

University of Pennsylvania  
The Wharton School

**Real Estate Finance: Investment and Analysis**  
**Fall 2024, TR 1:45-3:15**  
**REAL/FNCE 2090**

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Office Hours: Thursdays, 3:30-4:30 p.m.  
in 429 Vance Hall or by appointment

**Course Objectives:**

- 1) To expose you to the terms, issues, and topics in commercial real estate;
- 2) To give you the basic skills and intuition you need to begin to evaluate a variety of real estate investments.

Real estate is a multi-faceted field, encompassing both an operating industry and a broad category of investments. It has its own institutional features, jargon, and investment structures. As the survey course in the Real Estate Department, this class aims to provide a broad overview of the real estate field. Higher-level classes in the Real Estate Department examine in more detail many of the topics from this class.

The presumption in this class is that you have no prior real estate experience, and no pre-existing knowledge of the real estate industry is necessary to do well in this class. However, this class does rely on a wide array of fundamental finance concepts, hence Finance 1000 is a prerequisite for enrollment.

**Course Materials:**

**Readings:** Most of the readings are chapters from the required textbook, *Real Estate Finance and Investments, 5.2 Edition*, by Linneman and Kirsch. Used copies are okay – the syllabus lists page numbers for the 5.2 edition but it’s easy to figure out the conversion to other editions. The Linneman text will serve you well through your career. However, if you do not wish to purchase a copy, we have made a number of excerpts available on Canvas under “Course Materials@Penn Libraries”. Additionally, several copies of the textbook are on reserve at Lippincott.

Other readings are available on Canvas through the Study.net link or in the “Files>Readings” folder.

Required readings are denoted on the syllabus and students are expected to cover them before class. Many of these readings are necessary to complete problem set assignments

that are due before class (see below). Other readings are optional.

For students interested in learning more, or having a different explanation of the same material, a good supplemental text is *Commercial Real Estate Analysis and Investments* by Geltner, Miller, Clayton and Eicholtz. Other interesting supplemental readings are *Investing in REITs* (Block) and *A Primer on Securitization* (Kendall and Fishman)

**Class notes:** Copies of the PowerPoint slides used in class will be posted in PDF format on Canvas in advance of class time. Even if the slides are posted well in advance, I often update and modify them a day or two before class, so you should plan to print or download the most current version shortly before class. These slides are not designed to be a substitute for attending class.

**Financial Calculator:** You will need a financial calculator to compute annuities and present values. You are also responsible for knowing how to use the annuity and present value functions. Most students find it faster to use a simple financial calculator than to use Excel for these functions. You will need to use a financial calculator on the exams. Any calculator able to perform the above functions will do, such as the HP 10bii+. If possible, I will make calculators available for borrowing from the reserve desk at Lippincott Library.

**Canvas:** I rely on Canvas to communicate with you and provide class materials:

- Copies of the slides used in class
- Sample Excel spreadsheets from the in-class examples
- Problem sets (both required questions and practice problems) and other assignments
- Case materials
- Old exams (with solutions)
- Supplemental class material, such as newspaper articles
- Announcements, updates, and clarifications
- Discussion threads for Q+A (e.g., about a case)

### **Problem Sets:**

**Class Prep questions:** These questions are due before class on the dates indicated on the calendar and should be submitted via Canvas. These questions are meant to help you think about a topic before we cover it in class and/or in preparation for a class discussion. Some of these questions are qualitative and don't have a right or wrong answer. Other questions are quantitative and have a correct answer, but I do not expect you to get it right – the goal is to make you think about a particular issue so that you can make the most out of class.

You should submit your answers to these questions via Canvas by 9 p.m. the day before class. You may discuss the questions with other students, but each student should submit their own answer. The TAs and I will review your answers and you may be called to expand on them in class. Your submissions will be graded as complete – if you have

made an effort to answer the question, even if the answer is not correct – or incomplete if you do not submit an answer or if your answer indicates that you have put minimal or no effort in working through the question.

