



**Spring session - 2023**  
**Finance 740, Fixed Income**

**Instructor**

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**Teaching Assistant**

Sabrina Ben Said, PhD student in our Finance and Economics program

Sabrina's role is to answer questions about the material and the homework. Please use the Discussion Board in Canvas for this purpose. Sabrina and/or I will get to your questions as quickly as we can, typically very quickly.

**Class times and location**

T-Th, 8:00am to 9:15am, Grainger 1210B

**Instruction mode**

Face-to-face

**Office hours**

Tuesdays, 3:00pm to 5:00pm, in person in Grainger 3115  
Fridays 8:00am to 9:30am, on zoom (link provided on Canvas)

**Course objective**

This course covers the fundamentals and goals of fixed income methods and portfolio management and describes how those fundamentals are applied in practice. This is

a hands-on class with a heavy emphasis on quantitative applications.

### **Official course description and requisites**

Detailed coverage of fixed income securities and their derivatives; asset backed/mortgage backed securities; pricing and portfolio strategies; term structures models and other analytical tools. Requisites: FIN 700 and GB 704, or MSFE enrollment. Or department permission.

### **Resources**

The main source of material for this course are my power point slides, all of which you can download from Canvas. No textbook is required. I will assign readings on occasion, you can download those from Canvas too.

On Canvas you will also find a Piazza discussion board. Post your questions there so that all benefit from it and can participate (i.e. help me) in arriving at the right answer.

Quantitative applications will rely on the Bloomberg terminal, Excel and, occasionally, Python. You will need to become proficient with Bloomberg. I will teach you the Python we need, as needed.

### **Grading**

Your course grade will be computed as follows:

1. Become Bloomberg Certified (5%)
2. Class participation (10%)
3. Group presentation (10%)
4. Homework (15%)
5. Midterm (25%)
6. Final (35%)

The grade distribution will meet the following criteria:

**A** Up to 40% of students

**AB** 20-40%  
**B** 0-30%  
**BC** 0-30%  
**C** 0-30%  
**D/F** 0-5%

To complete the Bloomberg certification requirement, please upload your (*BMC*) Bloomberg Market Concepts certificate of completion to Canvas **by May 5th**.

Your participation grade is based on my necessarily subjective assessment of your willingness to contribute to in-class conversations.

For the group presentation criterion, together with up to 5 students, you will prepare a 30mn presentation on either a topic drawn from the list of suggested topics provided at the very end of the syllabus or on a topic of your choice, which you will need to get pre-approved by me. You will need to schedule a time at the start of class before the end of the semester. I will approve and announce scheduled times on a first-come-first-serve basis. Your presentation will be followed by a 10mn Q&A session. You will be graded both on the quality of your presentation and on how well you answer questions.

Homework problem sets will be assigned more or less on a weekly basis. The problems are meant to make you practice/replicate what I will show you in class. Being ready for my exams means first and foremost understanding the homework fully. You will need to upload your homework in a pdf form to Canvas. You cannot upload any excel file. Your pdf should provide answers to each of my questions and a short explanation of how you reached that answer, and explanation that can include images of partial excel tables. What you turn in should be 4 pages long or less. I encourage you to work in groups. However, each student must turn in their own write-up of answers. (Given that you will be working in groups I understand and accept that many answers will be identical to one another.) No late assignment will be accepted, barring a documented emergency or an exception within the University's guidelines.

The midterm will take place on Thursday, March, 9th from 6:00pm to 7:30pm, and will be administered remotely. The final, likewise, will be administered remotely during final week at a date TBD. Exams are open books and open internet. You are allowed to use any resource you want. The only rule is that you cannot communicate with one another.

## **Academic misconduct**

Academic misconduct of any sort will result in a failing grade, as a minimum consequence.

Now for the formal version: By virtue of enrollment, each student agrees to uphold the high academic standards of the University of Wisconsin-Madison; academic misconduct is behavior that negatively impacts the integrity of the institution. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these previously listed acts are examples of misconduct which may result in disciplinary action. Examples of disciplinary action include, but is not limited to, failure on the assignment/course, written reprimand, disciplinary probation, suspension, or expulsion. <https://conduct.students.wisc.edu/syllabus-statement/>

## **Students who require testing accommodations**

Students who qualify for testing accommodations must schedule an appointment with testing and evaluation services (please go to <https://testing.wisc.edu/>) who will administer the exams and enforce the appropriate time limitations. Exam appointments cannot be made prior to the official start of the exam. All exams must be completed within 24 hours of the official starting time.

