

MATH 111-004 – THE CALCULUS I

Syllabus

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Website: www.mathcs.emory.edu/~rpschne
Classroom: MSC W304
Class Time: MWF 1:00 – 1:50 PM
Textbook: Stewart, *Single Variable Calculus: Early Transcendentals* (7th ed. – **exact version needed**)

"And what are these [derivatives]? ... They are neither finite quantities, nor quantities infinitely small, nor yet nothing. May we not call them the ghosts of departed quantities?"—Bishop George Berkeley, criticizing the discovery of the Calculus

Course goals

Math 111 is an introduction to differentiation and integration of functions of one variable. Topics covered include limits, continuity, derivatives, maximum-minimum problems, antiderivatives, definite integrals, and the Fundamental Theorem of Calculus, which reveals differentiation and integration to be intrinsically interconnected. Students will gain facility with important concepts and methods, and will see scientific and real-world applications along the way.

Secondary goals of the course are to provide historical background and intuitive motivation for the ideas we encounter, in hope of fostering an appreciation of this beautiful, powerful theory—the seeds of which were planted in ancient times, and whose development continues today.

Coursework and quizzes

"There is no royal road to geometry."—Greek mathematician Euclid to King Ptolemy, when the Egyptian ruler asked for an easy method to learn mathematics

Nothing will substitute for hands-on practice in mastering this material, and students will find that the work pays off as their Calculus skills continually blossom. Students are expected to keep up with reading assignments, to review lecture notes from each class before the next meeting, and to work through all homework assignments and examples given in the text.

Much like music, mathematics is an art requiring constant practice. A brief **weekly quiz** will be given at the end of class on either Monday or Friday; quiz problems will usually resemble examples from the week's homework assignments and lectures. The two lowest quiz grades will be dropped at the end of the semester. **There will be no make-up quizzes without proper documentation** (see *Attendance* below). **Homework** will be assigned, but will not usually be graded. Students are encouraged to work together on the homework—mathematics is often a collaborative art form—but the written solutions must be each student's individual work for extra credit to be given.

Exams

There will be three mid-term examinations and a final exam. Mid-term exams will not be cumulative, but the final exam will cover material from the entire semester. Students who keep up with reading and homework, and seek help when needed, can expect to succeed on the exams. **Mid-terms will occur in February, March, and April**; reasonable notice of the exact test dates will be given as they approach. **The final exam will take place from 3:00 – 5:30 PM on Wednesday, May 4**; this date cannot be adjusted, by University policy. **There will be no makeup exams without proper documentation** (see *Attendance* below). In particular, **Emory University policy absolutely prohibits rescheduling final exams; students should take note of the final exam dates before making any travel plans, as missed final exams will result in scores of zero.**

Grading policy

Final grades will be calculated roughly as follows:

- Quiz average: 20%
- Mid-term exam average: 50%
- Final exam: 30%

End-of-semester letter grade rubric:

A = 93-100, A- = 90-93, B+ = 87-90, B = 83-87,
B- = 80-83, C+ = 77-80, C = 73-77, C- = 70-73,
D+ = 67-70, D = 63-67, D- = 60-63, F = below 60

Course plan

While the actual pace of the course may be adjusted accordingly, we will cover the following topics and sections in the textbook.

- Pre-calculus review §1.1 – 1.3
- Exponential and logarithm functions §1.5 – 1.6
- The tangent and velocity problems §2.1
- Limits and continuity §2.2, 2.3, 2.5, 2.6
- The derivative §2.7 – 2.8
- Differentiation formulas, trigonometric formulas, product and quotient rules §3.1 – 3.3
- The chain rule, implicit differentiation §3.4 – 3.5
- Derivatives of logarithm functions §3.6
- Applications to Economics, exponential growth and decay §3.7 – 3.8
- Applications of differentiation §4.1 – 4.5, 4.7
- Antiderivatives §4.9
- The integral, Fundamental Theorem of Calculus §5.1 – 5.5
- Applications of the integral §6.1 – 6.2, 6.5

Course policies

Attendance: Students are expected to **attend every class session**. There is no direct penalty for missing class; however, students must anticipate that each absence will adversely affect their grade, unless great effort is applied to catch up. **Exams and quizzes may not be made up** except in case of unavoidable circumstances, documented illness, religious holidays and other absences that are excused under Emory policy; in such cases, students must appeal to the [Office for Undergraduate Education \(OUE\)](#) to have their absences excused.

Calculators, laptops, cell phones, other exam policies: Calculators, computers and cellular phones will not be useful for any of the quizzes or examinations, and will not be allowed during those times; nor will notes or textbooks be allowed. The use of calculators to check homework is permitted, of course. Laptops are not allowed in class unless I grant permission in advance. Any use of cellular phones during class is prohibited, and phones must be silenced during class. Students may not leave the classroom for any reason during exams.

Honor code: All students must understand and abide by the [Emory Honor Code](#). In particular, students must work quizzes and examinations alone, and are to write up their own homework submissions.

Resources

“Do not worry about your difficulties in mathematics; I can assure you that mine are still greater.”—A. Einstein

Academic help and equal access: Students are strongly encouraged to make use of the **Calculus Help Sessions** held Wednesday and Thursday from 5:30 to 7:30 PM in MSC W302. Students in need of help or advice should please contact me or visit during office hours. Tutors are also available through EPASS. Emory University is an equal access institution; qualified students may obtain accommodations for special needs through the [Office of Access, Disability Services and Resources \(ADSR\)](#).

Questions, concerns, advanced topics: I ask every student to visit me during office hours with questions, concerns or comments as soon as they arise, and not to let time slip by if he/she feels puzzled or is falling behind. Students with questions or ideas reaching beyond course material are also encouraged to visit.