**Practice problems:** Additional practice problems are meant to be done after class to consolidate your understanding of the material. Doing these problems is a fundamental part of learning the class material and are essential to prepare for the exams. Solutions are provided. I will neither ask you to hand in the problem sets nor grade them. They still are important. Please do the practice problems after the topic in which they are covered. (For example, do Practice Problems set #9 after we cover Topic #9.)

**Old exams:** Three years' worth of old exams will be available on Canvas. I encourage you to do these, timed and without looking at the solutions, in advance of the midterms.

### Cases:

There will be three group-based cases, each of which will include a quantitative component (financial modelling) and a qualitative component.

You will choose your own case team of **up to four members** and must work with the same team on all three cases. Your group may contain members from my class section, but not other professors' sections. It is your responsibility to find a team. You and your teammates should sign up under the "team sign-up" section on Canvas before Case 1 is distributed. The cases require a variety of skills, from financial savvy to management. You should try to have a mix of talents and backgrounds on your team. In addition, I strongly discourage you from taking the "divide and conquer" approach of having only one or two team members work on each case.

You will be more successful if the group uses a collaborative process. **You are responsible for making your team work.** If you think a teammate is not working in good faith, or has neglected to finish her/his share of work, you must try hard to work it out within the group. If you still feel aggrieved after the case is turned in, send me an email *before the case is graded*. If two or more serious complaints are registered against you by your group members, 20% will be deducted from your overall case grade.

You may discuss the cases with other groups in this class and give and receive assistance. However, each group must separately prepare their own case materials and write-ups. Cases are to be submitted on Canvas by the due date and time on Canvas. Cases will be due in advance of being discussed in class so I can review them to prepare the class discussion. Any case that is turned in after the deadline but before the class discussion will incur a late penalty of 0.5% per hour. **Cases will not be accepted after the case discussion class starts, nor will extensions be given.**

### Examinations:

**Workload:** Two midterm exams will be held in regularly scheduled class time. The exam will be closed-book and closed-note, though you will be allowed two pages of notes. You will also need to use a financial calculator for calculations.

**Midterm dates:**

Exam 1: Tuesday, October 1

Exam 2: Thursday, November 21

**Material covered:** Exams will cover the material presented in class and during guest lectures, the class notes, the cases, the practice problems, and the required readings. Exam 2 is not cumulative, but assumes proficiency in the basic skills taught in the first portion of the class.

**Passing the exams:** Both exams must be passed in order to receive a passing grade for the course.

**Exam makeups:** Exams must be taken at the assigned time. *If you know in advance that you will not be able to attend class on the exam dates, do not take this class.* Makeups will be given only for medical or exceptional personal situations. To be eligible for a makeup, you need to notify me in advance of an exam if there is a chance you might miss it, unless in the case of a truly unforeseeable emergency.

**Attendance:**

Your presence and attention in class is critical to the collective classroom experience. Because of that, I grade attendance. You may have up to three absences without losing attendance credit, as long as those absences are accompanied by you completing a Course Action Notice (CAN) to report your absence. Absences due to extenuating circumstances such as illness or family emergencies, as reported in the CAN, are eligible for access to that day's class video. Please do not send me any documentation of medical issues such as illness; I do not need to see it.

Walking into class late is disruptive and disrespectful to your fellow classmates and professor. Hence, I take attendance at the start of class (using the aPlus+ app) and arrivals after I start class (even a minute or two late) will be marked as absent.

**Grading:**

**Weights:** The course grade will be based on the following:

- Exams: 40 percent (20 percent each); you must pass each individually.
- Cases: 45 percent (15 percent each)
- 15 percent participation, attendance, and submission of "Class prep questions".
- You get a 0 for the class if you do not get a 100% on the "I read the syllabus" quiz on Canvas. I allow retakes until you get it right.

**Curve:** Generally, each individual assignment is curved and the variance is standardized so no one assignment contributes more variance to your final grade than another. The curved scores are totaled for each student and the total is curved again within section. In practice, this means that your grade is determined by how many standard deviations your assignment scores are above or below your section's mean and whether you have correlated over- or underperformance across assignments.

**Regrades:** My policy on regrades is appended to the syllabus.

**Guest Speakers:**

Guest speakers are scheduled outside of normal class time. These sessions are **required** material. These lectures often cannot be videotaped (so the guests feel comfortable speaking freely). You may need to get the notes from someone else if you are unable to attend.

