Financial Data Analysis and Practice
Babson Finance 6200

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1 Course summary

This hands-on course teaches practical skills, reviews key issues of finance, trains students how to use different data sets for research, provides an introduction to the use of a Bloomberg terminal, provides an introduction to the Python computer language and environment, and provides some introduction to different aspects of the finance profession including ethics and compliance.

The main focus of this course is to teach students how to define and answer financial problems using financial data and/or analysis. Students will thus learn how to scope financial problems and then find, download, and analyze financial data, as well as how to read, interpret, and understand financial data analysis prepared by others. Different datasets, data sources, and analysis tools such as Bloomberg, CRSP, and WRDS will be introduced, and students are expected to be able to use find and download data from them on their own. Programming and statistics will also be reviewed.

In addition, students will be made aware of professional practices and standards in different financial professions to prepare students for rapid entry into the workplace, as well as an ethics and compliance module. At times, the course will mimic working in an actual workplace to provide a simulation of practical experience.

2 Learning objectives

The course is designed around helping students learn and successfully demonstrate application of (a) *technical skills in finance* in the service of (b) *complex financial problem solving* while upholding appropriately high (c) *ethical and professional standards*. (These three items are the key learning goals of the Babson MSF program.)

In this hands-on project- and skill-based course, MSF students will be exposed to key data sets across different areas, including (but not limited to) equities, bonds, and foreign exchange across a variety of US and international markets. Students will learn how to access, analyze, and use different data sets, as well as to understand key components of data infrastructure, such as the basics of company- and security-level data identifiers, US exchanges and trading venues, accessibility of key data sets, major data vendors, and licensing issues. Students develop their knowledge of Bloomberg, WRDS and CRSP, and other databases. Students will be exposed to programming in Python and should end the course

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[*]Information is subject to change. This version updated September 6, 2022.

with some familiarity with Python and basic programming skills. Students will be exposed to Bloomberg and should end the course with some familiarity with Bloomberg and its functionality. Specific skills in certain datasets will be covered and students will apply these skills to specific projects. An ethics and compliance module will be taught and covered. Interspersed throughout the course will be topics regarding financial practice and professionalism.

3 Course logistics

3.1 Class time and location

Classes will be held on Mondays and Wednesdays in the Cutler Center (Babson Commons 001), although some special sessions will be held at alternate times and locations to be announced in advance. Standard meeting times are Section 1: 8:15AM–9:30AM, Section 2: 11:45AM–1:00PM, and Section 3: 1:15PM–2:30PM.
Except with specific permission, students may only attend their registered section.

3.2 Instructor

Luke Stein can be contacted as follows:

- Via the course's Discord server: This is the preferred way to contact me for questions or comments that can be shared publicly, since other students may benefit from my response and resulting discussion

- Email: lcdstein@babson.edu (please include "6200" in subject)

- Phone: (781) 239-5060

- Office hours: By Appointment in Tomasso 224 or via Webex

I generally prefer that graduate students refer to me as "Luke" in class and other casual settings, but appropriate professional forms of address include "Dr. Stein" and "Prof. Stein." I use "he/him" pronouns.

3.3 Prerequisites

Registration is limited to Babson M.S. in Finance students; exceptions require instructor approval.

4 Course materials

Outside of the classroom, course materials will distributed in three ways

Canvas The course Canvas site will serve mainly to distribute non-public materials (e.g., lecture slides, homework), and to collect and grade submissions (including peer reviews). Please ensure you are receiving Canvas announcements).

GitHub The course GitHub page is where I will distribute links to useful resources, public material (including sample data and code), and maintain an updated course schedule.

Discord The course Discord server serves as a place to chat formally and informally about topics related to our class. Questions and comments can engage anyone in the class, and you can tag participants by name, section, or expertise. High quality, professional engagement through Discord (especially answering classmates' questions) is a component of good class participation.

4.1 Technology

In addition to technology available in the Cutler Center, and what is required to access and engage in class (access to the web and Discord), you will likely want to be able to access on a personal computer:

1. Microsoft Excel.

2. Standard, freely available data science software tools to be discussed in class including Python (and various related packages including pandas, NumPy, and Seaborn) and a text editor or software development environment.

4.2 Books and resources

Many resources will be useful in the course, and will discussed in class, posted, and/linked online. In addition several books will be useful; links to each are on the course GitHub page

4.2.1 Required text

- "Introduction to Modern Statistics" (1st ed.), Mine Çetinkaya-Rundel and Johanna Hardin. Freely available on web, or purchase PDF or print edition.

4.2.2 Recommended texts

- "Think Python" (2nd ed.), Allen B. Downey. Freely available on web or PDF, or purchase print edition. This is recommended for new Python programmers, and especially those without much programming experience generally.

