

FINC672

Workshop in Finance - Empirical Research

Prof. Matt Fleckenstein

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Office Hours: Fridays, 8am-10am, 310 Purnell Hall or by appointment.

COURSE DESCRIPTION

The objective of this course is to provide an overview of empirical research in finance. This 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” 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 the equity markets 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 dataframes 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

- Day(s): Tue, Thu
- Time: 9.30am - 10.45am.
- Location: Purnell Hall 324A

OFFICE HOURS

Office hours will be held in person on Fridays from 8.00am to 10.00am in 310 Purnell Hall, or by appointment

COURSE WEBPAGE

<https://fleckenstein-m.github.io/FINC672-SP2023/>

COURSE MATERIALS

All course materials will be posted on the course webpage at <https://fleckenstein-m.github.io/FINC672-SP2023/>.

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 both sections based on your two midterms, the final exam, and quizzes. The weighting shown below under Final Grade Breakdown determines your final rank among all students enrolled in the sections I teach.

- 10% Class Participation
- 30% Midterm 1

- 30% Midterm 2
- 30% Final Exam

EXAM SCHEDULE

- Midterm 1
 - *March 7, 2023*
 - Time: 9.30am - 10.45am.
 - Location: Purnell Hall 324A.
- Midterm 2
 - *April 11, 2023*
 - Time: 9.30am - 10.45am.
 - Location: Purnell Hall 324A.
- Final Exam
 - *May 19, 2023*
 - Time: 10.30am - 12.30pm.
 - Location: Purnell Hall 324A.

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.

EXPECTATIONS

The Higher Education Act of 1965 (Amended) defines a credit hour as the following:

Credit hour: Except as provided in 34 CFR 668.8(k) and (l), a credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that reasonably approximates not less than (1) One hour of classroom or direct faculty instruction and a minimum of two hours of out of class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or ten to twelve weeks for one quarter

hour of credit, or the equivalent amount of work over a different amount of time.

This course is three credit hours. I expect you to: - Come to class with a copy of the lecture slides, ready to go through them. Prior to each class, I recommend skipping through the next 25 slides or so. - Review the lecture slides after we have gone over them in class, making sure that you understand what we went over in class. - Attempt the examples in the lecture slides. - To the extent that you do not understand some of the material, ask questions, either via e-mail (if the questions are short) or during office hours. If you have a long question, but cannot make regularly scheduled office hours, e-mail me to make an appointment and we will find a mutually agreeable time.

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 lecture. 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/>).

ACKNOWLEDGMENTS

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