

MFE 230A: Investments and Derivatives

Spring 2026: Term 1

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Office hours: Thursdays, 4–5PM, F686 or Zoom [or by appointment]
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Exceptions: 4/16 (by appointment that week)

Class times: Tuesdays & Thursdays, 10:00AM–12:00PM, F320

GSI: William Zhang
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Sections: Fridays, 1:00PM–2:30PM, F320

Office hours: Fridays, 2:30–3:30PM, F605 or Zoom [or by appointment]

Overview: The first part of the course provides an intermediate introduction to investments and asset pricing. We start with a foundational approach to financial markets, introducing questions on portfolio choice and the determinants of assets' prices and returns. We next analyze investor preferences and decision-making under risk, covering expected utility, mean-variance utility and other preference specifications, risk aversion, and risk rankings. We then analyze the general portfolio choice problem in mean-variance and more general settings. Building on these results, we study some workhorse asset-pricing models: the Capital Asset Pricing Model (CAPM), the Arrow-Debreu economy, the Lucas economy, the consumption CAPM, and Arbitrage Pricing Theory (APT). We relate these models to real markets and discuss market efficiency, asset-pricing puzzles and anomalies, and factor models. Our main focus is on stocks and bonds, but we also discuss other assets. We will spend between 2/3 and 3/4 of the term on this part of the course, as it provides a foundational understanding of risk, return, and portfolio choice.

The second part of the course analyzes financial derivatives markets. We cover forwards, futures, swaps, and options, with a focus on how to price these assets using arbitrage theory. These instruments allow one to tailor the amount and kind of risk one takes, including those associated with changes in interest rates, exchange rates, stock prices, commodity prices, default probabilities, and inflation. We discuss how derivatives can be used to achieve various hedging and speculative objectives and study applications

of derivative-pricing techniques, within and outside of derivatives markets. This part of the course has some overlap with MFE230Q, which provides a more technical treatment of arbitrage theory, whereas our focus in this course is more on introductory intuition and actual pricing formulas. A more advanced treatment of practical implementation and more complex models are offered in MFE230D.

Course material: We will use bCourses for course logistics, announcements, and grades. All other course materials, including lecture slides, accompanying sets of notes, and problem sets, will be uploaded to Box.

Required texts: Johan Walden, *Quantitative Finance*, 2026 (PDF).
Jean-Pierre Danthine & John B. Donaldson, *Intermediate Financial Theory*, 3rd ed., 2014 (Academic Press).
John C. Hull, *Options, Futures, and Other Derivatives*, 10th or 11th ed., 2017/2021 (Pearson).
Recommended: John Campbell, *Financial Decisions & Markets*, 2017 (Princeton).

Optional texts: John H. Cochrane, *Asset Pricing*, 2005 (Princeton).
Kerry E. Back, *Asset Pricing and Portfolio Choice Theory*, 2nd ed., 2017 (Oxford).
Jonathan E. Ingersoll, *Theory of Financial Decision Making*, 1987 (Rowman & Littlefield).
Tomas Björk, *Arbitrage Theory in Continuous Time*, 4th ed., 2020 (Oxford).
Mark Rubinstein, *Rubinstein on Derivatives*, 2000 (Risk).
Zvi Bodie, Alex Kane, & Alan Marcus, *Investments*, 12th ed., 2021 (McGraw Hill).

Grading: Course requirements include attendance and participation in class, four assignments, a midterm exam, and a final exam. Questions about the grading of any exam or assignment, including regrade requests, must be made in writing within one week of the time that the exam or assignment is returned to you. Except for questions related to the final exam, all questions should be directed to the GSI. The following weights will be used to determine grades:

- 5% Attendance & participation
- 20% Assignments
- 30% Midterm exam
- 45% Final exam

Grade option: In addition, students have the option of dropping the midterm grade and having the final count for 75% of the course grade. In other words, students who are unhappy with their midterm exam grade are able to substitute the final exam grade in place of the midterm grade. This option is **automatically** invoked at the end of the course if and only if it will benefit the student. Midterm participation is **mandatory** in order for this option to be invoked; you cannot miss the midterm exam.

Attendance: Please attend all classes, and be in your seats at the beginning of the lecture time. Naturally, a few students may miss class or arrive late on rare occasions due to illness or emergency. Please inform us with a short email if such an occasion arises.

The use of phones during class is prohibited, and the use of laptops, tablets, or other devices is discouraged and only allowed for notetaking. If laptops or tablets become a distraction, we will prohibit all devices for the remainder of the term (with the exception of approved accommodations).

Students who attend class regularly (missing no more than one or two lectures) and participate attentively should expect full credit for the attendance and participation portion of the course grade.

Assignments: There are four written problem sets. Students are allowed to work in small groups of no more than four people total. A group should submit a single copy of their work with names of all group members listed. While you may collaborate, each of you should fully understand how to solve each problem. You must solve all problems and write up solutions by yourselves; this is the best way to prepare for the exams. Late assignments will not receive credit. The assignments are due on the following dates, at the beginning of class:

- Assignment 1: April 2
- Assignment 2: April 14
- Assignment 3: April 30
- Assignment 4: May 12

Midterm: There is an in-class midterm exam on **Thursday, April 23, 10:00AM–12:00PM**. All students must take the exam at this time — no exceptions (even if you think you might drop the midterm grade). The exam is closed book, but you may bring two pages of notes (double-sided, either handwritten or typed) for the exam. You will need a basic calculator that can compute logarithms.

