Math 165 §4, Fall 2010

Analysis 1, section 4

10:50 TTh, CNS E101

Professor:	Lawrence Stout
Office:	C209C CNS
Office Hours:	1-3 TTh, 2-3 W
Phone:	556-3038
e-mail:	lstout@iwu.edu
Web:	http://www.iwu.edu/∼lstout

Required Texts:	Small and Hosack
	Calculus, an Integrated Approach

Course Description

The Analysis sequence provides a unified approach to calculus in one and several variables building on the background you already have by taking a very different approach to the subject than is done in most high school courses. The first course deals with limits, continuity, and differentiation; the second does differentiation for functions of several variables and integration for functions of one variable; Analysis 3 does multiple integrals and integration of forms, culminating in a generalized Stokes's theorem. The sequence differs from the calculus you saw in high school both in its organization and in its depth. This course concentrates much more on rigorous concept development than it does on mechanical technique.

At the start you will see little that looks like the calculus you studied in high school. We will concentrate on successive approximation as the way we gain information about real numbers. Since the least upper bound property (critical for important parts of the theory) is what distinguishes the real numbers from the rationals, we will spend some time exploring boundedness and its consequences for sets of real numbers and sets in $\mathbb{R}^n$. Many of the exercises will ask you to come up with examples of sets or functions with particular properties or say why no such example exists.

Limits of sequences as a way of approximating real numbers form the basis for our analysis of limits of functions and continuity. We will also look

at the more standard delta-epsilon definition, since some theorems are easier to prove using that definition. The sequence definition is nice because it carries over without modification to higher dimensions.

The first chapter on differentiation finish the course. We will stress the derivative as a rate of change, as the slope of a tangent line, and as a best linear approximation to a function near a point. The Mean Value Theorem and its consequences form the base for much of our further theory and almost all of the applications of the derivative. One application is a study of maxima and minima in one variable. The course ends with a study of derivatives for vector valued functions.

The greatest strength of the book is in its problem sets, so much of the course both in and out of class will focus there.

Written work and grading:

We will have three hour exams, each worth 100 points, and a comprehensive final, worth 150. Tentative dates are on the class calendar at http://www/iwu/edu/ lstout/Analysis1/Analysis1F10Cal.html. Homework will be due each Tuesday.

My exams always include definitions, examples of how those definitions apply, proofs of theorems, and problems of varying difficulty. Competence in the mechanics of the subject will earn you a C; mastery of the technique and the definitions and reasonable facility with the applications is B work; I expect facility with the theory, mastery of the technique and applications, and clear expression of mathematical ideas for an A.

I will use a straight scale for determining grades. To allow flexibility at boundaries, I reserve the right to change the boundaries, but will draw them no higher than:

A : 90% or over
A-: [87,90)
B+: [83,87)
B : [78,83)
B-: [75,78)
C+: [70,75)
C : [65,70)
C-: [60,65)
D : [50,60)
F : below 50%

Note: The line for passing will not move, the others *may* move downward.

Attendance Policy

I expect you to read the relevant sections of the books before the class where we will be discussing them. Classes and office hours are what you pay tuition for, so take advantage of them.

There is no deduction of points for classes missed.

Policy on Academic Integrity

Work handed in for a grade is expected to be your own work. On exams and individual projects there should be no collaboration: this will be made explicit on the assignment sheet. On daily homework there is something to be gained by talking and working with your fellow students; the writeup, however, should be your own. If you use outside sources, cite them. If you get help from an individual, give credit. It is not wise for you to neglect learning how to do the work on your own, since exams will all require all work to be done individually. Any cheating on exams or collaboration on assignments where it has been explicitly prohibited will be treated as a violation of the policy on academic dishonesty in the student handbook and will be reported to the Associate Provost.

Other Issues

Please be courteous to the other members of the class: don't chat so they can't hear, and leave your cell phones off.

I have a rare inherited form of macula dystrophy which has gotten worse this summer, so my central vision is not good in my right eye. This makes it hard for me to read print and to see faces. Please help by writing clearly and reasonably large. If I pass you outside of class and don't seem to have recognized you, please don't take offense: I probably couldn't see your face. Since the facial expressions usually provide needed feedback to the professor which I am worried about not getting I'll try using a card system. Green means "All's well, I'm with you"; yellow means "I'm starting to get confused", and red means "Whoa! Try that again another way."