FINC672
Financial Data Analytics

Prof. Matt Fleckenstein
Email: mflecken@udel.edu
Office Hours: Tuesdays, 4.00pm-5.00pm, 310 Purnell Hall or by appointment.

COURSE DESCRIPTION

This course provides an overview of empirical research in finance, with an emphasis on modern data-driven methods. The course is organized into two parts. In the first part, students build foundational programming and data science skills in Python, with a practical focus on collecting, cleaning, transforming, and analyzing large financial datasets—skills that are increasingly essential in the era of big data and financial technology (FinTech). In the second part, students study widely used, state-of-the-art statistical methods in empirical asset pricing. Throughout the course, students apply programming tools and statistical techniques to real-world research questions in equity, derivatives, and fixed-income markets.

LEARNING GOALS

After completing this course, students will be able to:
- Write Python programs using core concepts, including data types, data structures, functions, control flow, and loops.
- Work effectively with tabular data structures (e.g., dataframes) for financial data analysis.
- Load, store, and manage large datasets; perform advanced data cleaning, conversion, and transformation for market and accounting data.
- Create clear, informative visualizations to explore data and communicate empirical findings.
- Retrieve financial data from online sources using web services/APIs and integrate those data into a research workflow.
- Construct and analyze stock portfolios and implement mean–variance portfolio optimization.
- Estimate and interpret the Capital Asset Pricing Model (CAPM) and multi-factor asset pricing models.
- Design, implement, and backtest systematic investment strategies using historical equity and fixed-income data.
- Compute and interpret performance and risk metrics to evaluate investment strategies and investment funds.

- Apply and evaluate a machine learning model for credit default prediction and interpret model outputs in a finance context.

CLASS TIMES

Section	FINC 672
Day(s)	Tue, Thu
Time	2.20pm-3.40pm
Location	Purnell Hall 114

OFFICE HOURS

Section	FINC 672
Day(s)	Tuesdays
Time	4.00pm-5.00pm
Location	310 Purnell Hall

PREREQUISITES

FINC 670 (Theory of Financial Decision Making) and ECON 622 (Applied Econometrics I) are prerequisites.

COURSE WEBPAGE

https://fleckenstein-m.github.io/FINC672-SP2026/

COURSE MATERIALS

All course materials will be posted on the course webpage at https://fleckenstein-m.github.io/FINC672-SP2026/.

ADDITIONAL RESOURCES

- Zherlitsyn, Dmytro (2024). Python for Finance.
- Lewinson, Eryk (). Python for Finance Cookbook – Second Edition
- Hilpisch, Yves (2018). Python for Finance, 2nd Edition.
- Pandas Cheatsheet.

GRADING POLICY

- Your final course grade is based on four components: (i) two midterm exams, (ii) a final exam, (iii) a class project, and (iv) class participation.
- Grades are assigned *on a curve*. This means your overall performance will be *ranked relative to other students* in the section(s), using the weighted components below.

ASSESSMENT WEIGHTS

- *25%* Midterm 1
- *25%* Midterm 2
- *25%* Final Exam
- *15%* Class Project
- *10%* Class Participation
- Your weighted total determines your *percentile rank*, which is then converted into a *final letter grade.*

Grade	Percentile Rank
A	94.0 and above
A-	90.0 to <94.0
B+	87.0 to <90.0
B	84.0 to <87.0
B-	80.0 to <84.0
C+	77.0 to <80.0
C	74.0 to <77.0
C-	70.0 to <74.0
D+	67.0 to <70.0
D	64.0 to <67.0
D-	61.0 to <64.0
F	<61.0

ASSESSMENT COMPONENT: CLASS PROJECT

Students will complete an empirical data-analysis project in Python that applies the tools and methodologies covered in the course. The project should be based on a finance-related research question (e.g., asset pricing, portfolio analysis, factor models, performance evaluation, or credit risk) and should involve obtaining, cleaning, analyzing, and clearly presenting results using real-world data.

Students are responsible for selecting an appropriate topic and dataset(s), implementing the analysis in Python, and communicating their findings in a professional format.

PROJECT PROPOSAL (REQUIRED)

Each student (or project team, if applicable) must submit a short project proposal outlining:

- *Research question and motivation:* What you plan to study and why it matters.
- *Data:* The dataset(s) you plan to use, including sources and key variables.
- *Methodology:* The main empirical approach and statistical/financial methods you plan to apply.
- *Planned outputs:* Proposed tables, figures, and performance metrics (as relevant).
- *Feasibility plan:* A brief timeline and any anticipated challenges (e.g., data access, computation).