- September 23, 7 p.m., SHDH 350: Adam Gallistel, Managing Director, GIC
- TBD
- November 11, 7 p.m., SHDH 350: Olivia John, Founder and CEO, Osso Capital

**Classroom Expectations:**

**Electronics:** Laptops and cell phones are not allowed to be used during class except for some very specific instances (such as going over a modeling assignment) when I will announce that they are okay. Tablets/reMarkables are allowed as long as they lie flat on the desk and are being used for reading or annotating class notes or for taking notes.

**Be on time:** I will start on time and end on time. Please do not arrive late; it is a distraction to me and others in the room.

**Be prepared:** Completed the *required* readings in advance of the lecture and be ready to comment on or discuss the class material.

**Participation:** Be willing to participate in class discussions, and to speak up if you're bewildered.

**Guest speakers:** Be present for the talks by outside speakers unless you have a conflict with another class.

**Good sport:** I expect that you will not find every topic we cover to be of interest to you, but that you will be a good sport about it. Students who are considering a career in real estate development, for example, are interested in very different things than students who are considering a career on Wall Street. All the topics we will cover are of interest to someone in the class, but not all necessarily are of interest to everyone. Please recognize that your classmates and you do not necessarily share the same tastes when I go into depth on a topic that you feel is not especially relevant to you.

**Getting help:**

**Email:** Do not think that a question is too "basic" to ask me. I am happy to help students understand any material they are having difficulty with. All I ask is that you take a serious stab at it yourself before turning to me.

**Office hours:** I hold regular drop-in office hours in my office. If you would like to reserve a specific time slot just for yourself or you and your case team, please email me and we'll schedule an appointment.

**Lecture recordings:** Recordings of lectures are available upon request for students who had an excused absence or who were in class but want to rewatch the class. Case discussions are not recorded.

**TAs:** The course TAs will hold office hours in advance of the cases and review sessions for the practice problems before the exams.

**Policy on “AI”:** Within this class, you are welcome to use AI models for any purpose, except on exams. If you use an AI program, its contribution must be acknowledged in the assignment, and if you include material generated by an AI program, it should be cited like any other reference material. You will be penalized for using an AI program without acknowledgement and the university's policy on plagiarism still applies to any uncited or improperly cited use of work by others, including an AI tool, or submission of work by others as your own. In addition, you are responsible for any inaccurate, biased, offensive, or otherwise unethical content you submit regardless of whether it originally comes from you or an AI program.

**Honor Code:**

It is your responsibility to make sure your entire team prepares the cases independently. Violations by any team member will result in the entire team failing the class. Here are the rules: You may verbally discuss the cases, including ideas, approaches, and solution methods, with other students who are currently enrolled in REAL/FNCE 2090. Each group must separately prepare their own case materials and write-ups without reference to anyone else's case materials or write-ups.

You may not obtain assistance, or solicit advice, from current students in MBA sections of this class, former UG or MBA students, current or past employees of firms involved with the cases, or anyone else involved in the real estate investment industry. You also may not provide such assistance or advice once you are no longer enrolled in this class. You may not share your written materials or Excel with anyone.

Violations of these rules will be treated as violations of Penn's Code of Academic Integrity. I do not distinguish between the plagiarizer – the team using other's materials – and the provider of the materials. Do not circulate your solutions to the cases. If I find your case to be the source of plagiarized material, I will report the violation through the University's academic integrity process, even if you have already graduated.

**Other items:**

**Schedule:** The class schedule is an ambitious goal and may not reflect the actual timing, or even sequence, of covering material.

**Pass/fail:** Be aware that it is the policy of the Real Estate Department that students who take the class pass/fail cannot count the course toward the credits necessary to complete the real estate concentration.

**Expectation of mutual respect:** This class strives to be an inclusive community, learning from the many perspectives that come from having differing backgrounds and beliefs. As a community, we aim to be respectful to all. Faculty and students are expected to commit to creating an environment that facilitates inquiry and self-expression, while also demonstrating diligence in understanding others' viewpoints.

