MA 265 Calculus III **Don Faust** **Syllabus**

The Calculus provides, fundamentally, solutions to two problems: the development of a fruitful concept of the slope of a curve at a point on the curve, and the development of a fruitful concept of the area bounded by a curve. After two millennia of struggle with these problems, solutions were basically constructed by the seventeenth century. But possibly what makes the Calculus so central to mathematics (and to the wide range of disciplines which make daily use of mathematics) is the great number and variety of ways which have been found in the last three hundred years, and which are continuing to be found, to make productive use of these solutions in successfully attacking many practical problems.

In your first semester of the Calculus sequence, you looked carefully at the concept of the derivative (which addresses the first problem) and the concept of the integral (which addresses the second problem), and began to see how these concepts provide powerful problem-solving tools.

In your second semester of the Calculus sequence, you extended the family of functions, and the toolbox of techniques, to which these concepts of derivative and integral can be applied. Further, especially driven by the problem of the lack of certain indefinite integrals, you learned about the machinery of infinite series, how to represent a function f(x) by a power series s(x) (where, for each x, s(x) is an infinite series), and how to use the Taylor Theory of these power series to generate approximations which attack this problem.

In this semester, your third semester of the Calculus sequence, we will carry forward the concepts of derivative and integral, from the rather simplistic setting of a real-valued function of one real variable (i.e., functions y = f(x)) which predominated in Calculus I and II, to more interesting and application-rich settings involving real-valued and vector-valued functions of many real variables. Along the way, it will be both insightful and fun to see (1) how we extend the concepts of derivative and integral to these richer settings, developing tools involving for example “partial derivatives”, “directional derivatives”, “gradients”, “multiple integrals”, “line integrals”, and “surface integrals”, and (2) how these tools are used in a number of powerful applications, e.g. involving the force fields which are ubiquitous in the study of mechanics and electricity.

More generally, the following broad perspective may be helpful to you. The fundamental tools of continuous mathematics provide a rich storehouse of models for the representation and solution of many problems. Making intelligent use of these models involves both (1) developing a facility for analyzing problems and casting them in ways which, where appropriate, make good use of these models of mathematics, and (2) developing a facility for working with these models themselves. Our course will take us through a representative sample of these tools of mathematics, and will concentrate on both aspects (1) and (2) delineated above. It can be a very exciting journey (if your involvement is sincere and includes both good class attendance and a parallel daily commitment to hammering things out on your own through daily study and problem-solving), at the end of which you will find not only that your mathematical maturity has been substantially enriched, but also that the general analytical skills you bring to bear in the broader arena of your daily professional and personal life will be substantially enriched as well.

Text:

MULTIVARIABLE CALCULUS by Stewart

Evaluation:

Firstly, in addition to ungraded daily assignments, there will be a sequence of graded SUBMITTED ASSIGNMENTS (SAs) which can be resubmitted repeatedly until satisfactory.

Secondly, there will be three mid-semester exams and a final exam. Only very exceptional circumstances could justify missing an exam; in these rare cases, permission must be requested in advance.

The evaluation schedule is as follows:

Exam 1:	Wed	29 Sep	150+30	points
Exam 2:	Wed	27 Oct	150+30	points
Exam 3:	Wed	1 Dec	150+30	points
Final Exam:			350	points
Submitted Assignments: to be submitted en masse before or on Fri 3 Dec for grade recording			110	points

==========

Total:	1000	points

Grading:

90-100%, A; 80-89%, B; 70-79%, C; 60-69%, D; 0-59%, F. The grading may be less stringent, but not more stringent, than this.

DISABILITY SERVICES

If you have a need for disability-related accommodations or services, please inform the Coordinator of Disability Services in the Disability Services Office at 2001 C. B. Hedgcock (227-1700; TTY 227-1543). Reasonable and effective accommodations and services will be provided to students if requests are made in a timely manner, with appropriate documentation, in accordance with federal, state and University guidelines.