



Instructor:

Prof. Lu Zhang
Department of Finance
Fisher Hall 760A
585-267-6250 (cell, emergency only please)
Email: zhanglu@fisher.osu.edu (preferred mode)
Office Hours: By appt, very flexible, Zoom/in-person

Class Meeting Schedule:

Session (5350): TuTh, 1:00--2:30pm, in-person, Gerlach 355
Session (4570): TuTh, 4:30--6:00pm, in-person, Gerlach 305
Session (4844): Th, 6:15--9:30pm, CarmenZoom

Course Materials:

Required: **Bodie, Kane, and Marcus, 2024, *Investments*, 13e, McGraw-Hill.** This book (BKM) is the standard Investments text for all top business schools. Earlier versions of the textbook are likely cheaper. You can use earlier versions for our class if you wish. The course Web site in Carmen contains: (i) lecture notes; (ii) some additional readings in pdf format; (iii) suggested questions for the HBS case; and (iv) weekly quizzes. Students are responsible for obtaining these essential course materials from the Carmen course Web site.

Course Description: This course studies the theory and practice of investment management. The course is applied and quantitative, as concepts and empirical methods are applied to real data.

Prerequisites: Students are required to have completed an introductory finance course and basic probability and statistics. The field of investments is inherently quantitative. Some familiarity with matrix algebra will be useful but is not required. Basic statistics is more essential because statistical tools are used in virtually all lectures throughout the course (well, stock returns are random). Statistics knowledge should extend through multiple regression, covariance, and hypothesis testing.

Course Learning Outcomes:

By the end of this course, students should gain expertise to:

- Explain risk aversion and utility; implement the concept of risk aversion in measuring a utility function and summarize how risk aversion affects allocation; work with a portfolio that allocates funds between a risky asset and a risk free asset; and interpret how leverage could be used in allocation
- Calculate standard deviation and return for two-security portfolios and find the minimum variance combinations of the two securities; explain systematic and firm-specific risk; demonstrate how diversification can reduce the amount of firm-specific risk in the portfolio by combining securities with differing patterns of returns; quantify this risk-reduction concept by calculating and interpreting covariance and correlation coefficients; and conceptualize the importance of diversification
- Explain systematic and firm-specific risk and how one can reduce the amount of firm-specific risk in the portfolio by combining securities with differing patterns of returns; if the portfolio is adequately diversified and firm-specific (or nonsystematic) risk is virtually eliminated, beta (or systematic risk) becomes the relevant risk measure for the portfolio; identify inputs required to use index models and interpret the security characteristic line
- Explain the Capital Asset Pricing Model (CAPM) and construct and use the security market line

- Summarize how to structure asset pricing tests; identify major anomalies in returns on securities; explain the role of microcap stocks and related measurement problems in asset pricing tests
- Explain factor models and the arbitrage pricing theory (APT); use APT to identify mispriced securities; interpret the similarities and differences between the CAPM and APT and the limitations of each; have the knowledge of and be able to implement the state-of-the-art multifactor models on real data
- Explain market efficiency and how to make rational decisions based on efficient markets; summarize the basic theories of behavioral finance; summarize the basic ideas behind the investment, return on equity, and expected growth factors in the investment CAPM and use the q -factor model
- Calculate risk-adjusted return measures and to evaluate investment performance; implement a style analysis; decompose excess returns into components attributable to asset allocation choices

How This Course Works:

Mode of delivery: The online sessions are 100% online. You will find a sequence of materials and activities each week in Carmen. We will meet for weekly Zoom sessions via CarmenCanvas during our scheduled class meeting time. The course delivery is **synchronous**.

The day session is in-person.

Pace of activities: This course is divided into **modules** that are released at least one week ahead of time. Apart from our meetings, you can schedule your efforts freely throughout the week as you keep pace with our weekly progress.

Credit hours and work expectations: This is a **1.5-credit-hour course**. According to [Ohio State policy](#), students should expect around an average of 1.5 hours per week spent on direct instruction (instructor content and Carmen activities) in addition to 3 hours of homework (reading and quiz preparation).

