

Rutgers University, School of Business – Camden  
**52:390:425:90 Fixed Income Securities**  
**Spring 2023**

Professor: Gene Pilotte  
Office: BSB 317  
Office Phone: 856-225-6548  
Email: [pilotte@camden.rutgers.edu](mailto:pilotte@camden.rutgers.edu)

### **Communications to Professor**

The most reliable way to contact me is via email to the address above. Feel free to do so if you have questions over the lecture material. I generally reply within 24 hours. In your message, please include your name, the course name, and be as specific as possible regarding the difficulty that you are having. If you state the question clearly, it is easier for me to help.

### **Communications from Professor**

Emails will be sent to students' campus email addresses. It is each student's responsibility to ensure that they have a campus email account and to check email regularly.

### **Office Hours: by appointment**

If you have a problem that is difficult to resolve by email, we can arrange a phone call or web meeting.

### **Course Description**

This course provides an introduction to fixed income securities and interest rate derivatives. The objectives of the course are to

- describe important fixed income securities and markets, and
- develop the analytical tools needed to value these securities and to manage interest rate risk.

The course begins with the analysis of securities characterized by pre-determined cash flows that occur at fixed points in time, then develops the tools needed to analyze interest rate derivatives and debt securities with embedded options. Mastery of the material covered is essential if you intend to pursue professional certifications such as the CFA (Chartered Financial Analyst) or FRM (Financial Risk Manager). A detailed list of learning goals appears later in this document.

### **Required Textbook**

*Bond Markets, Analysis and Strategies*, by Frank J. Fabozzi and Francesco A. Fabozzi, Tenth edition, MIT Press.

**Online Resources on Canvas learning management site:** <https://canvas.rutgers.edu>

On the course canvas site you will be able to view announcements, video lectures, and access a variety of resources that you need to do well in the class. Resources that you will need include lecture outlines, lists of key formulas for each section of the course, homework assignments, homework solutions, and exams.

## Financial Calculator

The minimum requirement for completing this course is a calculator with a power function. However, you will find things *much* easier if you have a financial calculator. If you are planning a career in finance, you need one. Two popular calculators are the Texas Instruments BA II Plus (or Plus Professional) and the HP 10BII. Another widely used, but more expensive, calculator is the Hewlett Packard 12C (original or Platinum). If you buy the HP12C you will have to get used to using Reverse Polish Notation. RPN is a method of data entry that minimizes the number of keystrokes used to do chain calculations. The HP12C Platinum allows both RPN and algebraic notation. Currently, the BA II Plus and the HP 12C (both versions of each) are the only calculators allowed for the Chartered Financial Analyst and Financial Risk Manager certification exams.

## Exam Schedule and Grading Weights

There are four required exams, two during the semester and one during finals week. Note that the *exam dates are tentative and subject to change* as needed. The material covered will be identified and discussed prior to each exam. There are both graded and ungraded homework assignments.

	<i>Scheduled Date (tentative)</i>	<i>Grading Weight</i>	<i>Percent Weight</i>
<i>Exam 1</i>	February 9 – 11	80 points	23%
<i>Exam 2</i>	March 23 – 25	100 points	29%
<i>Exam 3</i>	April 16 - 18	90 points	25%
<i>Exam 4</i>	May 7 - 9	50 points	14%
<i>Graded Homework</i>	Feb 3, March 3, April 7, April 28	30 points	9%

Grades will be assigned based on each student's total points according to the following scale:

<i>Grade</i>	<i>Range</i>		<i>Grade</i>	<i>Range</i>
<i>A</i>	90% -100%		<i>C</i>	58% - 65%
<i>B+</i>	82% - 89%		<i>D</i>	50% - 57%
<i>B</i>	74% - 81%		<i>F</i>	<50%
<i>C+</i>	66% - 73%			

## Exam Make-up Policy

If, for a university approved reason, you cannot take an exam at the scheduled time you must give the professor written notice at least one week in advance so that other arrangements can be made. If the situation does not allow for advance notification (for example, emergency hospitalization), contact the professor as soon as possible. Make-up exams for non-university approved reasons are not guaranteed. The professor reserves the right to request written documentation to support your absence (such as a doctor's note, an obituary, or military orders).

