

# FINC672

## Workshop in Finance - Empirical Methods

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Prof. Matt Fleckenstein

Email: [mflecken@udel.edu](mailto:mflecken@udel.edu)

Office Hours: Tue/Thu, 1.00pm-2.00pm, 310 Purnell Hall or by appointment.

### COURSE DESCRIPTION

This course provides an overview of empirical research in finance. The course is divided into two main parts. In the first part, students develop fundamental programming knowledge and data science skills in the Julia programming language. This part of the course is an intensive introduction to procedures for collecting, processing and analyzing financial datasets, which have become increasingly important with the emergence and popularization of “big data” and “FinTech” in finance. The second part of the course covers widely used state-of-the-art statistical methodologies in empirical asset pricing. Students will learn to apply programming techniques to real-world empirical research questions in equity and fixed-income markets.

### LEARNING GOALS

After completing this course, students will

- have a thorough understanding of fundamental programming concepts in the Julia programming language including data types, data structures, functions, control flow and loops.
- understand tabular data structures and how Julia data frames are used in financial data analysis.
- be able to load and save large datasets into data frames, and apply advanced data conversion and transformation techniques to financial market data.
- have a thorough understanding of data visualization techniques.
- understand how to connect to and use online web services to download financial datasets.
- be able to form and analyze stock portfolios and implement mean-variance analysis.
- implement and estimate the Capital Asset Pricing Model (CAPM) as well as multi-factor models.
- implement investment strategies such as a momentum trading strategy.
- estimate performance measures to evaluate investment strategies and investment funds.
- understand the Value at Risk (VaR) measure and test it on real financial market data.

- be able to work with and analyze high-frequency financial market data such as tick-by-tick foreign exchange and Bitcoin data.

### CLASS TIMES

Section	FINC 672
Day(s)	Tue, Thu
Time	11.10am-12.30pm
Location	Memorial Hall 126

### OFFICE HOURS

Section	FINC 672
Day(s)	Tue, Thu
Time	1.00pm-2.00pm
Location	310 Purnell Hall

### PREREQUISITES

FINC 311 (Principles of Finance) and 314 (Investments) are prerequisites. A good understanding of basic algebra, calculus, and statistics is key to mastering the material covered in this course. It will also be useful if you already have some familiarity with: Present Value, compounding of interest rates, the CAPM, and Black-Scholes. If you are unfamiliar with these concepts, it will simply mean a little bit more work for you as we go through the associated topics in class.

### COURSE WEBPAGE

<https://fleckenstein-m.github.io/FINC672-SP2024/>

### COURSE MATERIALS

All course materials will be posted on the course webpage at <https://fleckenstein-m.github.io/FINC672-SP2024/>.

### Resources

- Kamiński, Bogumił (2023). Julia for Data Analysis.
- Storopoli, Huijzer and Alonso (2021). Julia Data Science..

## Cheatsheets

- Getting Started with Julia - live.
- Fastrack to Julia cheatsheet.
- Plots.jl Cheatsheet

## GRADING POLICY

Your final grade is based on i) two midterm exams, ii) a final exam, and iii) class participation. Grading is on a curve. This means that you will be ranked relative to all students in the sections based on your two midterms, the final exam, and class participation. The weighting shown below under Final Grade Breakdown determines your final rank among all students enrolled in the sections.

- 20% Class Participation
- 25% Midterm 1
- 25% Midterm 2
- 30% Final Exam

## EXAM SCHEDULE

### 1. Midterm 1

- *March 5, 2024*

### 2. Midterm 2

- *April 16, 2024*

### 3. Final Exam

- Date and Time set by Registrar's Office.

## ASSESSMENT COMPONENT: CLASS PARTICIPATION

You are expected to come to class and be prepared to answer questions on the material. *Homework assignments* will be given nearly every week and will be announced in class and posted on the course webpage. You are expected to work on the homework assignments in groups of three. Homework assignments must be submitted in class before the lecture starts on the date the assignment is due. In addition, I reserve the right to ask the groups to solve up to three questions from the homework assignments in front of the class. The groups can select the problems they would like to present. I also reserve the right to give *Quizzes* in class. These will not officially be announced beforehand. The in-class quizzes will be modeled on the examples in the lecture material after the topic is covered.

## 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.*

The use of ChatGPT (or other similar AI) to complete assignments, cases, or other parts of the course will be considered academic misconduct unless you personally wrote the underlying code to the AI.

### 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).

**Other 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. This includes, but is not limited to, UD's Title IX policies (<https://sites.udel.edu/sexualmisconduct/title-ix/>).

At Lerner College of Business and Economics, we celebrate diversity, amplify voices, and promote understanding and belonging through open dialogue, impactful initiatives, and engaging programs. In the classroom, we value human diversity in all its richly complex and multi-faceted forms – expressed through race and ethnicity, culture, political and social views, religious and spiritual beliefs, language and geographic characteristics, gender, gender identities, and sexual orientations, learning and physical abilities, age, and social or economic classes. Should you encounter any concerns or issues, particularly related to inclusivity or discrimination, we encourage you to reach out to your professor, the Office of Equity and Inclusion, and/or the Dean of Students for support and resolution. Discover more about our upcoming events by visiting the LDC Events page and take the step to pledge your commitment to diversity and inclusion by signing the Lerner Promise. For more information and/or to volunteer, please contact Professor Anu Sivaraman ([anusiva@udel.edu](mailto:anusiva@udel.edu)).

**ACKNOWLEDGMENTS**

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