**Wellness statement:** I am deeply aware of and sympathetic to the challenges that students may face both in and out of the classroom. Mental health concerns or stressful events may lead to diminished academic performance or reduce your ability to participate in daily activities. Free, accessible, confidential mental health services are available on campus

(see the Counseling & Psychological Services (CAPS) website at <https://caps.wellness.upenn.edu/>). Students should also feel free to reach out to me to discuss any issues or request accommodations as necessary.

**Copyright Information:**

All federal and state copyrights reserved for all original material presented in this course through any medium, including lecture and print. Any copyrighted material provided in this course is for your personal, noncommercial use and may not be copied and distributed to others without the prior permission of the copyright owner. Individuals are prohibited from being paid for taking or transferring their class notes without my express written permission. **This also means you are not permitted to post class slides, notes, or case materials on course material sharing sites.**

## Course Schedule

Required readings are in bold text. Textbook readings available via “Course Materials@Penn Libraries” are marked with an asterisk (\*). Other readings are optional. Textbook chapter and page numbers are listed for the 5.2 edition.

Date	Topic	Readings
1. August 27	Topic #1: Real Estate Investments <ul style="list-style-type: none"> <li>• Course requirements</li> <li>• Class overview</li> <li>• Overview of real estate markets</li> </ul>	Linneman [Chapter 2, 16-29.] “What Is Real Estate?”
2. August 29	Topic #2: Property-level valuation <ul style="list-style-type: none"> <li>• Fundamentals of value</li> <li>• DCF valuation</li> <li>• Pro-forma structure</li> <li>• Components in NOI</li> <li>• CapEx reserves</li> <li>• Cash flow at sale</li> <li>• Cap rates</li> <li>• Return measures</li> </ul>	<b>Take the “I read the syllabus” quiz on Canvas.</b>  Optional: Watch “Valuation methods” video on Canvas  *Linneman [chapter 5, pp. 55-69] “Property Level Pro Forma Analysis” <b>Linneman [chapter 6] “Financial Modeling”</b> *Linneman [chapter 9] “The Use and Selection of Cap Rates” *Linneman, “Prerequisite I: The Basics of Discounted Cash Flow and Net Present Value Analyses” *Linneman, “Prerequisite II: IRR: What It Is and What It Isn’t” Berk and DeMarzo, <i>Corporate Finance (Third Edition)</i> , chapter 4: “The Time Value of Money.”
3. September 3	Topic #2: Valuation methods, continued Topic #3: Leases <ul style="list-style-type: none"> <li>• Land rights</li> <li>• Lease terms</li> <li>• Effective rent</li> </ul>	Optional: Watch “Cap rates” video on Canvas
4. September 5	Topic #3: Leases <ul style="list-style-type: none"> <li>• Land rights</li> <li>• Lease terms</li> <li>• Effective rent</li> <li>• Percentage rent</li> <li>• Optionality</li> </ul>	<i>Class Prep (CP) #1: Leases</i>  *Linneman [chapter 4] “The Fundamentals of Commercial Leases.”
5. September 10	Topic #4: Real estate markets and pricing	<i>Class Prep (CP) #2: Cap rates</i>
7. September 12	Topic #5: Creating or finding value in real estate investments	BP: Linneman, “Forces Changing the Real Estate Industry Forever”
8. September 17	Topic #6: Evaluating pro-formas	<i>CP #3: “Brooklyn Mixed-Use” mini-case</i>