- "A Whirlwind Tour of Python," Jake VanderPlas. Freely available on web. This is recommended for more experienced programmers, or as an efficient review/reference after working through more basic Python texts.

- "Python Data Science Handbook," Jake VanderPlas. Freely available on web, or purchase print edition. A key resource and reference for moving from basic python into more analysis-focused tools.

- "Introduction to Python for Econometrics, Statistics and Data Analysis" (5th ed.), Kevin Sheppard. Freely available PDF. Another treatments of these topics, with paired video lessons.

- "Coding for Economists," Arthur Turrell. Free website. An application-focused approach suitable for complete beginners who have never written any code before, with a number of worked examples. Has useful, opinionated, up-to-date advice on actually setting up a technology stack.

4.2.3 Other optional texts

- "Python for Data Analysis" (2nd ed.), Wes McKinney. Available only as purchased print edition. The classic book on classic tools for using Python for Data Analysis. Goes into more detail on some topics than PDSH, but may be harder to follow as an introduction.

- "Data Analytics Using Microsoft Excel With Accounting and Finance Datasets" (v. 2.0), Joseph M. Manzo. Available only for purchase on web, PDF, or print. We will be using Excel throughout the course, where I will generally assume familiarity with basic functions and cover some more advanced ones (such as Pivot Tables) in class. Students looking to improve their skills or for a refresher may wish to consider this book, which has been used in FDAP in the past and (unlike many more generic Excel books) focuses on finance applications.

5 Grading and course deliverables

Your course grade will be calculated as follows:

Component	Type	Weight	Due Date
Class participation and professionalism	In class and on Discord	20%	Throughout
Homework and peer review	Online submission	10%	Throughout
Microsoft Excel Collegiate Challenge	Participation	5%	9/14–10/9
Midterm project (group)	Written report	10%	10/23
Professional ethics module	In class and written report	10%	10/24–10/31
Final project (group)	In-class presentation	15%	12/5
Market report (individual)	Written report	15%	12/6
Final examination (take-home)	Online submission	15%	12/7–12
Total		*100%*	

Graded components and/or final course grades may be adjusted (i.e., "curved"), but will only be "curved up." That is, any such adjustment will guarantee that an unadjusted grade of 90% corresponds to an A– or better, 80% to B– or better, and 70% to C or better. Any "curve" will therefore only help you relative to a traditional numerical rubric; you will never be "curved down." Information about such a "curve" will *not* be provided during the semester; grades will only be adjusted (at the instructor's discretion) after the final examination.

You are responsible for retaining copies of all your submitted work until final grades are submitted, and resubmitting or returning it to the instructor on request.

5.1 Class participation and professionalism

Students should be prepared and actively participate throughout the semester in the classroom and through the course Discord; high quality participation demonstrates thoughtful preparation for class and a knowledge of relevant current events, as well as engagement with in-class material. My goal is to see overall evidence of demonstrated commitment to learning and helping your classmates learn, which you can do in a variety of ways; I am looking for consistency and quality rather than quantity.

5.2 Homework and peer review

Approximately eight weekly homework assignments will be posted on Canvas, where they will also be submitted. Deadlines will be indicated on Canvas (typically Sundays at midnight). You will also need to conduct brief peer reviews of classmates' homework submissions, which will be assigned via Canvas. You should be prepared to discuss homework assignments in class any time after their due date.

Homework assignments are designed principally for learning, not assessment. You are welcome (and even encouraged!) to consult with classmates, but you must write and submit all your own work individually. You should cite all collaborators by name in your submission.

You are explicitly prohibited from accessing or consulting prior-year Finance 6200 homework assignments or solutions (including either students' or sample solutions).

5.3 Microsoft Excel Collegiate Challenge

All students are expected to participate in the "Training Ground" and Round 1 of the Microsoft Excel Collegiate Challenge. Round 2—and hopefully the finals—are optional but recommended. You may register individually or with a team. Your performance in the challenge will not count towards your course grade, but participation (including appropriate contribution to a team effort) will is required to receive credit for this deliverable.

5.4 Midterm group project

A midterm project will be assigned and submitted via Canvas.

The project is designed for a mix of learning and assessment. You must complete it independently from other groups. You should not seek assistance from anyone outside your group (whether in the class or not) except for the instructor, including posting questions on course-related topics or soliciting feedback on your work.

5.5 Professional ethics module

You will be asked to prepare readings for discussion during an in-class module on professional ethics. There will also be a written deliverable addressing a practical ethical issue faced by financial professionals. You will be graded on the quality of your preparation and contribution to in-class discussion, and on your written deliverable.

