# Calculus for the Social Sciences II

**MATH 126-02, TuTh 9:30 - 10:45, Swords 302, Spring 2008**

**Dr. Gareth Roberts**

**Contacting me:** Office: SWORDS 326, e-mail: `groberts@radius.holycross.edu` (Please use this email, it is **NOT** my groupwise account!) phone: x2350

**Office hours:** Mon. 2:00 - 3:00, Wed. 1:00 - 2:00, Tues. & Thurs. 11:00 - 12:00 or by appointment.

**Required Text:** *Single Variable Calculus, Concepts and Contexts*, Third ed., James Stewart.

**Web page:** `http://mathcs.holycross.edu/~groberts/Courses/MA126/homepage.html` Homework assignments, course schedule, exam materials, useful links and other important information will be posted at this site. Please bookmark it!

**Course objectives:**

- Develop an understanding for the techniques and applications of one variable calculus.
- Become proficient at making clear and coherent mathematical arguments.
- Work and communicate with your peers.
- Have fun while learning calculus!

**Syllabus:** The main focus of the course is to study integration of real-valued functions of a single variable. Applications of the integral, specifically geared towards economics and the social sciences, will also be featured. The subject will be approached from both a conceptual and a computational viewpoint. Rather than just learning a set of formulas, techniques and algorithms, the theory and applications of Calculus will be central to our study. The text has been chosen with this goal in mind. Many of the exercises require a solid understanding of concepts as opposed to a cursory "plug-and-chug" approach.

A tentative outline of the course is given below. We will cover most of the material in the textbook from Section 4.9 to Section 8.3.

- Course introduction, antiderivatives (1 class)
- Area and the definite integral (2 classes)
- The Fundamental Theorem of Calculus (2 classes)
- Exam 1
- Techniques of integration: $u$-sub, parts, partial fractions, trig. sub. (4 classes)
- Approximating definite integrals, improper integrals (2 classes)
- Applications of integration: area, volumes of revolution, average value (3 classes)
- Exam II
- Applications of integration: economics, probability (2 classes)
- Differential equations: simple examples, direction fields, Euler's method (2 classes)
- Differential equations: separation of variables, Newton's Law of Cooling, continuous compound interest (3 classes)

- Exam III
- Infinite sequences and series, geometric series, integral test (2 classes)
- Calculus Jeopardy (last class)
- Final Exam

**Homework:** There will be homework due every Thursday at the START of class. No homework will be assigned during the week of an exam. All assignments will be posted on the course web page. There will be a list of problems for you to hand in, a nonempty subset of which will be graded. **Late homework will not be accepted.** While you are allowed and encouraged to work on homework problems with your classmates, the solutions you turn in to be graded should be your own. Plagiarism will not be tolerated.

It is HIGHLY recommended that you take advantage of the **Calculus Workshop**, a drop-in peer tutoring center, open Sunday through Thursday from 7:00 - 9:00 pm in SWORDS 302/328. This is an excellent place to receive help while you are working on homework problems or studying for exams.

**NOTE:** Late homework will not be accepted. The only excused homework which is late will be accompanied by a letter from your Class Dean. However, you will be allowed ONE "mulligan" over the course of the semester where you can turn in the assignment up to one week after the original due date.

**Quizzes and Exams:** There will be a weekly quiz given at the start of class EVERY TUESDAY, except for weeks in which a midterm exam is scheduled. These will be short, one or two problem quizzes designed to keep you abreast of the current course material. The lowest quiz grade of the semester will be dropped. In addition, there will be three in-class midterm exams. A comprehensive final will be given at the end of the semester.

The exam schedule is given below. Please mark these dates down and plan accordingly. Any conflicts must be legitimate and brought to my attention well before the exam is scheduled. If you have any specific learning disabilities or special needs and require accommodations, please let me know early in the semester so that your learning needs may be appropriately met. You will need to contact Dr. Neil Lipsitz in Disability Services (Hogan 209, x3693) to obtain documentation of your disability.

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| **Exam Schedule:** | **Exam 1** | **Thurs., Feb. 14** | **In Class** |
| | **Exam 2** | **Thurs., March 27** | **In Class** |
| | **Exam 3** | **Thurs., April 24** | **In Class** |
| | **Final Exam** | **Fri., May 9** | **2:30 – 5:30 pm** |

**Academic Integrity:** The Department of Mathematics and Computer Science has drafted a policy on academic integrity to precisely state our expectations of both students and faculty with regards to cheating, plagiarism, academic honesty, etc. You are required to read this policy and sign a pledge agreeing to uphold it. Anyone who violates the Departmental Policy on Academic Integrity will receive a 0 for that assignment or exam as well as possible further disciplinary action involving your Class Dean.

**Grade:** Your course grade will be based on the scores you receive for each of the following items:

- classroom participation/interest 5%
- homework 15%
- quizzes 15%
- midterm exams 35% (best exam 15%, second best 12%, worst 8%)
- final exam 30%

**How to do well in this course:**

- ATTEND THE LECTURES, PARTICIPATE and ASK QUESTIONS

  I take pride in my lectures and work hard to make complicated subject matter look easy. However, this will not be of much use to you if you don't attend class. Furthermore, several class periods will involve your participation in activities designed to get you to think. These days should be fun, with me lecturing little and you participating greatly. Do not take for granted the privilege you have of attending college. Value your time here and I will make it worth your while.

- DO YOUR HOMEWORK REGULARLY.

  The best way to learn mathematics is to *do* mathematics. This means mastering the material to the point where you could explain it to your classmates, your friends or your mom. "You don't really learn the subject until you teach it," is a common adage among mathematicians. It is not enough to know how to mimic an algorithm. An "A" student should be able to follow and propose arguments as to why an algorithm is working or not working.

- WORK WITH YOUR CLASSMATES.

  Some of the best assets available to you are the knowledge and abilities of your peers. Learn to explain mathematics to your classmates. Mathematics can be fun and rewarding when there are people around you who enjoy figuring out problems as much as you do. Take advantage of this opportunity and organize study groups.