Advanced Placement Calculus

MATH 136-04, MTuWF 2:00 - 2:50, Swords 302, Fall 2010

Professor Gareth Roberts

Contacting me: Office: Haberlin 305, e-mail: `groberts@radius.holycross.edu` (Please use this email, it is **NOT** my groupwise account!) phone: x2350

Office hours: Mon. 11:00 - 12:00, Tues. 12:00 - 1:00, Wed. 8:00 - 8:50 (in Wheeler seminar room), 1:00 - 1:50, Fri. 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/MA136/homepage.html`
Homework assignments, computer labs, schedule changes, exam materials, useful links and other important information will be posted at this site. Please bookmark it!

Is this the right Calculus course for me? This course is for students who have either received one unit of AP credit in Calculus (4 or 5 on the AB exam or a 3 or lower on the BC exam with an AB subscore of 4 or 5) or who have taken a solid year of calculus in high school. If you have never taken Calculus or did not do well in your high school calculus course, then you should consider enrolling in Math 131 or 133 (Calc 1). This course is designed for students interested in majoring in either Mathematics, Computer Science, Physics, Biology, Chemistry or Economics. For more information, please see the *Advanced Placement and Introductory Courses* section of the Mathematics and Computer Science course listings in the college catalog.

Homework: There will be homework due every Wednesday at the START of class, to be completed using the online homework system **WebAssign**. **Late homework will not be accepted.** While you are allowed and encouraged to work on homework problems with your classmates, the solutions you 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 136-04 is holycross 1101 5238 . Eventually, you will also need an access code to use the system, obtainable from the bookstore. You will have free access to WebAssign until Sept. 15th.

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 328. This is an excellent place to get help while you are working on homework problems or studying for exams.

Computer Labs: Certain classes will involve the use of technology to illustrate and explore some aspect or application of calculus. These will be days of collaborative learning and may include using the mathematical software package MAPLE in a computer lab. You will be asked to complete several computer projects working in groups of 2 to 3 people.

Syllabus: We will be covering the material from the standard year-long calculus sequence Math 131/132 in just one semester. The main focus of the course is the study of real-valued functions of a single variable. This includes both differentiation and integration of functions as well as the numerous applications of these processes. 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 text, Chapters 1 through 8. A few extra classes are included for certain topics, allowing for possible computer labs.

- Essential Functions: exponential, logarithmic, trigonometric, shifting, inverses (4 classes)
- The Derivative: limits, continuity, derivative as a function (3 classes)
- Differentiation Rules: product, quotient, chain, implicit differentiation, linear approximation (5 classes)
- Exam I
- Applications of the Derivative: related rates, curve sketching, optimization problems, Newton's method (7 classes)
- Integration: antiderivatives, area, the definite integral, the Fundamental Theorem of Calculus (4 classes)
- Techniques of Integration: u-sub, integration by parts, other techniques, improper integrals (4 classes)
- Exam II
- Applications of Integration: area and volume, arc length, average value, probability (4 classes)
- Differential Equations: slope fields, Euler's method, separable equations, population models (6 classes)
- Exam III
- Infinite Series: sequences, convergence tests, power series, Taylor series (7 classes)
- Calculus Jeopardy (last class)
- Final Exam

Quizzes and Exams: There will be a weekly quiz given at the start of class EVERY FRIDAY, 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 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. We will review for each midterm during the Monday class on the week of the exam.

Exam Schedule:

Exam 1	Wed., Sept. 29	In Class
Exam 2	Wed., Nov. 3	In Class
Exam 3	Wed., Dec. 1	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 10%
- computer labs 10%
- midterm exams 40% (best two exam 15% each, worst 10%)
- final exam 25%

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