Final: There is a three-hour final exam scheduled on **Tuesday, May 19, 10:00AM–1:00PM**. All students must take the exam at this time. The exam is closed book, but you may bring four pages of notes (double-sided, handwritten or typed) for the exam. The location will be announced when it is available.

Guest session: On **Tuesday, April 28, 4:00–5:15PM**, there will be an optional session outside of regular class time with practitioners from **BlackRock** and the **UC Investments Office** (which manages the UC system’s endowment). Speakers will discuss how frameworks from class — portfolio construction, asset allocation, factor models — translate to real-world practice. The session will be in person, with a remote option for part-time students.
(Optional, recommended)

Accommodations: If you have or think you may have a disability, you can work with the Disabled Students’ Program (DSP) to determine any accommodations you may need. If you have accommodation needs, please submit your DSP letters of accommodation as soon as possible, and at least two weeks before an exam. If you anticipate or experience any barriers to learning, please feel free to discuss your concerns with me, the GSI, or the program office.

Ethics & AI use: Students who take this class are bound by the [Berkeley Honor Code](#). Students are only allowed to work together in small groups for homework assignments, but each student is still responsible for understanding and being able to complete the problem set on his or her own. Students are allowed to consult all the material provided in the course, but are not allowed to use any external material that resembles a “solution” to an assignment, or any online tools that might serve as aids in generating a solution, except as explicitly permitted by the AI policy below. Students are also allowed to discuss course material with each other. However, outside of one’s own small group, any such help must stop far short of hinting at or providing the solution to an assignment. Any test or assignment submitted by you and that bears your name is presumed to be your own original work.

AI policy: You must understand and be able to explain everything you submit. AI tools may be used for **limited, restricted purposes**: clarifying concepts (as you would consult a textbook or classmate), grammar and spelling assistance, and other uses if explicitly specified on individual assignments. If an assignment permits AI for coding, you **must** write your own code comments to show your understanding of the steps, and note any AI tools used at the end of your submission. Written responses to problem set questions must be entirely your own; this is the best preparation for exams. AI is **strictly prohibited** on exams and for any purpose not explicitly permitted. You may be asked to explain your work if unauthorized AI use is suspected. Violations will be treated as breaches of academic integrity.

We ask students to refrain from behavior that has been demonstrated to interfere with a positive classroom experience. This especially includes holding any type of side conversation. The use of phones is prohibited, and the use of laptops and tablets is discouraged; see the **Attendance** section above for details on the device policy.

Part-time students: This course will use Honorlock to proctor your remote exams. Honorlock may record your webcam, audio, and screen. Ensure that your computer meets the [requirements](#). You may need to present a photo ID. If you are unable to use Honorlock, please let us know as soon as possible so we can refer you to an appropriate workaround (e.g., DSP proctoring).

Schedule: Below is a course outline. For each lecture’s listed readings, read the assigned chapters in advance. Chapters refer to Walden (W), Danthine and Donaldson (DD), and Hull (H). Some topics may run over to the next classes. We may accordingly fall behind the listed schedule at some points and catch up thereafter. Given this, it is possible that **assignment due dates may change during the semester**. I will let you know in advance if this is the case.

Course schedule outline

Part 1: Investments

Class 1 (3/24)	Topics	Introduction to investments, preferences
	Reading	(W) Chapter 2, 3.1 Class notes
Class 2 (3/26)	Topics	Preferences <ul style="list-style-type: none">• Expected utility, risk aversion, CRRA, CARA• Ranking of risks
	Reading	(W) Ch. 3 (remainder) (DD) Ch. 3–4
Class 3–6 (3/31–4/9)	Topics	Portfolio choice <ul style="list-style-type: none">• Modern portfolio theory• Portfolio separation theorems• Long-term investments under uncertainty• Universal portfolios
	Reading	(W) Ch. 4 (DD) Ch. 5–7
	Assignments	Assignment 1 due 4/2
Class 7–9 (4/14–21)	Topics	Asset pricing: Intro & core models <ul style="list-style-type: none">• CAPM, Black-Litterman model• Lucas economy
	Reading	(W) Ch. 5.1–5.4 (DD) Ch. 8–9
	Assignments	Assignment 2 due 4/14
Class 10 (4/23)	<hr/> Midterm exam <hr/>	
Class 11 (4/28)	Topics	Asset pricing: Advanced models <ul style="list-style-type: none">• CCAPM• APT
	Reading	(W) Ch. 5.4–5.5 (DD) Ch. 10–11, 14 <i>Optional: Guest session with BlackRock & UC Investments (4/28, 4:00–5:15PM)</i>

Course schedule outline (*continued*)

Part 2: Derivatives

Class 12–13 (4/30–5/5)	Topics	Introduction to derivatives markets and prices <ul style="list-style-type: none">• Forwards, futures• Swaps• Vanilla stock options• No-arbitrage pricing relations• Replicating strategies
	Reading	(W) Ch. 10.6 (H) Ch. 2–7, 10–12
	Assignments	Assignment 3 due 4/30
Class 14–15 (5/7–12)	Topics	Derivatives pricing models, extensions <ul style="list-style-type: none">• Black-Scholes model• Binomial model• Option Greeks and applications• Jumps, stochastic volatility (<i>preview, if time</i>)
	Reading	(W) Ch. 9.5, 13 (H) Ch. 13–15, 19, 27
	Assignments	Assignment 4 due 5/12
Final (5/19, 10AM)		———— Final exam ————
