

## Syllabus

# MATH-UA 250 Mathematics of Finance

**Lectures:** Tuesdays, Thursdays. 5:30-6:45PM, CIWW 5117

**Recitations:** Fridays, 2:00- 3:15AM, CIWW

**Adjunct Professor:** Joseph Cerniglia, jac355@nyu.edu

**Office hours:** RM 620 CIWW, Tuesday at 3:45-4:45PM. Thursday at 6:20 -7:20 PM Also by appointment. We can communicate by email, phone, Skype, etc.

**TA:** Louis Guigo, lg2894@nyu.edu

**TA office hour:** TBD

**Grader:** Yuan Cheng, yc3682@nyu.edu

## Course description

- Introduction to the mathematics of finance. Topics include: Financial instruments pricing, time value of money, portfolio optimization, interest rates and a few finance practitioner oriented topics.
- Become familiar with the concepts of mathematical modeling and financial engineering
- Understand the mathematics used in finance: basic probability and calculus
- Write simple computer code to implement models and utilize real word data using R, Python, or Matlab

## Prerequisites

Multi-variable calculus, some prior knowledge of probability and statistics. Time will be spent reviewing basic concepts as needed during recitations.

## Computing

Several assignments will require some lightweight computing. Previous experience is not needed, but students should have some exposure to programming in R, Python, Matlab, etc. The R software is available as a [free download](#). Python is available as a free download <https://www.anaconda.com/download/> or try <https://www.python.org/>. If you have any questions regarding the programming, please email me. If desired, we can allocate recitation time to introduce students to basics of programming.

## Class Policies

***Preparing for class: Please read the sections of the book in advance of class. Our class time is best used for discussing ideas, doing examples, etc. It is intended to supplement the book, not to replace it. Ideas and examples are important; thus, to do well in this course you are strongly advised to come to every class.***

Recitations: The recitations are not lectures (they will not cover entirely new material). Rather, they provide an opportunity for practice, and for questions. Typically, the recitation instructor will ask you to consider questions related to the recent class material (perhaps similar to recent or current homework). Come to recitation prepared to think and talk as well as to listen.

Late Homework: Each homework assignment will have a due date (typically by the beginning of a particular class or recitation). Late homework will not be accepted. It is strongly recommended to turn in hard copy.

## Communication and announcements

Look there for important course announcements, in particular corrections to assignments. This site has a class message board that everyone in the class can see. If you have a technical question or comment, please post it there rather than sending an email to the instructor or the TA. That way everyone can see the question (and be grateful someone asked it) as well as the answer. If you think there is something wrong with the lecture notes or an assignment, please email me as soon as possible. The instructor and TA will check this site often to post replies. Please feel free to reply to other posts if you have something to contribute, even if it's just more questions. Polite and constructive feedback on the class also is encouraged. You can check your grades on Blackboard. If you are an NYU student not registered for the class, email the instructor for access. Please email the instructor or TA only for personal matters (schedule an appointment, request to submit an assignment late, etc.).

## Academic integrity

Please read the [NYU CAS academic integrity policy](#). All those rules apply to this class. Unless explicitly stated in writing on the assignment, all homework in this class is individual. Students may not hand in work they have copied from another source. Students are forbidden to allow their homework to be copied for the purpose of cheating. If assignments from different students have similarities that show one was copied from the other, both students will be penalized. This applies to written work and coding.

I will ensure that the work load is manageable by an individual student working independently. I will work with the grader and TA to identify violations. This will minimize the benefit of cheating and ensure that those who don't cheat are not at a disadvantage. I will listen to anyone's thoughts or complaints on this issue. Please let me know if the work load is unmanageable or if you suspect others of cheating.

## Tentative Schedule

*Please check the schedule often, I will continue to update it as the semester progresses.*

Week	Date	Reading	Concepts
Week 1	Sep 4 & 6	Intro, Ch 1	Overview, Markets, Time Value of Money
Week 2	Sep 11 & 13	Ch 2, Ch 4	Time Value of Money, Futures/Forwards
Week 3	Sep 18 & 20	Ch 5, Ch 6.1,6.2	Options - General, Binomial Model
Week 4	Sep 25 & 27	Ch 6	Binomial Model
Week 5	Oct 2 & 4	Review, Mid Term 10/04	Review, Mid Term
Week 6	Oct only 11	Ch 3	Portfolio Management
Week 7	Oct 16 & 18	Ch 3	Portfolio Management
Week 8	Oct 23 & 25	Ch 3, Ch 9	Portfolio Management/ Interest Rates
Week 9	Oct 30 & Nov 1	Ch 9, Review	Interest Rates/ Mid Term Review
Week 10	Nov 6 & 8	Mid Term 11/6, Ch 9	Mid Term / Interest Rates
Week 11	Nov 13 & 15	Ch 9,	Interest Rates/ Black Scholes
Week 12	Nov only 20	Ch 8	Black-Scholes

Week 13	Nov 27 & 29	Ch 8	Black-Scholes
Week 14	Dec 4 & 6	Ch 8	Black-Scholes
Week 15	Dec 11 & 13	Special Topics, Review	Special Topics, Exam