SYLLABUS
Scientific Calculus I, Fall, 2006

Instructor: James A. Davis Office hours: MWF 8-9; T 2-3
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I. COURSE DESCRIPTION:

Math 231, scientific calculus, emphasizes the astonishing applicability of calculus to the sciences. Ever since Newton and Leibnitz discovered the explanatory power of calculus to planetary motion, mathematicians and scientists have continued to discover that calculus is the language of nature. Recent advances in the biological sciences have continued this tradition, making it clear that scientists in the 21st century must understand calculus in order to participate in future breakthroughs. This course, together with Math 232, will equip you to participate in scientific research by helping you understand how the mathematical tools from calculus can be applied to various scientific questions.

The prerequisite for this course is either a year-long high school calculus course or a semester-long college level introductory calculus course. Thus, we expect that you come into this course with a basic familiarity with the derivative as the slope of the tangent line to a curve. We will review that material with an emphasis on how those ideas apply to the sciences. We will then extend those ideas to 3 dimensions, a natural extension of calculus into the mathematical description of the world we live in (we can do 4 dimensions if you want to include time as a dimension). We will end the course with an overview of integration and its applications to the sciences.

Math 231 satisfies the Field of Study Symbolic Reasoning requirement of the general curriculum. In addition, Math 232 (Scientific Calculus II, the second semester of this sequence) satisfies the University wide requirement for anyone seeking a Bachelor of Science degree. If you have any question regarding whether this is an appropriate course for you to be taking, please don’t hesitate to come talk to me.

We will use the book Calculus concepts and context by Stewart. We will cover much of chapters 1, 2, 3, 5, and 11, covering the following topics: modeling using functions (chapter 1), definition and computation using the derivative (chapter 2), applications of derivatives (chapter 3), multivariate differentiation and applications (chapter 11), integration topics (chapter 5).
II. **GRADING:**

Three hour exams (100 pts each) 300 pts
Exam dates: 9/22, 10/23, 11/20

Quizzes (20 pts each) 100 pts
Approximately 7 quizzes will be given; your score will be the sum of the best 5. No make-up quizzes will be given for any reason.

Homework grade 100 pts
You will turn in weekly homework assignments

Final Exam (Tuesday 12/12 9-12) 200 pts

**TOTAL** 700 pts

(NOTE: You can get 10 bonus points for attending a lecture sponsored by the math and computer science department)

III. **ATTENDANCE:** Attendance is expected. You are responsible for making up any work you miss if you are not in class. I reserve the right to punish serious abuse of privileges (I will warn you before I do so).

IV. **ACADEMIC HONESTY:** All work on tests and quizzes must be your own. Calculators are permitted on quiz and test days, but you are never permitted to share them (make sure that you bring one on quiz and test days!). I may restrict your use of certain functions on the calculator for certain problems. On homeworks, I want to encourage you to speak with fellow students about the problems. The important principle to keep in mind is that any solutions that you turn in must have been written by you. If I suspect that you are simply copying from someone else, I will warn you before taking honor council action.