	and risk at the property-level <b>Case #1 handed out</b>	<b>BP: Martin, “Nine Abuses Common in Pro Forma Cash Flow Projections”</b> <b>Linneman [chapter 10]</b> “Development Pro Forma Analysis.”
9. September 19	Topic #7: Mortgages <ul style="list-style-type: none"> <li>• Mortgages 101 – elements and terms</li> <li>• Amortization</li> <li>• Underwriting and debt capacity</li> <li>• Debt service</li> <li>• Debt in the pro forma</li> </ul> <b>Midterm review sheet handed out</b>	*Linneman, “Prerequisite III: Amortization Fundamentals”  Optional: Watch “Amortization” video on Canvas
10. September 23, 7 p.m.	Guest Speaker: Adam Gallistel, Managing Director, GIC	
September 24	No class	
11. September 26	Topic #7: Mortgages, continued <ul style="list-style-type: none"> <li>• Mortgage options</li> <li>• Construction financing</li> <li>• Refinancing</li> <li>• Risk of leverage</li> </ul>	<i>CP #4: Refinancing</i>  <b>Linneman [chapter 5, *pp.74-75]</b> “Property Level Pro Forma Analysis” <b>*Linneman [chapter 15]</b> “The Use of Debt and Mortgages”
12. October 1	<b>Midterm Exam 1 – in class</b> <i>Topic #8: Taxes and Real Estate</i>	<b>Linneman [4<sup>th</sup>: chapter 4, pp. 55-56, 59-63; 5<sup>th</sup>: chapter 5, pp. 70-73, 75-83]</b> “Property Level Pro Forma Analysis” <b>Linneman [4<sup>th</sup>: chapter 16; 5<sup>th</sup>: chapter 18]</b> “Real Estate Exit Strategies.”
October 3	<b>No class – Fall break</b>	
12. October 8	Topic #8: Taxes and Real Estate <ul style="list-style-type: none"> <li>• Taxes in the pro forma: Income taxes, depreciation, capital gains</li> </ul>	<b>Linneman [chapter 5, pp. *70-73, 75-83]</b> “Property Level Pro Forma Analysis” <b>Linneman [chapter 18]</b> “Real Estate Exit Strategies.”
13. October 10	Case #1 discussion	
14. October 15	Topic #8: Taxes and Real Estate, continued <ul style="list-style-type: none"> <li>• Taxes in the pro forma: Income taxes, depreciation, capital gains</li> <li>• Tax risk</li> </ul> <b>Case #2 handed out.</b>	<i>CP #5: Getting to ATCF</i>
15. October 17	Topic #9: Financing real estate <ul style="list-style-type: none"> <li>• Ground leases</li> <li>• Hybrid debt</li> <li>• Joint ventures</li> </ul>	<b>*Linneman [chapter 17]</b> “Ground Leases as a Source of Finance.” <b>Linneman [chapter 19]</b> “Real Estate Private Equity Funds” <b>BP: Maira, “Understanding Real Estate Joint</b>

	<ul style="list-style-type: none"> <li>• Mezzanine debt</li> </ul>	<b>Ventures”</b> Linneman, [chapter 14] “Should You Borrow?”
16. October 22	Topic #9: Financing real estate, continued	
17. October 24	Topic #10: Pricing and cycles in real estate markets <ul style="list-style-type: none"> <li>• Boom/busts and oversupply</li> <li>• Managing the cycle</li> <li>• Inflation</li> </ul>	<b>BP: Smith, “Adjustment Mechanisms in Real Estate Markets”</b> <b>*Linneman [chapter 25] “Real Estate Cycles”</b> Linneman [chapter 11] “Development Feasibility Analysis”
18. October 29	Topic #11: Equity securitization and the REIT market <ul style="list-style-type: none"> <li>• Intro to REITs</li> <li>• Financial evaluation: FFO and AFFO</li> <li>• Financial evaluation: NAV and implied cap rates</li> <li>• UPREITs</li> </ul>	<b>BP: Harper, “Basic Valuation of a Real Estate Investment Trust”</b> <b>Linneman [chapter 21] “REITs and Liquid Real Estate”</b> <b>BP: BofAML REIT Primer, 6<sup>th</sup> edition, pp. 1-7, 23-24</b> <b>Linneman [chapter 12] “Real Estate Company Analysis.”</b>
19. TBA	<b>TBA Guest Speaker</b>	
20. October 31	<b>Case #2 discussion.</b>	
21. November 5	Topic #12: Securitization of Debt Interests: Commercial Mortgage-Backed Securities <ul style="list-style-type: none"> <li>• CMBS history and growth</li> <li>• Structuring basics</li> <li>• Pooling and tranching</li> <li>• Rating</li> </ul> <b>Case #3 handed out.</b>	<b>BP: Gordon, “How to Build a Bond”</b> <b>BP: Cibelli, “Lord Abbett Investment Brief, CMBS 2017”</b> <b>Linneman [chapter 16] “Sources of Long- and Short-term Debt”</b>
22. November 7	Topic #12: CMBS, continued. <ul style="list-style-type: none"> <li>• Pricing</li> <li>• Risk: Conflict-of-interest in special servicing</li> </ul>	<i>CP #6: CMBS</i> <b>BP: Poindexter, “Defaults in Securitized Real Estate Loans”</b>
23. November 11	Guest Speaker: Olivia John, Founder and CEO, Osso Capital	
24. November 12	Topic #13: Corporate real estate <ul style="list-style-type: none"> <li>• Own vs. rent</li> <li>• Sale-leasebacks</li> <li>• Returns</li> </ul>	<b>Linneman [chapter 23] “Corporate Real Estate Decision Making”</b>
25. November 14	Topic #14: Housing Markets	<b>BP: Sinai, “Safety in Renting”</b>
26. November 19	Topic #14: Housing Markets, continued	
27. November 21	<b>Midterm Exam 2</b>	
November 26	No class.	

