

Spring 2024

FIN 320-001: Fin Data Analytics

Yanguang Liu

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FIN DATA ANALYTICS

FIN 320 001

Spring 2024

Faculty Contact Information

Instructor: Dr. Alice Liu, Ph.D.

Office: 4033 SOM **Phone:** 973-596-3257 (office)

Email: yl224@njit.edu (*the best way to contact me*)

Class Time & Location: Tuesdays & Thursdays 8:30 – 9:50am; KUPF 108

Office Hours on Campus and Zoom: Tuesdays 4-5pm in office or by appointment (<https://njit-edu.zoom.us/j/9823062262?pwd=bHR4cUIHQW5QY1JSSmdTZU9sYldhUT09>)
Passcode: 001416

TA: Longzheng Chen (lc525@njit.edu) Office Hours: Thursdays 4-5pm in fourth floor at school of management

Course Overview

Data analytics have witnessed applications in many fields including finance. FIN320 will cover data analytics for common finance applications using popular programming languages, such as Python. Establishing quantitative views and mastering analytical approaches are critical nowadays for finance. This course will provide needed analytics training for this area. The main goal of this course is to give students exposure to core ideas in financial technology as well as develop hands on programming skills while implementing these ideas. Students are also encouraged to expand on areas of interest to them by visiting the Ray Cassetta Financial Analysis Lab to further research them using the Bloomberg Terminal.

Course Objectives

The main goal of this course is to give students exposure to core ideas in financial technology as well as develop hands on programming skills while implementing these ideas. Students are also encouraged to expand on areas of interest to them by visiting the Ray Cassetta Financial Analysis Lab to further research them using the Bloomberg Terminal.

- Develop programming skills in financial technology, such as Python
- Write custom Python code and use existing Python libraries to estimate risk and return parameters, and build better diversified portfolios.
- Gain an understanding of advanced data analytics methodologies, and quantitative modelling applied to alternative data in investment decisions
- Carry out in-depth investment analysis
- Present the investment analysis related to a real business world

Textbook: Python for Finance Analyze Big Financial Data, 2nd Edition, by Yves Hilpisch, published by O'REILLY, 2017 ISBN-13: 978-1491945285
ISBN-10: 1491945281

Recommended Financial Newspapers

Financial Times

The Wall Street Journal

Course Website

The Canvas site is where most course materials are posted. Make sure you have an NJIT UCID and password so that you are able to access Canvas. I will use Canvas to post announcements and learning materials throughout the semester. So, please be sure to check the site (canvas.njit.edu) frequently. Please contact helpdesk (973-596-2900) for problems associated with Canvas.

Since this is in-person course, you will have to take responsibility for spending the appropriate amount of time to learn the material and preparing for the class. *You should expect to spend at least 6-9 hours each week on the course.*

Course Deliverables/Final Grade Components

Your grade for this course will be based on the following components:

Grading Items	Total
Unit Exams	40%
FinTech Competition	20%
Lesson Exercises	30%
Lesson Discussions	10%
Total	100%
Bonus -Bloomberg Certificate	5%
Bonus-In-class exercise submission	3%

The scale used for grading (**NO curve**) is as follows:

A	90% - 100%
B+	85% - 89%
B	80% - 84%
C+	75% - 79%
C	70% - 74%
D	60% - 69%
F	Below 60%

Lesson Exercises

You will complete the lesson exercises at the end of each week. The exercise is the independent work and must be completed by Sunday of the week we cover the module. The lowest score of the quiz will be withdrawn.

Lesson Discussions

Lesson discussion postings are required of all students. Actively participating in all discussions is one of the best ways to help build a sense of community and collaboration. There will be a weekly topic that will be related to the course content or something that extends the course information to current financial market. You can also ask questions and reply to other students' questions related to our classes to participate in the weekly discussions. You must participate in these weekly discussions.

Your responses should be a minimum of 30 words and must be posted by **Friday at 11:59 pm**. So other students have time to read your post. You will also respond to at least one post from other students in the open discussion thread. These responses must be a minimum of 10 words. The post must be posted by **Sunday at 11:59 pm**. So, you need to have two posts each week.

Late posts are not accepted.

