my office door. You are also welcome to schedule a meeting outside of my formal office hours by sending me an email.

## Homework and Quizzes

There will be a homework assignment due roughly every week, on Friday. Homework will be due at the start of class, but I will be flexible about accepting homework handed in at the end of class if you happen to be late.

From time to time we will have short quizzes. The quiz contents will typically involve material from the current reading or homework assignment, and will be announced in advance. The goal of the quizzes is to encourage you to keep up with the readings and homework. Each quiz will be worth the equivalent of 1/2 of one homework.

### Late Homework

Written homework is due at the start of class on the date due.

I will accept from every student a single late homework without any questions. Hand in a piece of paper when the homework is due with a note on it to let me know that you are taking your late homework, and the homework will then be due on the next homework's due date (or one week later, whichever comes first). The first two and the last homework assignments cannot be handed in late.

### Homework and L<sup>A</sup>T<sub>E</sub>X

All homework in this class will be written using the mathematical typesetting program L<sup>A</sup>T<sub>E</sub>X. Doing this will help you learn to use a tool universally used by mathematicians to publish their work, and will also help you focus your attention on the quality of your writing. After all, it's easier to revise something you've written on a computer.

L<sup>A</sup>T<sub>E</sub>X has a reputation for having a steep 'learning curve'. I'll try to make it easy for you to get started with it. On the course web page there are instructions for installing L<sup>A</sup>T<sub>E</sub>X, a sample homework set, and a guide for **Beginning L<sup>A</sup>T<sub>E</sub>X**. I will also post templates for the first few homework assignments. All you'll need to do is fill in your name, and fill in the proofs.

### Class Participation

Learning to speak mathematics is a lot like learning to speak a foreign language. I can't imagine teaching it without having an interactive class.

You are welcome to ask questions at any point (though if a question is too tangential I might ask you to come ask it again during office hours.) I will frequently ask questions of you. Of course, if you haven't volunteered to give an answer, it is OK to reply with "I don't know". After all, if you knew everything about proofs, you wouldn't be taking this class!

We will also occasionally work in groups, and present proofs to the class as a whole. Sometimes you might be asked to give respectful feedback about another group's proof.

All of this means that I will be asking you to be contributing when you come to class. I will recognize your contributions by giving you a class participation grade equivalent to one homework assignment. Think of it as an easy A for being an active, engaged, respectful class member.

### Midterms

There will be two in-class midterm exams *tentatively* to be held on Wednesday, February 20 and Wednesday, April 3. The midterms will not be comprehensive.

### Final Exam

There will be a two-hour final exam on Friday, May 10 at 1pm. The exam will be comprehensive.

### Evaluation

Course grades will be determined as follows:

Homework, Quizzes, Class Participation	25%
Midterm 1	25%
Midterm 2	25%
Final	25%

Letter grades will be assigned according to the following scale. This scale is a guarantee. I reserve the right to lower the grade cutoffs, but I will not raise them.

A+	97–100%	C+	77–80%	F	$\leq 60$
A	93–97%	C	72–77%		
A-	90–93%	C-	70–72		
B+	87–90%	D+	67–70%		
B	83–87%	D	63–67%		
B-	80–83%	D-	60–63%		

**However**, you must earn a C- or better on the final exam to obtain a course grade of C- or greater.

### Tentative Schedule

Week	Topics and Events
1/18	Chapter 1
1/21 – 1/25	Chapter 1 Alaska Civil Rights Day
1/28 – 2/1	Chapter 2
2/4 – 2/8	Chapter 2, 3
2/11 – 2/15	Chapter 3
2/18 – 2/22	Chapter 5
2/25 – 3/1	Chapter 4
3/4 – 3/8	Chapter 4, 6 Friday: Midterm
3/11 – 3/15	No Classes No Classes
3/18 – 3/22	Chapter 6 Friday: Last day to withdraw with a 'W'
3/25 – 3/29	Chapter 8
4/1 – 4/5	Chapter 9
4/8 – 4/12	Chapter 8, Section 10.5
4/15 – 4/19	Chapter 11
4/22 – 4/26	Chapter 13 Friday: Spring Fest
4/29 – 5/3	Chapter 13
5/6 – 5/10	Exam Week Monday: Last day of class Friday: Final Exam Due

## Rules and Policies

### Collaboration

You are encouraged to work together in solving homework problems. But each student must write up his or her own solutions independently. If you receive significant help solving a problem, it is customary to make a note in your homework to give the person who helped you credit.

### Makeup Exams

You can make up an exam if certain extenuating circumstances prevent you from taking it and if you inform me in advance. Contact me as soon as possible if you are going to miss an exam.

### Attendance

Attendance is not included directly as part of your grade. But skipping math classes is a pretty bad idea.

### Cell Phones

Turn off your cell phone before you come to class.

### Disabilities Services

I will work with the Office of Disabilities Services (203 Whitaker, 474-7043) to provide reasonable accommodation to students with disabilities.

### Incomplete Grade

Incomplete (I) will only be given in Computer Science, Mathematics or Statistics courses in cases where the student has completed the majority (normally all but the last three weeks) of a course with a grade of C or better, but for personal reasons beyond his/her control has been unable to complete the course during the regular term. Negligence or indifference are not acceptable reasons for the granting of an incomplete grade. (Note: this is essentially the old University policy.)

### Late Withdrawals

A withdrawal after the university deadline from a Department of Mathematical Sciences course will normally be granted only in cases where the student is performing satisfactorily (i.e., C or better) in a course, but has exceptional reasons, beyond his/her control, for being unable to complete the course. These exceptional reasons should be detailed in writing to the instructor, department head and dean.

### Academic Dishonesty

Academic dishonesty, including cheating and plagiarism, will not be tolerated. It is a violation of the Student Code of Conduct and will be punished according to UAF procedures.