28. December 3	<b>Case #3 presentations.</b>	
December 5	<b>Case #3 presentations, continued</b>	

### Regrade Policy

I strive for accuracy and equity in the grading for this class. However, despite my best efforts, grading is sometimes imperfect. The following set of rules provides a mechanism for requesting regrades to correct grading errors. If you do not follow these rules, you will forfeit your right to a regrade. The rules are designed to maintain fairness by not rewarding gratuitous regrade requests while also not penalizing students for bringing errors to my attention.

The onus for bringing any errors to my attention falls upon you. Pick up your assignments promptly so you can check the grading and make sure that your grade on Canvas matches the grade on your assignment.

1) If we made an error in adding up your points to obtain your total score, all you need to do is email me a short explanation describing the points we failed to add and also give me a printout of your email attached to your graded assignment.

2) My intent is that you only lose points *once* for a mistake. Sometimes, an error in one part of an assignment creates incorrect answers in another part of the assignment. In that case, we look for internal consistency. If your answer would have been correct had you not made your earlier mistake, we will note the mistake but not deduct further points for it. Similarly, if in a case you repeat the same calculation in a number of circumstances, we will deduct points only once for a calculation error but we will try to note it every time. (If an error is circled but no point deduction is noted, we did not take off points for it.)

If you believe that we inadvertently deducted points multiple times for the same error, please email me with a *detailed* explanation. Please also print out your email and submit it to me along with the graded assignment. Be sure to take the time to make sure you understand the errors you made before submitting the regrade request.

3) To aid your understanding of the material and of the grading philosophy, I typically provide an explanation of how the points were allocated. If you believe your grading was not consistent with the stated guidelines, please email me with a *detailed* explanation. Please also print out your email and submit it along with the graded assignment. Be sure to take the time to make sure you understand the errors you made before submitting the regrade request. If not, you run the risk that you actually did worse than you thought and we were too generous with the points given. I will not consider regrade requests that are based on an argument that the grading guidelines being unfair. The guidelines are applied equally to everyone, and thus are equitable. Rather, the regrade request is intended to correct errors in adhering to the rubric.

4) If you merely would like an explanation of the grading on an assignment, email me letting me know what you would like me to explain. We will set up a time to meet and I will explain it to you. I need this advance notice to review your assignment before we meet; it is not a good use of time to go over the grading of your assignment in “real time” with no preparation.

*General policies:*

- 1) I personally do all the regrades, in conference with the graders.
- 2) If you request a regrade, the entire assignment will be reviewed. Errors tend to be random and offset each other. It would be unfair to the rest of the class to correct only the grading errors that went against you but not the ones in your favor.
- 3) Regrade requests will be accepted for *three weeks* following the *return* of an assignment. If an assignment has multiple parts, the deadline for a regrade request for *any* part of the assignment is three weeks after the return of the *last* part of the assignment.
- 4) The acceptable margin of error on a 100-point assignment is +/- 2 points. Please do not submit regrade requests for one or two points total. The exception is if we added up your points incorrectly: In that case I will correct any size error.