

# Calculus 1

MATH 135-04, TuTh 11:00 - 12:15, Swords 302, Fall 2015

Professor Gareth Roberts

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**Office hours:** Mon. 2:00 - 3:00, Tues. 10:00 - 11:00, Wed. 1:00 - 2:30, Thurs. 10:00 - 11:00 or by appointment.

**Required Text:** *Calculus: Single Variable (Early Transcendentals)*, third ed., Jon Rogawski and Colin Adams (bundled with LaunchPad for \$95 in the College bookstore)

**Web page:** <http://mathcs.holycross.edu/~groberts/Courses/MA135/homepage.html>  
Homework assignments, class handouts, 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 designed for students interested in majoring in either Mathematics, Computer Science, Physics, Biology, Chemistry, Economics or Accounting and who have **not** received a 4 or 5 on either the AB or BC advanced placement exams in Calculus. If you have taken an advanced placement course or a solid high-school course in Calculus, you should consider enrolling in Math 136, Calculus 2, since most of the course material will be a review for you. For more information, visit the *Mathematics Introductory Courses and AP Credit* section of the Math/CS Department's webpage.

**Homework:** There will be homework due every Thursday at the START of class, except for the weeks in which a midterm exam is scheduled. Homework will consist of two parts, an online component to be completed using the system **LaunchPad** and a hand-written portion consisting of selected problems from the course textbook.

**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 or enter on the computer should be your own work. No help from any Internet sources other than those offered by LaunchPad is allowed. Plagiarism will not be tolerated and will be treated as a violation of the Departmental Policy on Academic Integrity.

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. In addition, Kathryn (Kate) Spitler (HC '18) will be serving as a modified teaching assistant for the class and will hold her own office hours as well as conduct exam review sessions.

**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.

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

- Functions: linear, exponential, logarithmic, trigonometric, polynomials, piecewise (2 classes)
- New functions from old: shifting, stretching, composition, inverses (2 classes)
- Limits: instantaneous velocity, asymptotes, graphical and numerical approaches (1 class)
- Exam I
- Limits: basic laws, continuity, algebraic evaluation of, squeeze theorem, limits at infinity, Intermediate Value Theorem (4 classes)
- The derivative: tangent line, limit definition of, derivative function, power rule (2 classes)
- Exam II
- Differentiation rules: product, quotient, chain rule, trig, implicit, exponential, logs (4 classes)
- Meaning of the derivative: rates of change, related rates, linear approximation (2 classes)
- Applications of the derivative: extrema, Mean Value Theorem, first derivative test (1 class)
- Exam III
- Applications of the derivative: L'Hôpital's rule, curve sketching, optimization (3 classes)
- Calculus Jeopardy (last class)
- Final Exam (Cumulative)

**The Flipped Classroom:** Approximately half of the classes this semester (most Tuesdays) will solely consist of problems and/or worksheets for you to complete in groups. For these classes there will not be a traditional lecture, but rather the class is “flipped” so that active student learning is the primary focus. You will be expected to prepare for these classes by watching videos and/or reading the text beforehand. Certain features in LaunchPad (such as the “dynamic figures”) will be assigned for you to complete before class meets.

**Quizzes and Exams:** There will be a weekly online quiz given using LaunchPad after each homework assignment. These will be short, straight-forward quizzes designed to make sure you are keeping up with the material. The lowest quiz grade of the semester will be dropped. In addition, there will be three midterm exams given 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.

<b>Exam Schedule:</b>	<b>Exam 1</b>	<b>Thurs., Oct. 1</b>	In Class
	<b>Exam 2</b>	<b>Thurs., Nov. 5</b>	In Class
	<b>Exam 3</b>	<b>Thurs., Dec. 3</b>	In Class
	<b>Final Exam</b>	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:

- participation (includes in-class work, preparedness, attitude, effort) 10%
- homework and quizzes 20%
- midterm exams 45%
- 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, on those special days when the classroom is "flipped," it is up to you to come prepared for class. Taking some initiative beforehand will result in a better learning experience for you. 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 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 outside of class.

- 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 that you don't understand something. Some might even characterize it as a strength.

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

— Albert Einstein