## Homework

*There will be both graded and ungraded homework assignments.* The homework listed on the course schedule on the following page will not be graded. Those assignments with solutions are available on the Canvas site, so you can check your work as you go. They are essential practice for doing well on the exams because they identify most concepts that you will be tested on. The best 3 of 4 graded homework scores will be used in determining your grade.

## Course Schedule

Note: My lectures on Parts 1 through 4 will correspond closely to the coverage in the text. Coverage of Parts 5 through 7 will include substantial additional material.

Part 1: Basic bond concepts: pricing and yield measures

Chapters 1, 2, and 3  
Homework 1

### Exam 1

Part 2: Measures of bond price volatility: duration, convexity, and immunization

Chapter 4  
Homework 2

Part 3: U.S. Treasury securities and the term structure of interest rates

Chapters 7 and 6, in that order  
Homework 3

### Exam 2

Part 4: Overview of corporate debt securities

Chapters 8 and 21  
Homework 4

Part 5: Risk neutral pricing of bonds and related options

Chapter 19  
Homework 5

### Exam 3

Part 6: More interest rate derivatives: repurchase agreements, swaps, and futures

Chapter 29  
Homework 6

Part 7: Mortgage-backed securities

Chapters 11, 12, and 13  
Homework 7

### Exam 4

**Learning Goals and Objectives**  
**Finance 425**  
**Fixed Income Securities**

**Bond Basics:** Students will be able to

1. List and describe the features and risks associated with a variety of debt instruments and identify the market sectors in which they are traded.
2. Use time value (TVM) of money calculations to value lump sums and annuities.
3. Apply TVM and quotation conventions to the pricing of noncallable bonds, floating rate bonds and inverse floaters.
4. Explain and calculate yields for bonds and bond portfolios.
5. Calculate the sources of a bond's dollar return and calculate a bond's total (horizon) return.

**Measures of Price Volatility:** Students will be able to

1. Explain the use of duration and convexity in approximating the price-yield relation.
2. Calculate duration and convexity measures for bonds and bond portfolios using the traditional, formula, and approximation methods.
3. Apply duration and convexity in calculating percent and dollar returns on bonds and bond portfolios.
4. Use duration to immunize a financial liability, immunize the balance sheet of a financial institution, and hedge a bond position.

**Treasuries and the Term Structures:** Students will be able to

1. Identify and use the appropriate quotation conventions to price U.S. Treasury bills, notes, and inflation protected securities.
2. Explain the auction process in the primary Treasury market.
3. Explain the stripping of Treasury securities.
4. Explain the difference between the traditional, spot, and par yield curves.
5. Construct and use the spot and par yield curves.
6. Calculate implied forward rates.

**Corporate Debt:** Students will be able to

1. Explain the features of and terminology associated with common types of corporate debt securities.
2. Explain and interpret bond ratings.
3. Explain and work with mortality rates, survival rates and transition matrices.
4. Demonstrate an understanding of key aspects of bankruptcy law.

**Valuing Interest Rate Options:** Students will be able to

1. Understand the process of calibrating a binomial interest rate tree.
2. Use a calibrated binomial tree to value straight, callable, and puttable bonds.
3. Use a calibrated binomial tree to value stand-alone call options and put options.
4. Explain the difference between traditional, static and option adjusted yield spreads.
5. Demonstrate an understanding of key aspects of bankruptcy law.

