Math F215: Introduction to Mathematical Proofs

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 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	ffdam@uaf.edu
Phone	474-1196
Web	http://www.math.uaf.edu/~maxwell
Required Text	Mathematical Proofs: A Transition to Advanced Mathematics,
	<i>Chartrand et. al.</i> , 1 st edition

Prerequisites:

MATH F201 (possibly concurrently)

Class Time

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

Lecture Times MW 3:30-4:30 Greuning 304

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. I have an open door policy; if I'm in my office and my door is open, please feel free to drop by with questions. 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. We will decide together on the first day of class on a good day of the week for your homework to be due. 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 unannounced quizzes. The quiz contents will typically involve material from the current reading or homework assignment. The goal of the quizzes is to encourage you to keep up with the readings and homework.

Late homework will not be accepted; it interferes with posting solutions. Also, quizzes cannot be made up. As compensatioon, I will drop your lowest homework or quiz grade.

Midterms

There will be two in-class midterm exams tentatively to be held on Wednesday, February 22 and Wednesday, April 5.

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Final Exam

There will be a two-hour final exam on Monday, May 8 at 3:15pm. The exam will be comprehensive.

Evaluation

Course grades will be determined as follows:

Homework and Quizzes	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 also reserve the right to lower the thresholds.

Α	90–100%
В	80-89%
С	70–79%
D	60–69%
F	0–59%

Tentative Schedule

Week	Topics and Events
1/23 - 1/27	Sets
1/30 - 2/3	Logic
	Friday: Last drop day (50% refund)
2/6 - 2/10	More Logic, Direct Proof
2/13 - 2/17	Direct Proof and the Contrapositive
2/20 - 2/24	More on Direct Proof and the Contrapositive
	Wednesday: First midterm
2/27 - 3/3	Proof by Contradiction
3/6 - 3/10	Proof by Contradiction
3/13 – 3/17	Spring Break

3/20 - 3/24	Prove or Disprove Exercises
	Friday: Last day to withdraw
3/27 - 3/31	More Prove or Disprove Exercises
4/3 - 4/7	Equivalence Relations
	Wednesday: Second midterm
4/10 - 4/14	Functions
4/17 - 4/21	Cardinality
5/1 - 5/5	Proofs in Calculus
5/8 - 5/12	Exam Week
	Wednesday: Final Exam 1:00pm

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.