The written deliverable is designed for a mix of learning and assessment. You must complete it entirely independently.

5.6 Final group project

A final project will be assigned via Canvas. Each group will choose a topic relevant to the assignment, and will present their findings in class.

The project is designed for a mix of learning and assessment. You are welcome (and even encouraged!) to consult with classmates, but the presentation and supporting analysis must be prepared solely by members of your group.

5.7 Market report

You will be asked to choose a financial market and write a data-based report on it. The specific assignment will be described on Canvas, where you will submit your report.

The project is designed for a mix of learning and assessment. You are welcome (and even encouraged!) to consult with classmates on your project, but you must write and submit your own work.

5.8 Final examination

The class will end with an individual, take-home final examination, which will be assigned and submitted via Canvas. You will have several days to complete the examination.

The final examination is designed principally for assessment, and it will be entirely "open note"—you can use any pre-existing resources—but you must complete it entirely independently. You should not seek assistance from anyone (whether in the class or not), including posting questions on course-related topics or soliciting feedback on your work.

6 Course policies

6.1 Classroom policies and professionalism

As a general rule, I ask that you demonstrate appropriate respect and professionalism. More specific classroom policies will be established and enforced only if this guiding principle proves insufficient to ensure a productive learning environment.

Announcements will be distributed via the course's Discord server and/or Canvas. Please ensure that you are signed up there for your enrolled course section, with notifications turned on (for example, for the Discord #announcements channel) as appropriate. You should not assume that class is cancelled without notice unless I (or any alternative instructor) have not arrived by 15 minutes past the scheduled class time.

Course content, including lectures, may be copyrighted material and students may not sell notes taken during the conduct of the course. Course material including lecture recordings may not be distributed except with specific permission.

6.2 Attendance policy

The Graduate School does not require class attendance with the exception of students taking classes in the Blended Learning format. Although attendance in class is not mandatory, faculty members may and often do include class participation as a significant component in calculating a student's course grade. Therefore, students should plan to attend all class sessions,[1] whether in person or virtual, to avoid negative impact on their grade—including failing the course. It is the student's responsibility to notify the faculty before being absent unless the student is unable to do so (e.g., due to extreme illness or accident).

6.3 Academic integrity and ethical behavior

Students are expected to hold themselves to the highest standard by committing to making ethical, well-informed decisions in and outside of the classroom. Students are held to the behavioral expectations as outlined in Babson College's Student Code of Ethics, which includes Academic Honesty & Integrity.

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[1] Please however note Section 6.4 on accomodations, as well as Massachusetts General Laws Chapter 151C, Section 2B: "Any student in an educational or vocational training institution, other than a religious or denominational educational or vocational training institution, who is unable, because of his religious beliefs, to attend classes or to participate in any examination, study, or work requirement on a particular day shall be excused from any such examination or study or work requirement, and shall be provided with an opportunity to make up such examination, study, or work requirement that he may have missed because of such absence on any particular day; provided, however, that such makeup examination or work shall not create an unreasonable burden upon such school. No fees of any kind shall be charged by the institution for making available to the said student such opportunity. No adverse or prejudicial effects shall result to any student because of his availing himself of the provisions of this section."

As noted in the Graduate Student Handbook, "You are required to know the policies and procedures set forth in both the Graduate Student Handbook and Babson College Student Code of Ethics"; failure to take appropriate steps to fully understand the Code of Ethics will be neither an acceptable nor tolerable excuse for any Academic Integrity violation.

Your expressed commitment to understand and abide by the Code is a requirement of your continued enrollment at Babson, and you will be asked to reaffirm your understanding of and commitment to Babson College's Student Code of Ethics throughout your time as a Babson student.

Academic integrity is important for two reasons. First, independent and original scholarship ensures that students derive the most they can from their educational experience and the pursuit of knowledge. Second, academic misconduct violates the most fundamental values of an intellectual community and diminishes the achievements of the entire college community. Accordingly, Babson views academic misconduct as one of the most serious violations of the College's expectations that a student can commit while at Babson College. Specific behaviors that constitute academic misconduct, as defined in the Code, are *cheating, fabrication, facilitating academic dishonesty, plagiarism, participation in academically dishonest activities, and unauthorized collaboration.* In the instance I am presented with evidence to suggest that you engaged in any of these behaviors, I will refer the incident to the Office of Community Standards for review.

If you have questions relative to academic integrity expectations within the context of a particular assignment, please ask me directly. General questions can be directed to communitystandards@babson.edu.

6.4 Accommodations

Any student who faces a conflict between the requirements of a course and the observance of their religious belief, should contact the instructor early in the semester. In such an event, reasonable accommodations will be provided to the extent they do not create an unreasonable burden on the College.