**Repos, Swaps and Futures:** Students will be able to

1. Calculate the cash flows associated with repurchase and reverse repurchase agreements
2. Calculate the cash flows associated with interest rate swaps.
3. Demonstrate the use of interest rate swaps to hedge a financial institution's duration gap or an outstanding bond position.
4. Explain the difference between forward and futures contracts.
5. Price forward contracts with the cost of carry model and understand its relation to the futures price.
6. Using quotation conventions, calculate the price of T-Bill, Eurodollar, and T-Bond futures.
7. Determine the futures positions required to alter portfolio durations

**Mortgage Backed Securities (MBSs):** Students will be able to

1. Describe mortgage types and prepare an amortization table for a level-pay mortgage
2. Describe the securitization process, participants, and characteristics of MBSs
3. Calculate the price to be paid for buying a portion of a mortgage pool
4. Explain the factors affecting prepayment behavior, prepayment models, and the implications for MBS investors.
5. Explain the cash flows to stripped MBSs and Collateralized Mortgage Obligations
6. Explain the impact of interest rate changes on prepayments and prices of MBS strips

### **Key Spring 2023 Dates:**

Spring 2022 classes begin	Tuesday, January 17th
Last day to drop classes w/o “W”	Tuesday, January 26th
Last day to add classes	Tuesday, January 26th
Spring recess	Saturday, March 11 <sup>th</sup> – Sunday, March 19 <sup>th</sup>
Last day to withdraw with “W”	Monday, April 3rd (5:00pm)
Regular classes end	Monday, May 1st
Reading days	Tuesday, May 2nd and Wednesday May 3rd
Final exam period	Thursday, May 4th – Wednesday, May 10th

### **Academic Integrity**

The Academic Integrity policy can be found at <http://studentconduct.rutgers.edu/student-conduct-processes/academic-integrity/>

***Students are responsible for understanding the principles of academic integrity and abiding by them in all aspects of their work at the University.*** Students are also encouraged to help educate fellow students about academic integrity and to bring all alleged violations of academic integrity they encounter to the attention of the appropriate authorities.

Academic Integrity means that you (the student) must:

- properly acknowledge and cite all use of the ideas, results, or words of others,
- properly acknowledge all contributors to a given piece of work,
- make sure that all work submitted as your own in a course activity is your own and not from someone else
- obtain all data or results by ethical means and report them accurately
- treat all other students fairly with no encouragement of academic dishonesty

Adherence to these principles is necessary in order to ensure that:

- everyone is given proper credit for his or her ideas, words, results, and other scholarly accomplishments
- all student work is fairly evaluated and no student has an inappropriate advantage over others
- the academic and ethical development of all students is fostered
- the reputation of the University for integrity is maintained and enhanced.

Failure to uphold these principles of academic integrity threatens both the reputation of the University and the value of the degrees awarded to its students. Every member of the University community therefore bears a responsibility for ensuring that the highest standards of academic integrity are upheld. Violations are taken seriously and will be handled according to University policy.

## **Code of Student Conduct**

Rutgers University-Camden seeks a community that is free from violence, threats, and intimidation; is respectful of the rights, opportunities, and welfare of students, faculty, staff, and guests of the University; and does not threaten the physical or mental health or safety of members of the University community, including in classroom space.

As a student at the University you are expected adhere to the Code of Student Conduct.

To review the code, go to the Office of Community Standards:

<https://deanofstudents.camden.rutgers.edu/student-conduct>

Note that the conduct code specifically addresses disruptive classroom conduct, which means *"engaging in behavior that substantially or repeatedly interrupts either the instructor's ability to teach or student learning. The classroom extends to any setting where a student is engaged in work toward academic credit or satisfaction of program-based requirements or related activities."*

## **Disability Services/Accommodations**

The University is committed to supporting the learning of all students and faculty will provide accommodations as indicated in a Letter of Accommodation issued by the Office of Disability Services (ODS). If you have already registered with ODS and have your letter of accommodations, please share this with me early in the course. If you have or think you have a disability (learning, sensory, physical, chronic health, mental health or attentional), please contact <https://success.camden.rutgers.edu/disability-services>.

Accommodations will be provided only for students with a letter of accommodation from ODS. Their services are free and confidential. Letters only provide information about the accommodation, not about the disability or diagnosis.