Attendance and participation requirements: For the online sessions, your attendance is based on your online activities and participation. You are expected to log in to the course in Carmen every week. During most weeks you will probably log in many times. The following is a summary of expected participation:

- **Participating in online activities for attendance. Weekly CarmenZoom sessions at scheduled class times are **REQUIRED**.** All live, scheduled class sessions are required.
- **For the in-person session, participating in in-person classes at scheduled class times are **REQUIRED**.**

Discussion expectations: For online sessions, a significant component of our interactions will occur through Zoom in CarmenCanvas. Because this mode of discussion has benefits and challenges that differ from in-person class sessions, I wish to share my expectations for how we will meet and communicate:

- Complete pre-work and ready to have open, civil, and supportive discussions in-class.
- Be present (in video) during the entire class session.
- I kindly request that you update your Zoom profile with your name with a picture of your face.
- I kindly request that you share your faces on camera so we can communicate nonverbally as well.
- Please kindly mute your microphone when others are talking to minimize background noise.

Our goal is to create a safe environment where we can benefit from seeing each other and connecting.

Recordings: I will be recording our online Zoom classes for the benefit of students who might need to be absent due to unforeseen contingencies.

Course Technology:

For help with your password, university email, Carmen, or any other technology issues, questions, or requests, contact the Ohio State IT Service Desk. Standard support hours are available at ocio.osu.edu/help/hours, and support for urgent issues is available 24/7.

- **Self-Service and Chat support:** ocio.osu.edu/help
- **Phone:** 614-688-4357(HELP)
- **Email:** servicedesk@osu.edu
- **TDD:** 614-688-8743

Baseline technical skills for online courses

- Basic computer and web-browsing skills
- Navigating Carmen: for questions about specific functionality, see the [Canvas Student Guide](#).

Required technology skills specific to this course

- [CarmenZoom virtual meetings](#)
- [Recording a slide presentation with audio narration](#)
- [Recording, editing, and uploading video](#)

Required equipment

- Computer: current Mac (OS X) or PC (Windows 7+) with high-speed internet connection
- Webcam: built-in or external webcam, fully installed and tested
- Microphone: built-in laptop or tablet mic or external microphone
- Other: a mobile device (smartphone or tablet) or landline to use for BuckeyePass authentication

Required software

- [Microsoft Office 365](#): All Ohio State students are now eligible for free Microsoft Office 365 ProPlus through Microsoft's Student Advantage program. Full instructions for downloading and installation can be found [at go.osu.edu/office365help](https://go.osu.edu/office365help).

Carmen access

You will need to use [BuckeyePass](#) multi-factor authentication to access your courses in Carmen. To ensure that you are able to connect to Carmen at all times, it is recommended that you take the following steps:

- Register multiple devices in case something happens to your primary device. Visit the [BuckeyePass - Adding a Device](#) help article for step-by-step instructions.
- Request passcodes to keep as a backup authentication option. When you see the Duo login screen on your computer, click **Enter a Passcode** and then click the **Text me new codes** button that appears. This will text you ten passcodes good for 365 days that can each be used once.
- Download the [Duo Mobile application](#) to all of your registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service.

If none of these options will meet the needs of your situation, you can contact the IT Service Desk at 614-688-4357 (HELP) and IT support staff will work out a solution with you.

Grading and Evaluation:

Graded assignments may come in three forms, and students should note the expectations for each in the descriptions of our class assignments below.

- **Independent Work (I):** Strictly non-collaborative, original-individual work. You can discuss this assignment only with your instructor. Discussions with other individuals, either in person or electronically, are strictly prohibited.
- **Collaboration Required (C):** An explicit expectation for collaboration among students either in-class or outside (i.e. group work).

