

Syllabus

Instructor:

Charles Collot Room 604, Warren Weaver Hall, Courant Institute cc5786@nyu.edu

Website: The course website is available through **NYUClasses**.

Note: Questions concerning course material or general logistics of the course should be directed to the class *Chat*, which is available through the course *NYUClasses*. Emails concerning issues of a more personal nature should be sent to the instructor (Collot). However, before sending an email that concerns logistics, please check the *Syllabus*, the *Announcements* on the course *NYUClasses* for relevant information.

Class times:

Lectures: Mon. & Wed. 11:00-12:15 PM Courant Institute, 251 Mercer Street, Room 312 (Collot).
Recitation: Fri. 3:30-4:45 PM Courant Institute, 251 Mercer Street, Room 202 (Léger).

Office hours:

- Charles Collot (Instructor): Monday & Wednesday 12:15-13:15 PM, in Room 604 of Warren Weaver Hall, Courant Institute.
- Tristan Léger (TA): Monday 3:00-4:00 PM, in room WWH 905 of Warren Weaver Hall, Courant Institute.

Textbooks:

- *Real Analysis*, by Frank Morgan, American Mathematical Society. You are **required** to purchase a physical copy of the textbook, you can buy it at the NYU Bookstore.
- Some additional topics will be covered in *Introduction to Analysis, fourth edition*, by William R. Wade, Pearson, and in *Basic Analysis I, Introduction to Real Analysis volume I*, by Jiri Lebl which is free and available on line at <https://www.jirka.org/ra/realanal.pdf>. These books contain exercises to train.

Lecture notes: A document on the NYUClasses website will keep track of which part of the textbook *Real Analysis* by Morgan have been done. Precise lecture notes will be made for the parts of the course which are not contained in this textbook.

Course Outline: This course is an introduction to rigorous analysis on the real line. The topics include: the real number system, sequences and series of numbers, functions of a real variable (continuity and differentiability), the Riemann integral, basic topological notions in a metric space, sequences and series of functions including Taylor and Fourier series. It will be proof based, and you will learn how to write your own mathematical proofs.

Prerequisites: All students wishing to enroll in Math 325 Analysis are required to satisfy one of the conditions listed on the Mathematics Department CAS Calculus Information page.

Note: Last day to drop the course is Sunday, February 10th.

Grading: Grades will consist of four elements: recitation participation and attendance, homework, one midterm, one final exam.

- Recitation participation and attendance: 5%.
- Written homework: 15%.
- Midterm: 35%.
- Final: 45%.

Homework: A written homework set will be assigned on NYUClasses on Fridays of each week (including the first week). The written homework will be collected the following Friday at the start of recitation. The lowest homework grade will be dropped. No late homework (zero points).

Recitation participation and attendance's grade: A grade counting toward 5% of the final grade will concern the participation and attendance during recitation. Your TA will keep record of how often you attend the recitation and will give me a grade evaluating how much you attended. Similarly, he will keep record of how much you participate during recitation, and will give me a corresponding grade. The final attendance and participation's grade will be computed out of these two grades.

Exams:

- There will be one midterm exam on **April 1st**, 11:00-12:15, at Room 312 of the Courant Institute (same location and time as the lecture).
- The final exam will be held on:
Monday, May 20th, 11:00-12:50, this is a tentative exam date which will be confirmed shortly, and the exact location should be confirmed shortly as well.
Note that the final exam is *cumulative*.

Agenda:

| Week | Topic |
|--------------|---|
| 1, 2. | The real number system, limits of sequences and functions |
| 3, 4, 5, 6. | Topology: continuity, compactness, connectedness |
| 7, 8, 9, 10. | Calculus: the derivative, the Riemann integral |
| 11, 12. | Sequences and series of functions |
| 13. | Fourier Analysis |
| 14-15. | Basic analysis on metric spaces |

CLASS POLICIES:

At all times, students are expected to adhere to the NYU University Policy on Student Conduct. If a student is suspected of cheating, a letter will be sent to the NYU Office of Community Standards, and they will handle the issue.

Five days after graded papers are returned the grade becomes final. You should have any grading errors corrected during those five days. If you have any dispute with the grading, you should contact your instructor (Collot).

No make-up exams or homework are given. A missed homework/exam without a valid reason is zero points. Only reasons involving major medical incidents, grave family emergency and university athletics are valid excuses, and students must provide appropriate documentation. Whenever possible, advanced notice must be provided.

Calculators are NOT allowed on exams. Books, notes, laptops, cell phones, etc are not allowed. If you want a clock/watch during exams, be sure to bring one, but you will not be allowed your cell phone as a clock.

Students must inform the instructor of any essential information as soon as possible. Two examples of "essential information" are:

- Disabled Students: Disabled students would need a longer period of time for exams (as determined by the Moses Center for Students with Disabilities) should contact the instructor at the start of the course. You will not be given extra time if you present this information just before an exam.
- Student Athletes, etc.: Students participating in an official university athletic, musical, or similar event, which will cause them to miss an exam, should contact the instructor as soon as they know of a scheduling conflict.

General Advice:

Read the textbook regularly. For each hour of the lecture, you should read the corresponding sections of the book for at least 1 hr and spend another 1-3 hours solving homework problems - not necessarily only those problems that have been assigned. (Note: According to the Carnegie Rule, 8-12 hours of outside-of-classroom study time is required to succeed in a typical 4 hour/week college course.)

Pay attention to the way you write answers: in this course you have to show logic in your proofs, and to always highlight the main arguments.

Attend the lectures regularly! Attend office hours as much as possible - they can be amazingly helpful. To make the most of them, you should first read the text and try the homework problems yourself before coming to office hours.

Discuss the material/homework problems with other students in the class. Form study groups. Seek help through the NYU learning skills center (see below).

Other Resources:

1. The University Learning Center

<http://www.nyu.edu/ulc>

The NYU Learning Center provides free tutoring to all NYU students and runs drop-in individual tutoring sessions, group review sessions, as well as provides many skills workshops. The locations are the following:

- ULC@ARC, Academic Resource Center, 18 Washington Place, Lower Level.
- ULC@UHall*, 110 East 14th Street, top of stairs by UHall Commons.

For the group sessions, visit the website and: <https://www.nyu.edu/students/academic-services/undergraduate-advisement/academic-resource-center/tutoring-and-learning/group-review.html#stats>

2. The Math Undergraduate Tutoring Center

<http://math.nyu.edu/dynamic/undergrad/tutoring/>

Another free tutoring option is available to all NYU students through the Mathematics Department. Please visit the link above and click on the Room numbers to see the tutoring schedule. The tutoring sessions take place in Warren Weaver Hall, Room 505 and 524. No reservation needed!