Proposal due date: 2026-03-31.

ASSESSMENT COMPONENT: CLASS PARTICIPATION

- *Attendance*: You are required to come to class and be prepared to answer questions on the material.
- *Homework*: assignments will be given nearly every week. Assignments will be announced in class and posted on the course webpage. Homework will not be collected or graded; instead, it is designed to help you practice the concepts and techniques covered in lecture and to prepare for the exams.
- *Quizzes*: I also reserve the right to give in-class quizzes. Quizzes will be based on examples from the lecture materials and will be administered after the relevant topic has been covered and associated assignments have been posted.

EXAM SCHEDULE

1. Midterm 1

   - *March 3, 2026 (Tue)*
   - 2.20pm - 3.40pm; Purnell Hall 114

2. Midterm 2

   - *April 16, 2025*
   - 2.20pm - 3.40pm; Purnell Hall 114

3. Final Exam

   - *To bet determined by the Registrar's Office*
   - Time: TBD; Purnell Hall 114

POLICIES

FAIRNESS

I will make every effort to treat students with dignity and fairness and to be sensitive to the diversity that exists within the student body. Students with disabilities who request help will be given reasonable accommodation with the assistance of the Office of Disability Support Services (http://sites.udel.edu/dss). Please feel free to speak to me in private about any related issues.

ACADEMIC MISCONDUCT

Students are expected to abide by the University of Delaware Code of Conduct. Among other things, please do not submit plagiarized work or give or receive information during exams, and please provide proper acknowledgment in work when applicable. *Academic misconduct includes the use of websites such as CourseHero and Chegg.* The University's General Counsel has provided the following regarding such websites.

> *Notice: The University of Delaware owns a non-exclusive right to faculty materials that will be given to you during the course. These materials include ideas and comments provided by the instructor during class; test questions; handouts and course materials; and other materials representing the copyright-protected intellectual property of course instructors. You are prohibited from entering into relationships with web sites such as Course Hero, Notehall, or similar sites under which you agree, in exchange for the payment of a fee or salary, to post these materials online. Violations of this prohibition will be referred to the Student Conduct Office for investigation and disciplinary action under UD's Code of Conduct.*

CLASSROOM CONDUCT

Please silence all cell phones and do not text in class. Laptops and tablets will be permitted in class for note-taking purposes, but please do not distract your classmates by using your laptop to surf the internet or conduct other business during lectures. I reserve the right to ban the use of laptops and tablets if they become a distraction. I also ask that students remain professional and respectful during class discussions.

QUESTIONS OUTSIDE OF CLASS

For any questions that have not been sufficiently answered in class, please e-mail me or come to office hours.

ABSENCES FROM EXAMS

Absences from quizzes and exams will only be excused with written documentation from an appropriately accredited professional (e.g., a medical doctor).

UD ACADEMIC POLICIES

As a general rule, I will follow the University of Delaware's policies on any issues that are not spelled out in this syllabus.

THE SAFETY OF OUR LEARNING ENVIRONMENT

Student learning can only occur when students and their instructors feel safe, respected, and supported by each other. To ensure that our learning environment is as safe as possible, you are expected to abide by the most up-to-date University of Delaware's COVID-19 Guidelines,

ACADEMIC HONESTY

Please familiarize yourself with UD policies regarding academic dishonesty. The Academic Honesty Policy states: "Students must be honest and forthright in their academic studies. Students are expected to do their own work and must give proper credit for any work not their own. Students may neither give nor receive unauthorized assistance. Engaging in academic dishonesty, or allowing other students to do the same, corrupts the educational process and diminishes the quality of a University of Delaware degree." View theuniversity's procedures for resolving academic dishonesty concerns. Contact Community Standards & Conflict Resolution at communitystandards@udel. edu or (302) 831-2117.

UNAUTHORIZED RECORDING AND INTELLECTUAL PROPERTY

In accordance with the Student Guide to University Policies, students are prohibited from (1) unauthorized recording, entirely or in part, of any class, and (2) posting of notes, study guides, exams, answer keys or any other materials from a class (whether the student is enrolled in the class or not) on the Internet, whether or not for a fee, without express permission from the faculty member. Any questions regarding the Student Guide to University Policies should be directed to the University's Office of Community Standards & Conflict Resolution.

