

**Mathematics UN1101
Calculus I
Section 001
Fall 2021
Columbia University**

Instructor: Daniele Alessandrini.

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Office: 624 Mathematics.

Office hours: Tentative schedule: Mo. 11:30am-12:30pm Room 507 Mathematics, We. 9am-10am Room 622 Mathematics.

Website of the course:

<https://www.math.columbia.edu/~alessandrini/Courses/Calculus1-f2021/Calculus1.html>

Classroom: Room 203 Mathematics.

Lectures: Mo., We. 10:10am-11:25am.

Required text: Calculus: Early Transcendentals, 9th edition, by James Stewart (CENAGE Learning). The book is available at the Columbia bookstore. If you have the 8th edition or an earlier edition, that is probably fine too.

Prerequisite: No formal pre-requisites; an understanding of pre-calculus will be assumed.

Course outline: In this course we will describe some basic ideas and techniques that lie at the foundation of all pure and applied mathematics. We will discuss about functions and their limits, derivatives and integrals. We will focus on their meaning, significance, applications and methods of computation. We will use the first six chapters of the course textbook (Calculus, Early Transcendentals, by Stewart). In more detail, we will cover:

1. Functions (Chapter 1).
 - Polynomials and rational functions.
 - Roots.
 - Exponential and logarithm.
 - Trigonometric functions.
2. Limits (Chapter 2).
 - Computation of limits.
 - Continuous functions.
 - Increasing and decreasing functions.
3. Derivatives.
 - Introduction to derivatives (Chapter 2).
 - Differentiation rules (Chapter 3).
 - Maxima and minima (Chapter 4).

- Concavity (Chapter 4).

4. Integrals.

- Computation of integrals (Chapter 5).
- Applications of integrals (Chapter 6).

Electronic devices: Phones and other electronic devices must be silenced and put away during classes and exams.

Attendance: Attendance is NOT mandatory. Anyway, when skipping a lecture it is YOUR responsibility to figure out the exact content of the lecture and to stay up to date with the course and the information given in class. Usually, the best way to do this is to ask your classmates and possibly to borrow someone's notes. The approximate content of every lecture is given in the website of the course, with pointers to the relevant textbook sections.

Homework: Homework exercises will be published online every Wednesday night, and the solutions are due 6 days later, on the night between Tuesday and Wednesday. More precisely, the dead line for submitting will be on Wednesday early morning, at 5am. The solutions must be submitted electronically, via Courseworks. We *will* accept late assignment, but we deduct 10% of the points for every day of lateness.

Extensions: Understandably, there will be some weeks when a student doesn't manage to submit his homework. If you are just a few days late, you can still submit, with a small penalty of 10% of the points for every day of lateness. If you are under severe circumstances due to your health or other factors, you can request to be excused from submitting your homework for a particular week. In this case, please send me an email explaining your situation, and, if the request seems reasonable, you will be excused for that particular week. This can be granted only once or twice per student during the semester. Anyway, remember that similar exercises might still be given in a midterm or final exam, so you will eventually need to solve all the homework exercises at some point, as part of your preparation for the exams.

Students with disabilities: Students with disabilities, who are regularly registered with Columbia Health (DS) or Barnard CARDS, may be granted extra accommodations, as required by their situation.

Midterm exams: There will be midterm exams on Wednesday, October 6th and on Wednesday, November 17. The midterms will be during the usual class time.

Final exam: Projected schedule for the final exam: Wednesday December 22nd, 9am–Noon. The date will be confirmed by the University in November. The date of the final exam is not under the instructor's control, and cannot be moved.

Exam dates: You *must* plan to take the midterm and final exams at the scheduled time, so please make your travel plans accordingly. Besides students with disabilities having prior arrangements with DS or CARDS, the only exceptions will be for those with an incapacitating illness, a serious family emergency, or situations of comparable gravity. In this case you will need to ask your advising dean to send me a note. If your advising dean approves your reason for skipping a midterm, I will use the grade of your final exam as grade for your midterm. For the final exam, we will organize a make-up exam in January, at the beginning of the Spring semester. Incompletes can be granted only by your advising dean and only in the circumstances mentioned above.

Academic dishonesty Anyone guilty of academic dishonesty, such as cheating on an exam or helping someone else to cheat, will fail the course and faces further academic discipline.

Grading: I will first compute a numerical final score for every student. This will depend on the homework, the two midterms and the final exam. Every week the homework will be graded from 0 to 60 points. Every midterm and the final exam is graded from 0 to 60 points. The numerical final score is computed in the following way:

Let A be the average of the homework grades (where the two worst grades are discarded). Let M_1, M_2 be the grades of the two midterms. Let F be the grade of the final exam. The numerical final score S , also from 0 to 60 points, is given by

$$S = \frac{10A + 25M_1 + 25M_2 + 40F}{100}.$$

In other words, the formula is: Homework 10%, midterms 25%, final 40%.

After computing the numerical final score for every student, I will translate them into letter grades (A,B,C,D,F) using a curve. I will choose the curve after the final exam.