

MATH-UA.325.003: Analysis I

Course Syllabus

Instructor:	Samuel Walsh (walsh@cims.nyu.edu)
Textbook:	<i>Real Analysis</i> , FRANK MORGAN American Mathematical Society, ISBN: 0-8218-3670-6
Lecture:	MW 9:30 AM – 10:45 AM in Silver 410
Recitation:	F 9:30 AM – 10:45 AM in Silver 410
Office hours:	TBD in WWH 1306
Website:	See site on Classes

Overview. Analysis is essentially the study of limits, but of course that's not really the whole story. More concretely, we will cover the following topics: construction of the real number system, countability/uncountability, topology, differentiation, integration, sequence, power series, and metric spaces. Many of these no doubt sound familiar to you from your Calculus courses. The point of this class is to approach the subject rigorously. What we will find is that the concept of a limit is much richer than even Newton and Leibniz appreciated.

There are many excellent introductory Analysis books. We will use *Real Analysis* by Frank Morgan. Please note that this is different from some other sections of the course. This is a fairly new book that has the advantage of being very concise and readable (and inexpensive). The downside, of course, is that it does not cover every topic in depth. This means that attending lecture is incredibly important! You will not learn everything you need to know by just reading the book. You will be told in advance what topics will be covered in the next class, and I highly suggest that you read the relevant section of the book in advance.

If you would like a reference that does cover everything in depth, the following books are standard choices:

- *Principles of Real Analysis*, W. RUDIN. This is perhaps the best book written on the subject. It is, however, relatively expensive and very dense.

- *Calculus*, M. SPIVAK. The material covered here is slightly less advanced than what we'll do, but the book is extremely well written and a good reference.
- *Mathematical Analysis*, APOSTOL. Also a classic, dealing with much the same material as Rudin. It is a matter of taste, but Apostol is often thought to be a hard book.

Office hours. There will be two office hours held every week in WWH 1306. This is a time when I am guaranteed to be in my office and ready to answer questions about the course. Please do not hesitate to make use of it. You can also email me to set up an appointment if you have a scheduling conflict.

Homework. The majority of your learning will come through completing the homework assignments. These will be assigned weekly and *collected Monday at the beginning of class*. You are highly encouraged to work together, but each student must write up his or her own; *do not simply copy one another*. Work that has been copied will not receive credit. Also, please remember that the grader has to be able to follow your thought process in order to award credit. It is incumbent on you to ensure that your assignments are readable, both in terms of legibility and intelligibility. Given the size of the course, and the speed at which we're going to be moving, *late homework will not be accepted*. In exchange, at the end of the semester the lowest homework score will be dropped.

Exams. There will be a midterm exam and a final. Both will have an in-class and a take-home part. The dates are as follows.

Midterm	Wednesday, March 6th
Final:	Wednesday, May 15th

There will be no makeups without a serious excuse (e.g., medical emergency), so please plan accordingly. The final exam will be cumulative.

Grading. Your final grade will be determined according to the following formula. Homework: 30%; Midterm 30%; Final: 40%. There will be a curve, but you will never receive a lower grade than justified by the standard NYU grading scale.

Academic Integrity. This is an advanced class and so we will be doing take-home exams, and much of your grade will be dependent on homework. Do not abuse this trust: cheating and plagiarism will not be tolerated. Copied homework assignments will be given no credit, and cheating on the exams — take-home or in-class — will result in serious penalty. See the homework section for advice on the correct way to collaborate on homework.