Unit Exams

You will complete **three exams**. The exam policy can be found in Canvas. The lowest score of the exam will be withdrawn. The exam dates are indicated in the course calendar and announced in Canvas. Please mark your calendar for the important exam dates!

FinTech Competition

Students work in a group (no more than 5 students) to conduct an investment strategy analysis using programming skills and tools learned in this course. Students will submit a **group report and conduct a group presentation in the end**. You are ultimately evaluated on the strength, creativity and depth of your analysis, not on how much money you make in your portfolio.

Make ups / Incompletes

We use the following late assignment policy:

Late policy: just the facts

- The cutoff for on-time submission is 11:59pm on the due date. Late days are counted in 24-hour periods. Submitting between 12:01am on the next day and 11:59pm the next day is one day late, and so on.
- You are given 3 "grace days" (self-granted extensions) which you can use to give yourself extra time without penalty.
- Instructor-granted extensions are only considered after all grace days are used and only given in exceptional situations.
- Late work handed in when you have run out of grace is discounted 10 % per day late.
- Every assignment/case/chapter end homework has a hard deadline, usually 3 days past the original due date. I will usually upload the answer key to assignments 3 days past the original due date, so late submissions (penalty or not) are not accepted after the hard deadline.

Late policy: long-winded version

The philosophy driving this late policy has three goals:

Discourage lateness. We want to provide incentives for you to balance your commitments and adapt/triage as

necessary to meet deadlines. We curtail lateness by providing only a limited amount of grace, applying a penalty for lateness beyond grace, and enforcing a hard deadline.

Empower you to make your own decisions. You decide when your situation warrants the use of a grace day.

Keep things fair. Students are allowed an equal amount of grace. Only a truly exceptional situation is granted extension beyond the grace days.

Self-granted extensions (AKA “grace days”)

Grace days are “self-granted extensions”. We recognize that the competing demands of a challenging course load and extracurriculars can be an unforgiving landscape and even the most careful of plans can be derailed by an unforeseen event. When the unexpected happens – you get the flu, the network goes down, you delete a critical file, a personal situation escalates – you would usually have to request an extension from the staff. Instead you are given the privilege to grant yourself an extension without our oversight. One grace day extends the deadline by 24 hours. Grace days are your means to cover real problems: illness, stolen laptops, bike accidents, and so on. We don't intend them to cover ski trips, overcommitment, or poor planning, but you can use them as you choose and we don't check up on you. You may use all of your grace days for one assignment, distribute them across several assignments, or even better, hoard them for a crisis that thankfully never comes.

Instructor-granted extensions

Grace days are extensions, no different than what would be given by the instructor (other than you have the authority to determine when one is warranted). Your first line of recourse when crisis strikes is always to grant your own extension through use of a grace day. A request for an instructor-granted extension instead of using your own grace days will never be approved. Only after you have exhausted all of your grace days in valid use should you request further accommodation. In those extenuating circumstances, please contact me, preferably in person.

Students often go to great lengths to meet deadlines and conserve grace days: pull all-nighters, ignore other classes, miss events they wanted to attend, work when feeling poorly, submit unpolished programs, or take penalty late days as a last resort. It would not be respectful of their efforts to hand out extra days to students who were less committed to meeting deadlines or not as cautious in conserving grace days. If asking for an instructor-granted extension, you will be expected to legitimize how all of your grace days were used, and make a compelling case for additional accommodation beyond the grace days everyone else receives. We use this information to find an appropriate balance between providing relief to you and maintaining fairness to others.

If 1/3 of the students in the whole class ask for an extension of the deadline, I can extend the deadline for the whole class.

Late work with penalty

When you are out of grace days, submitting late work will be penalized 10% per day. By this calculation, it is worth taking a penalty late day if you have significant work you can complete, but if you have only small details to polish, it is better to turn it in and move on.

Submitting late work

If you are choosing to use one of your grace days, you do not need to confirm with us, just submit your work normally and it will be time-stamped accordingly. Note that no assignments (penalty or not) will be accepted after the hard deadline.

Tips for Better Grades

Grades are a reflection of the level of understanding of course content. Therefore, to achieve the grade of A or B in this class expect to:

- Participate 100% of the weeks. During each week new content is introduced, explained and then applied for better understanding.
- Turn in all course deliverables in a timely and professional manner.
- Ask any and all questions in Canvas.
- Take the bonus assignment!