Assignment Name	Points / Weight	Assignment Type
In-class quiz 1	12.5	I
In-class quiz 2	12.5	I
In-class quiz 3	12.5	I
In-class quiz 4	12.5	I
In-class quiz 5	12.5	I
In-class quiz 6	12.5	I
HBS Case on "AQR's Momentum Funds (A)"	15	C
Participation	10	I
Total Course Points	100	I

Course Assignments:

In-class quizzes will be conducted online via CarmenCanvas **for both in-person and online sessions.**

Academic integrity and collaboration: The quizzes are open-book. Students are free to use any resources available. However, **each individual student must complete the quizzes independently, and collaboration among students is strictly prohibited.**

HBS case on AQR's Momentum Funds (A) is available for purchase at <https://store.hbr.org/product/aqr-s-momentum-funds-a/211025?sku=211025-PDF-ENG>

We will study the AQR case on the last, 1.5-hour class. A presenting team can contain up to **five** members. If your team is interested in presenting the case, please email me as soon as possible. I will assign the case to a team via "first come first serve." The presenting team is responsible for preparing slides for the case, presenting the case, and leading the case discussion in class. I will work with the presenting team prior to the class to ensure that its slides are of sufficiently high quality. During the in-class discussion, I will mostly mediate the discussion, correct factual misstatements, and summarize the case at the end.

To compensate for their work, all members of the presenting team will receive the full grade for the case study as well as the full participation grade for the class (25 points in total).

If you are not presenting the case, you are required to submit a case write-up that answers the suggested questions for the AQR case (available in CarmenCanvas [Assignment]). The write-up can be done by teams. I will grade your performance for the case based on the write-up as well as the frequency and quality of your (individual) comments during the in-class discussion. High-quality comments during the in-class discussion are, naturally, a result from careful preparation prior to the class discussion.

Course Schedule:

Please refer to the Carmen course Web site for up-to-date information on the modules.

Week	Topics, Readings, Quizzes
1	Introduction: Lecture notes; Quantitative Review. Capital allocation to risky assets: Lecture notes; BKM Chapter 6
2	Quiz 1. Efficient diversification: Lecture notes; BKM Chapter 7
3	Quiz 2. Index models: Lecture notes; BKM Chapter 8. The CAPM: Lecture notes; BKM Chapter 9
4	Quiz 3. Empirical evidence on equity returns: Lecture notes; BKM Chapter 13; Hou, Xue, and Zhang (2020)
5	Quiz 4. Multifactor models: Lecture notes; BKM Chapters 10 and 13; Hou, Xue, and Zhang (2015)

Week	Topics, Readings, Quizzes
6	Quiz 5. Efficient markets, behavioral finance, and the investment CAPM: Lecture notes; BKM Chapters 11 and 12
7	Quiz 6. Performance evaluation: Lecture notes; BKM Chapter 24. HBS case on “AQR’s Momentum Funds (A)”

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Absence and Makeup Policy:

I empathize that technical difficulties such as power outage and internet disconnect do occasionally occur. If a student misses a quiz due to unforeseen contingencies, please contact me to make alternative arrangements.

Late Assignment Submissions:

No late submission for the HBS case write-up will be accepted.

Instructor Feedback and Response Expectations:

- Email Response Times: I strive to reply to emails within **24 hours on days when class is in session.**
- Graded Materials Return Times: The in-class quizzes will be graded immediately via CarmenCanvas. I will return the graded case write-up and participation grades within 3 days after our last class.

Academic Integrity:

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's Code of Student Conduct, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's Code of Student Conduct (<https://trustees.osu.edu/bylaws-and-rules/code>) and this syllabus may constitute Academic Misconduct (<https://oaa.osu.edu/academic-integrity-and-misconduct>)

The Ohio State University's Code of Student Conduct (Section 3335-23-04) defines academic misconduct as: Any activity that tends to compromise the academic integrity of the University, or subvert the educational process. Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's Code of Student Conduct is never considered an excuse for academic misconduct, so I recommend that you review the Code of Student Conduct and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the University's Code of Student Conduct (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University. If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Disability Services:

The university strives to make all learning experiences as accessible as possible. In light of the current pandemic, students seeking to request COVID-related accommodations may do so through the university's [request process](#), managed by Student Life Disability Services. If you anticipate or experience academic barriers based on your disability (including mental health, chronic, or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.