HARASSMENT, DISCRIMINATION, AND SEXUAL MISCONDUCT

The University of Delaware works to promote an academic and work environment that is free from all forms of discrimination, including harassment and sexual misconduct. As a member of the community, your rights, resources and responsibilities are reflected in the Non-Discrimination, Sexual Misconduct, and Title IX policy. Please familiarize yourself with this policy at the University's Office of Equity & Inclusion's website. You can report any concerns to the University's Office of Equity & Inclusion (302) 831-8063 or at kbuchko@udel.edu. You can report anonymously through UD Police (302) 831-2222 or the EthicsPoint Compliance Hotline. (Read the full policy; File a report.)

RESPONSIBLE EMPLOYEE DISCLOSURE STATEMENT

As a University employee, I must report any alleged violation of the Non-Discrimination, Sexual Misconduct and Title IX Policy. This means that if I become aware of any instance in which a member of our campus community, including students, may have experienced sexual misconduct—including sexual harassment, sexual assault, relationship violence (domestic or dating violence), or stalking — or any form of discrimination as outlined in the Policy, I am required to report the matter to the University's Title IX Coordinator. Once a report is made, the Title IX Coordinator will reach out to the affected party to provide information about their rights and options, available support resources, and how the University may respond to the report. The goal is to ensure the safety and well-being of both the individual and the broader campus community.

If such information is shared with me — whether during class, in a written assignment, or in a one-on-one conversation — I will respect your privacy. I will share the information only with the Title IX Coordinator.

For more information about the University's Non-Discrimination, Sexual Misconduct and Title IX Policy, support services, and reporting procedures, please visit www.udel.edu/sexualmisconduct. You may also contact the Title IX Coordinator directly at kbuchko@udel.edu. The University offers the following confidential resources:

1. TimelyCare provides 24/7 mental health support via telehealth for confidential crisis and victim support for survivors of all forms of sexual misconduct. Students can receive eight (8) free scheduled telehealth counseling sessions per year with a therapist of their choosing. Students can register for TimelyCare at https://www.udel.edu/students/health-wellbeing/counseling-center-services/timelycare/

2. If you need immediate counseling assistance after hours, TimelyCare: TalkNow offers unlimited free emergency virtual sessions within five (5) minutes of logging on. Available 24/7, TalkNow provides on-demand emotional support to talk about anything, including anxiety, relationships, depression and school-related issues. TalkNow can be accessed at https://www.udel.edu/students/health-wellbeing/counseling-center-services/timelycare/

3. Student Wellness & Health Promotion offers one-on-one appointments with a professional victim advocate or a dating violence counselor. The Victim Advocate is available for all UD students facing traumatic situations, including sexual assault, dating and domestic violence, sexual harassment, and stalking. The Victim Advocate also provides information on resources including professional advocacy, support groups and 24/7 crisis assistance. To contact the Victim Advocate, email victimsupport@udel.edu, use this link to schedule an appointment: Book an Appointment with me or visit https://www.udel.edu/students/support/victim-support-services/ for more information.

4. The Center for Counseling & Student Development Services provides individual and group counseling. The Counseling Center also offers walk-in hours Monday-Friday between 9:30am-4pm that are based on a first-come, first-served basis.

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

Any student who may need disability-related accommodations should contact the Office of Disability Support Services (DSS) office as soon as possible. For more information, please visitGetting Registered at DSS. Contact DSS by phone: 302-831-4643; fax: 302-831-3261; website:www.udel.edu/dss; email: dssoffice@udel.edu; or visit 240 Academy Street, Alison Hall Suite 130 during business hours (8-5 M-F).

NOTICE OF NON-DISCRIMINATION AND EQUAL OPPORTUNITY

The University of Delaware does not discriminate against any person on the basis of race, color, national origin, sex, gender identity or expression, sexual orientation, genetic information, marital status, disability, religion, age, veteran status or any other characteristic protected by applicable law in its employment, educational programs and activities, admissions, and scholarship and loan programs as required by Title IX of the Educational Amendments of 1972, the Americans with Disabilities Act of 1990, Section 504 of the Rehabilitation Act of 1973, Title VI and VII of the Civil Rights Act of 1964, and other applicable statutes and University policies. The University of Delaware also prohibits unlawful harassment, including sexual harassment and sexual violence.

For inquiries or complaints related to non-discrimination policies, please contact: Office of Equity & Inclusion- oei@udel.edu, (302) 831-8063

For complaints related to Section 504 of the Rehabilitation Act of 1973 and/or the Americans with Disabilities Act, please contact: Office of Disability Support Services, dssoffice@udel.edu, Alison Hall, Suite 130, Newark, DE 19716 (302) 831-4643 OR contact the U.S. Department of Education - Office for Civil Rights.