With less preparation and participation expect the grade of C or lower.

Classroom Policies

Success in business depends on the combined performance of the professional team, not the self-centered interests of one individual. Similarly, a good learning environment is collectively created and requires the contribution of ALL students within the class. To maximize classroom learning:

- **Engage in learning.** Actively contribute to discussion, exercises, and assignments.
- **Show respect.** Be respectful of others' thoughts and ideas.
- **Attendance Policy:** no classroom attendance is required but you will need to be present in the Canvas classroom each week.

Email Etiquette

- Put the course name **FIN 320 - XXX** in the subject line.
- Identify the subject of the e-mail with a brief but descriptive summary of the topic: include a proper salutation (e.g. Dr. Liu), and the assignment details such as the title, homework, or test.
- Conclude the e-mail message with a proper closing (e.g. Regards, Sincerely) and your full name.

Accommodations for Students with Disabilities

Students with special needs as outlined under the Americans with Disabilities Act should first register with the Counseling Center, 205 Campbell Hall 973 596-3414. Go to the web site <http://www.njit.edu/counseling/services/disabilities.php> for more information. If you wish to have a reasonable accommodation made for you in this class, please discuss the matter with me at the earliest possible time.

Academic Integrity

Learning is both an individual and a cooperative experience. Asking for and giving help freely in appropriate settings helps you learn. However, you should present only YOUR work as your own. University rules and standards define and prohibit “academic misconduct” by all members of the academic community including students. You are asked and expected to be familiar with these standards and abide by them. A link to the NJIT academic integrity policy can be found at:

<https://www.njit.edu/dos/code-student-conduct-article-11-university-policy-academic-integrity>

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at:

<http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu.

Expected Class Schedule

Please note that this is a tentative schedule. I reserve the right to adjust if necessary and new version will be announced and posted in Canvas. You are responsible for knowing what is in the latest version.

No.	Due Date	Assignment
PART I: Python Foundation		
UNIT 1		
1	Sunday 1/21	Syllabus & Module 1: Course Introduction Discussion
2	Sunday 1/28	Module 2: Python Variables and Data types Discussion and Exercise
3	Sunday 2/4	Module 3: Python Operator & Conditional Statement Discussion and Exercise

4	Sunday 2/11	Module 4: Python Functions & Sequences Discussion and Exercise
5	Sunday 2/18	Module 5: Using Iterations in Python & Advanced Python tools Discussion and Exercise
6	2/25	UNIT 1 Exam
PART II: FINANCE with Python		
7	Sunday 3/3	Module 6: Calculating and Comparing Rates of Return in Python Discussion and Exercise
8	Sunday 3/10	Module 7: Measuring Investment Risk Discussion and Exercise
9	Sunday 3/11-3/17	Spring Break No Class
10	Sunday 3/24	Module 8: Using Regressions of Financial Analysis Discussion and Exercise
11	Sunday 3/31	Module 9: Markowitz Portfolio Optimization Discussion and Exercise
12	4/7	UNIT 2 Exam
13	Sunday 4/14	Module 10: CAPM Discussion and Exercise
14	Sunday 4/21	Module 11: Multivariate Regression Discussion and Exercise
15	Sunday 4/28	Module 12: Monte Carlo Simulations as a Decision-Making tool Discussion and Exercise
16	Tuesday 4/30	FinTech Competition Presentation
16	Sunday 5/5	UNIT 3 Exam

Notes:

1. All assignments are due at midnight EST.
2. Upon the progress of the class, the instructor reserves the right to change the class schedule.
3. 01/22: Last day to drop a class.
4. 04/01: Last day to withdraw from a class.
5. More information about the deadlines:

<https://www.njit.edu/registrar/spring-2023-academic-calendar>

How to join the virtual office hours on Zoom:

Zoom: <https://njit->

[edu.zoom.us/j/9823062262?pwd=bHR4cUlHQW5QY1JSSmdTZU9sYldhUT09](https://njit-edu.zoom.us/j/9823062262?pwd=bHR4cUlHQW5QY1JSSmdTZU9sYldhUT09)

Meeting ID: 982 306 2262

Passcode: 001416

Dial by your location

- +1 309 205 3325 US