## **Course learning outcomes**

1. Students will be comfortable with the mathematics of fixed income markets
2. Students will use appropriate tools and techniques, including various measures of duration and convexity, to make decisions about trading and hedging portfolios of fixed income securities.
3. Students will be able to explain the structure and uses of fixed income derivative instruments, including options, forwards and swaps.

## **COVID protocols**

Please follow all University rules fully and strictly when it comes to respecting the health and safety of those who are in the same classroom as you.

## **Credit hours**

This is a 3-credit class. These are met according to the traditional Carnegie Definition: 3 times 75 minutes of classroom time and a minimum of two hours of out of class student work per hour of class over approximately 13 weeks.

### **Regular and substantive interaction**

Students have ample opportunity for substantive interactions with the instructors on a predictable and scheduled basis commensurate with the length of time and the amount of content in the course or competency via, inter alia, both in person and virtual office hours, ample exchanges during class time, and can also request meetings with the instructor as and when needed.

### **List of topics**

1. Fixed income basics
  - (a) Debt math
  - (b) Fixed income securities:
    - i. Issuers
    - ii. Seniority
    - iii. Security
    - iv. Covenants
  - (c) YTM, YTC, and YTW
  - (d) From spot yields to par rates to swap rates, and back
  - (e) Day count conventions
  - (f) Dirty vs clean prices
  - (g) Tick size and price quote conventions
  - (h) Risks of fixed income investing
  - (i) Duration and convexity
  - (j) DTS
  - (k) Floaters
  - (l) Quick introduction to swaps and the CDS basis
  - (m) Convertible bond arbitrage
  - (n) Capital structure arbitrage

- (o) Stat arb and pairs trading
- 2. Portfolio immunization
  - (a) Basic immunization math
  - (b) Using swaps to manage duration risk
  - (c) The case of commercial banks
  - (d) M-reits
- 3. The term structure
  - (a) Bootstrapping
  - (b) Theories of the term structure
  - (c) Active yield curve strategies
    - i. Stable curve strategies
    - ii. Shifts, twists, and butterflies
    - iii. Bullets, barbells, and ladders
  - (d) Convergence trades
    - i. Off-the-run/On-the-run
    - ii. Treasury (Futures) basis trade
    - iii. LTCM's downfall
  - (e) Carry trade
- 4. Interest rate models
- 5. Prepayment and Default
  - (a) Refinancing math
  - (b) Make-whole (or yield maintenance) clauses
  - (c) Default math
  - (d) Bond ratings and reduced form models
  - (e) Market implied default probabilities
- 6. Spreads galore
  - (a) Plain vanilla spreads
  - (b) Option-adjusted spreads
  - (c) Fixed income attribution

- i. Roll and carry
  - ii. Shift, twist, and butterflies
  - iii. Spreads
- 7. Asset-backed securitization
  - (a) Overview
  - (b) Mortgages
  - (c) Mortgage-backed securities
  - (d) Agency securities
- 8. Swaps
  - (a) Interest rate swaps
  - (b) Credit default swaps
  - (c) Synthetic CDOs
  - (d) Asset swaps and ASW spreads
  - (e) Total return swaps
  - (f) The Archegos debacle
  - (g) Real estate swaps

### **Suggested presentation topics**

1. The rise of Unitranche debt
2. Treasury auctions
3. TIPS
4. Eurodollar futures
5. CLOs
6. Munis
7. NY Fed's new Corporate Bond Market Distress Index (CMDI)
8. Capital structure arbitrage
9. On-the-run/Off-the-run convergence trade

10. TBA markets
11. Dollar rolls
12. Selling convexity
13. Repo markets
14. Asset swaps and ASW spreads
15. Bloomberg demos:
  - (a) PRTU and PORT
  - (b) BVAL
  - (c) Performance attribution
  - (d) FIHG, FIHR
  - (e) FIHZ, FISA
  - (f) FIRV, COMB
  - (g) CDSV
  - (h) FPA
  - (i) ICVS (zero curve builder)
  - (j) Any other advanced BB feature (run it by me first)
16. LTCM
17. The Orange County bankruptcy
18. The Archegos debacle
19. Negative sovereign yields: causes and consequences
20. Carry trade
21. Synthetic CDOs
22. CDX-CDS basis trade
23. Swap spread arbitrage
24. Total return swaps
25. Bond (or trade) pitch



## 26. Vulture funds

### **Course policies**

All other course policies are default UW-Madison policies.

### **Diversity and inclusion**

Institutional statement on diversity: Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals.

The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background people who as students, faculty, and staff serve Wisconsin and the world. <https://diversity.wisc.edu/>