

Calculus 1 with FUNdamentals

MATH 133-02, Fall 2013

MF 1:00 - 1:50 Swords 359, TuTh 12:30 - 1:45 Swords 302

Professor Gareth Roberts

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Office hours: Mon. 2:00 - 4:00, Tues. 11:00 - 12:00, Wed. 1:00 - 2:00, Thurs. 11:00 - 12:00 or by appointment.

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

Web page: <http://mathcs.holycross.edu/~groberts/Courses/MA133/homepage.html>

Homework assignments, class handouts, 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 theory of one variable calculus.
- Improve confidence in your mathematical abilities.
- 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 the study of real-valued functions of a single variable, particularly, rates of change of functions. 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.

This course meets five hours a week, allowing for a slower pace and the opportunity to address any deficiencies in your mathematical training. I hope to build a safe and supportive environment that will help you gain confidence in your abilities and increase your comfort level with mathematics. In addition, there will be several in-class activities that will hopefully be fun as well as educational.

A tentative outline of the course is given below. We will cover most of the material in the text from Chapters 1 through 4.

- A catalog of functions: linear, exponential, logarithmic, trigonometric, polynomials (6 classes)
- New functions from old: shifting, stretching, composition, inverses (3 classes)
- Parametric curves (1 class)
- Limits and continuity (7 classes)
- Exam I
- The derivative: velocity, limit definition, derivative function, second derivative (7 classes)
- Differentiation rules: power, exponential, product, quotient, chain rule, implicit, inverses, etc. (10 classes)
- Exam II

- Rates of change in applications, linear approximation (4 classes)
- Applications of the derivative: related rates, curve sketching, optimization, L'Hôpital's rule (7 classes)
- Exam III
- Newton's method, antiderivatives (2 classes)
- *Calculus Jeopardy* (last class)
- Final Exam (Cumulative)

Homework: There will be homework due every Tuesday at the START of class. Assignments will be posted on the course web page. Most of the problems are to be completed using the online homework system **WebAssign** while other problems are to be handed in separately on paper. **Late homework will not be accepted.** While you are allowed and encouraged to work on homework problems with your classmates, the solutions you present (or enter on the computer) should be your own work. No help from any Internet sources other than those offered by WebAssign is allowed. Plagiarism will not be tolerated and will be treated as a violation of the Departmental Policy on Academic Integrity.

In order to access WebAssign, you will need a **Class Key**. The Class Key for MATH 133-02 is holycross 9462 6542 . Eventually, you will also need to purchase an access code to use the system, obtainable from the bookstore with your textbook. You will have free access to WebAssign until Sept. 12.

It is 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 321. This is an excellent place to get help while you are working on homework problems or studying for exams. In addition, Megan Norton (HC '15) will be serving as a teaching assistant for our class, and will hold her own office hours and conduct weekly review sessions.

Quizzes and Exams: There will be a weekly quiz given at the start of class EVERY THURSDAY, 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 midterm exams that will take place during class. A comprehensive final will be given at the end of the semester.

The exam schedule is given below. Please make a note of these dates 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 the director of Disability Services in Hogan 215 (x3693) to obtain documentation of your disability.

Exam Schedule:	Exam 1	Thurs., Sept. 26	In Class
	Exam 2	Thurs., Oct. 31	In Class
	Exam 3	Tues., Nov. 26	In Class
	Final	TBA	2.5 hours

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. A violation of the Departmental Policy on Academic Integrity will result in a 0 for that assignment or exam, and a letter describing the occurrence of academic dishonesty will be sent to your Class Dean.

Grade: Your course grade will be determined by the scores you receive for each of the following items:

- classroom participation/interest 5%
- homework 10%
- quizzes 15%
- midterm exams 40% (best two exam 15% each, worst 10%)
- final exam 30%

How to do well in this course:

- ATTEND CLASS, PARTICIPATE and ASK QUESTIONS.

I take pride in my lectures and will work hard to get you to master the course material. However, this will not be of much use to you if you don't attend class. Furthermore, certain 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 and your friends. "You don't really learn the subject until you teach it," is a common adage amongst mathematicians. It is not enough to know how to mimic an algorithm. A strong 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.

- ASK FOR HELP WHEN NECESSARY.

Ask for help when you need to. One of the stumbling blocks for many math students (particularly us guys) is being afraid to ask for help. Just do it! It's actually ok to admit you don't understand something. Some might even say it's a strength.

Never regard study as a duty, but as the enviable opportunity to learn.

Albert Einstein