Any student who may need accommodation(s) based on the impact of a disability should contact the Department of Accessibility Services (DAS) as early in the semester as possible. Accessibility Services staff may be reached by email at accessibility@babson.edu, by phone at 781-239-5509, or by visiting Hollister Hall, Suite 220. Accessibility Services staff will coordinate reasonable academic accommodations for eligible students.

Accomodations may be appropriate in other settings. Any such accommodation should be requested in writing as soon as possible (ideally at least one week in advance).

6.5 Inclusive learning community

Babson College is committed to providing an exceptional educational experience for entrepreneurial leadership and participation in a diverse society to a student population that reflects the full diversity of this country and the world. This commitment is achieved through creating a climate that supports and celebrates diversity, social justice, and an appreciation of our global interdependence to find solutions to big problems based on a diverse range of perspectives. Babson College is committed to establishing and maintaining an environment free of all forms of harassment and discrimination for all College community members. Faculty strive to create and maintain an inclusive classroom experience where students feel comfortable engaging in deep, thought-provoking conversations while being respectful of each other and engaging in discussions that are inclusive of all of our identities.

7 Course schedule

This schedule should be considered *preliminary*, and will change during the semester. Topics and material may change based on class pace and interest.

Meeting	Date	Topics/Modules	Deliverable
	9/5	*No class (Labor Day)*	
1	9/7	Course introduction	
2	9/12	S1	HW1
3	9/14	P1	Peer review
4	9/19	cont.	HW2
5	9/21	P2	Peer review
6	9/26	cont.	HW3
7	9/28	cont.	Peer review
8	10/3	A1	HW4
9	10/5	P3, D1	Peer review
	10/6		Excel CC 0
	10/10	*No class (Indigenous Peoples' Day)*	Excel CC 1
10	**10/11**	*Tuesday class* S2, P4	
11	10/12	A2, D2, S3	
	10/15		Excel CC 2 (opt.)
12	10/17	P5	HW5
13	10/19	S4, D3	Peer review
14	**10/24**	*Meeting 8:15–10:00am or 12:45–2:30pm* A3	Midterm project
15	10/26	S5	
16	**10/31**	*Meeting 8:15–10:00am or 12:45–2:30pm* A3	Ethics report
17	11/2	S6, A4	
18	11/7	A5	HW6
19	11/9	P6	Peer review
20	11/14	A6	HW7
21	11/16	cont.	Peer review
22	11/21	D4	
	11/23	*No class (Thanksgiving break)*	
23	11/28	A7	
24	11/30	A8	
25	12/5	Group presentations	Final project
26	12/7	Group presentations *(Final exam distributed)*	Market report

	12/12	*No class (Final exam due)*	

(Final exam distributed)

Modules

Python

Module	Topic	Resources
P1	Introduction to Python	TP 1–3, 8, 10–12 WTP 1–7 CfE Getting Started 1, Coding 3, Getting Started 2.1–2.8 PESDA 2, 4, 10 PDA 2.3, 3.1
P2	Control flow and data structures	TP 5–7 WTP 8–14 CfE Getting Started 2.9–2.16 PESDA 12 PDA 3.2
P3	Data manipulation	PDSH 3 PESDA 8–9, 16 CfE Data 1, Data 2 PDA 5, 7–8, 10-12
P4	Visualization	PDSH 4.14 Seaborn Tutorial API overview and Plotting functions
P5	Regression and statistics	PESDA 21
P6	Numerical Python	PDSH 2 PDA 4 PESDA 3, 11, 19

Statistics and Inference

Module	Topic	Resources
S1	Introduction to data	IMS 1–3
S2	Exploratory data analysis (EDA)	IMS 4–6
S3	Regression modeling	IMS 7–10
S4	Foundations of inference	IMS 11–15
S5	Statistical inference	IMS 16–23
S6	Inferential modeling	IMS 24–27

Financial Data

Module	Topic	Resources

D1	pandas-datareader	[datareader documentation](#)
D2	Bloomberg	TBA
D3	WRDS	[WRDS](#) Data documentation, Classroom, Research [WRDS Python Data Access Library](#)
D4	Alternative data	TBA

Microsoft Excel

Excel will be used throughout the course, with coverage not divided into explicit modules.

Financial Applications

Module	Topic	Resources
A1	Fixed income	TBA
A2	Equity returns	TBA
A3	Professional ethics	TBA
A4	Foreign exchange	TBA
A5	Factor models	TBA
A6	Capital budgeting	TBA
A7	Derivatives	TBA
A8	Equity portfolios	TBA

This project is maintained by [lukestein-classes](#)