Advanced Placement Calculus

MATH 136-01, MTWF 8:00 - 8:50, Swords 359, Fall 2004

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. and Tues., 9:00 - 11:00, Wed. 9:00 - 10:00 or by appointment.

Required Text: *Calculus (single variable)*, Third ed., Hughes-Hallett, Gleason, McCallum, et al. It is suggested, but not required, that you also purchase the *Student's Study Guide* which is directly linked to the textbook.

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. 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. 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. Take care to write up solutions **in your own words**. Plagiarism will not be tolerated and will be treated as a violation of the Departmental Policy on Academic Integrity.

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. This is an excellent place to get 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.

Computer Labs: Some Tuesday classes will involve the use of technology to illustrate and explore an aspect or application of calculus. These will be days of collaborative learning and may include using the mathematical software package MAPLE in the departmental computer labs. You will be asked to complete 4 to 5 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 11. Please be aware that you will be expected to know some of this material **regardless of whether it was actually discussed in class.** Chapter review sheets will be handed out for many chapters detailing the material you are responsible for.

- A Library of Functions (exponential, logarithmic, trigonometric, shifting) 3 days
- The Derivative (limits, definition, second derivative, differentiability) 4 days
- Differentiation Rules (product, quotient, chain rules, implicit differentiation) 3 days
- Exam I
- Applications of the Derivative (curve sketching, optimization problems) 3 days
- The Definite Integral (Fundamental Theorem of Calculus, antiderivatives) 5 days
- Integration (u-sub, integration by parts, other techniques, improper integrals) 5 days
- Exam II
- Applications of Integration (volumes of revolution, density, center of mass) 4 days
- Series (geometric, convergence tests, power series) 6 days
- Approximating Functions (Taylor polynomials and series) 4 days
- Exam III
- Differential Equations (slope fields, Euler's method, applications) 7 days
- Calculus Jeopardy (last class)
- Final Exam

Exams: There will be 3 midterm exams and a comprehensive final at the end of the semester. 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 Dr. Matthew Toth of Disability Services in Hogan 207 (x 3693) to obtain documentation of your disability.

Exam 1	**Wed., Sept. 29**	8:00 - 8:50 am
Exam 2	**Wed., Oct. 27**	8:00 - 8:50 am
Exam 3	**Wed., Dec. 1**	8:00 - 8:50 am
Final	**Mon., Dec. 13**	2:30 - 5:30 pm

Exam Schedule:

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 determined as follows: homework 20%, computer labs 15%, classroom participation/interest 5%, midterm exams 35% (best exam 15%, second best 12%, worst 8%) and 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.