Course Overview

This course is a rigorous study of the ideas underlying calculus and an introduction to the real numbers. Rather than the computational focus of your previous calculus classes, this class will be devoted almost entirely to theory. We'll study the foundations of the real numbers, sequences and series of real numbers and the concept of a limit, continuity, derivatives, the riemann integral considered rigorously, and sequences and series of functions.

Essential Information

Professor	David Maxwell
Office	Chapman 308C
Email	ffdam@uaf.edu
Phone	474-1196
Web	http://www.math.uaf.edu/~maxwell
Prerequisites	ENGL 111X; ENGL 211X or ENGL 213X; MATH 215 and 202X; or my permission

Course Texts

The required text is

Introduction to Real Analysis, Robert G. Bartle and Donald R. Sherbert, 3rd edition.

There are lots of other nice texts out there. There are two that I recommend in particular.

Calculus, by Michael Spivak, is a lovely calculus text with a mathematical viewpoint. It has lots of nice problems, a clear exposition, and covers material similar to that of Bartle & Sherbert as well as some more sophisticated topics (e.g. π is irrational).

Principles of Mathematical Analysis, by Walter Rudin, is a classic text. It's harder book than our course text, and has a more general approach via metric spaces. But it has very clean tidy proofs and is a joy to read. If you end up finding you like analysis, you might enjoy using this text for self study.

Class Time

There will be three hours of class lecture each week and a one hour recitation. Class time will be spent on traditional mathematics lectures, whereas the recitation will be devoted to problem solving and working on homework solutions.

We will decide on the recitation time on the first day of class.

Lecture Times	
MWF	1:00–2:00 Greuning 410

Office Hours

I will schedule 2 hours a week of formal office hours. These times will be chosen after consulting with you. 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

There will be a homework assignment due every Friday at 4:30pm in my box. Homework will be listed on my web page, and will be assigned on as we progress through each day's lectures.

Late homework will never be accepted, but your lowest homework score will be dropped.

Most of your homework will be graded by our TA, Rob Luz. Usually, you will also be asked to hand a couple of problems in separately for me to grade on each assignment.

Midterms

There will be two midterm exams. They are tentatively scheduled to be held on October 16 and November 20. There will be two components to each midterm – a take-home exam that focusses on harder proofs, and an in-class exam with an emphasis on definitions, statements of theorems, and shorter proofs.

Final Exam

There will be a comprehensive final exam to be held on Saturday December 16.

On Proofs

You will be expected to write proofs on every homework and on every exam. Lots of them. Unlike the proofs class you have taken, the main focus of our course is not how to write a proof – we have new mathematical ideas to learn! Never-the-less, this is a writing intensive (W) class, and one of the goals of the class is to give you experience in writing proofs and more broadly in clear mathematical exposition. Your homework and exams will be graded for both mathematical content and exposition.

Evaluation

Course grades will be determined as follows:

Homework	35%
Midterms	35%
Final	30 %

Letter grades will be assigned according to the following scale. This scale is a guarantee; I also reserve the right to lower the thresholds.

A	90–100%
B	80–89%
C	70–79%
D	60–69%
F	0–59%

Tentative Schedule

Week			Topics and Events
9/1			Basic notation
9/6	–	9/8	Countability, ordering of the real numbers
9/11	–	9/15	Completeness of the real numbers and its consequences
9/18	–	9/22	Start sequences and series
9/25	–	9/29	Sequences and series continued
10/2	–	10/6	Limits
10/9	–	10/13	Continuity
10/16	–	10/20	Continuity continued. Midterm: Oct. 16
10/24	–	10/28	Differentiation
10/30	–	11/3	Riemann integral
11/6	–	11/10	Infinite series
11/13	–	11/17	More on infinite series, start sequences of functions
11/20	–	11/22	Modes of convergence. Midterm: Nov. 20. Thursday: Thanksgiving
11/27	–	12/1	Introduction to metric spaces
12/4	–	12/8	Metric spaces continued
12/11			Review

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 and Absences

Although attendance is not included as part of your grade, you are strongly encouraged to attend every class. 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.

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.