Math 166 §2, Spring 2009

Analysis 2

1:00 MWF, CNS E108

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Required Texts:	Small and Hosack
	Calculus, An Integrated Approach

Course Description

This course continues the study of calculus in one and several variables started in Analysis 1. In it we consider derivatives for functions of several variables (3.10 and Chapter 4), integration for functions of one variable (Chapter 5), evaluation of integrals (Chapter 6), and the development of the logarithm and exponential functions (Chapter 7).

All of this requires careful definitions and then makes use of the mean value theorem to prove results making it easier to see how to satisfy those definitions. We define the derivative for a function of several variables as a best linear approximation. The mean value theorem then lets us see how that can be satisfied if the partial derivatives are continuous. We getproperties of the gradient from the definition of the derivative and then see how those properties can be useful. We will use the derivative to find maxima, minima, and saddle points for functions of two variables. For constrained max-min problems we'll use Lagrange multipliers.

The definition of the definite integral as a Riemann sum has the advantage of looking just like many of the applications of the integral. It also suggests numerical techniques we can use to approximate definite integrals. It is not as useful for finding exact solutions, though. For that we use the beautiful and important Fundamental Theorem of Integral Calculus, which uses properties of the integral and the mean value theorem to tell us that to find integrals it suffices to find antiderivatives and evaluate.

The development of the natural logarithm as a definite integral is an elegant application of the fundamental theorem. It is also historically (almost) accurate. We can then derive the properties of the exponential function as the inverse to the natural logarithm. Logs and exponentials give us further examples for technique of integration and further important applications.

Written work and grading:

This material falls naturally into two pieces, so I will give two exams each worth 100 points (one after Chapter 4, one after Chapter 7). There will also be two projects each worth 100 points. Homework will be due each Friday. It will contribute another 100 points.

Look for the link to the calendar for the course on my.iwu to see what assignments, exam dated, and due dates for projects are.

I will use a straight scale for determining grade. 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.