

2024 FIN 4341 Actuarial Finance II

CRN: 24441

Spring 2024

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Class Hours: Tuesday/Thursday 6:00 – 7:20 pm (BUSN 326)

Office Hours: Tuesday/Thursday 3:00 – 4:00 pm or by appointment

Course Information: What this class is about and what we will do

COURSE DESCRIPTION

This course is an introduction to the fundamental concepts and applications of financial mathematics. Topics include bond valuation, bond amortization, interest rate swap, investment yield, investment portfolio, duration, convexity, asset/liability management, and immunization strategies. Students enrolled in FIN 4341 should have successfully completed FIN 4340.

EXPECTED LEARNING OUTCOMES

At the end of this course, students will be able to:

- (1) Understand the basic valuation of a standard bond, and callable bond.
- (2) Perform calculations relating to duration (Macaulay and modified), convexity (Macaulay and modified), spot rate, forward rate and yield curve.
- (3) Construct an investment portfolio to:
 - Redington immunize a set of liability cash flows.
 - Fully immunize a set of liability cash flows.
 - Exactly match a set of liability cash flows.
- (4) Develop analytical problem-solving skills to solve complex problems from first principles rather than memorization.

COURSE MATERIAL

Cardinal, T. Financial Mathematics and Applications. University of Illinois eText, 2023.

Course lectures and other study aids will be provided. These are the intellectual property of the faculty member and only available to students registered for the course and may not be shared with others not enrolled in the course. These materials and derivative products such as class notes, slide decks, or study notes and aids may not be shared, reproduced, distributed, transmitted, sold, or uploaded in any form physically or electronically to free, private, or commercial online environments including class-sharing websites without explicit written consent. Doing so is a breach of the Code of Student Conduct and could be a violation of the Federal Education Rights and Privacy Act (FERPA).

HOMWORK ASSIGNMENT SOFTWARE

Coaching Actuaries is an online software that allows students to submit homework assignments and check their work online. Access to Coaching Actuaries is required for this course.

GRADING AND HOMEWORK ASSIGNMENTS

Grade Distribution:

[100-90] = A (90, 80] = B (80-70] = C (70-60] = D < 59 = F

Grade Components:

Exam 1	15%
Exam 2	15%
Final Exam	50%
Coaching Actuaries: 8 Homework Assignments	15%
Excel VBA Project	5%
Total	100%

All exams will be closed-book, and no formula sheet is allowed. All exams and final are in-person and proctored. **The final exam will be cumulative.** Some questions will be an Excel file accessed on Blackboard and solved in Excel. You are allowed to use a calculator. Makeup exams are not stipulated for UEC exams and finals except under extremely urgent and extenuating reasons. Students are required to check and report any exam conflict with pre-scheduled dates related to Athletic performance or rehearsals and Religious observances. If for very severe medical reasons a student has to miss an exam, the instructor has to be notified before the exam, formal documentation has to be provided and verified after which a conflict exam must be performed within one week of the regular exam.

SOA FM EXAM AND UEC CREDIT

To obtain UEC credit, a student must score at least 85%. No exceptions. What we do in class and practice is geared towards achieving a successful outcome.

Homework Assignments:

The homework assignments aim to help you understand the theories covered in the class and to prepare you for the exams. You are allowed and encouraged to collaborate on these problems, although every student must submit their own answers. **Late homework is not accepted.** Please complete your assignments well in advance.

COURSE COMMUNICATION

- **Email:** UTEP e-mail is the best way to contact me. I will make every attempt to respond to your e-mail within 24-48 hours of receipt. When e-mailing me, be sure to email from your UTEP student account and please put the course number in the subject line. In the

body of your e-mail, clearly state your question. At the end of your e-mail, be sure to put your first and last name, and your university identification number.

- **Announcements:** Check the Blackboard announcements frequently for any updates, deadlines, or other important messages.

ATTENDANCE AND PARTICIPATION

Although there is no attendance point for this class, students are strongly encouraged to attend every class and participate in classroom discussions. Students who attend class regularly perform substantially better in the exams than those who do not.

EXCUSED ABSENCES AND/OR COURSE DROP POLICY

I will not drop you from the course. However, if you feel that you are unable to complete the course successfully, please contact the Registrar's Office to initiate the drop process. If you do not, you are at risk of receiving an "F" for the course.

ALTERNATIVE MEANS OF SUBMITTING WORK IN CASE OF TECHNICAL ISSUES

I strongly suggest that you submit your work with plenty of time to spare in the event that you have a technical issue with the course website, network, and/or your computer. I also suggest you save all your work in a separate Word document as a back-up. This way, you will have evidence that you completed the work and will not lose credit. If you are experiencing difficulties submitting your work through the course website, please contact the UTEP Help Desk. You can email me your back-up document as a last resort.

ACCOMMODATIONS POLICY

The University is committed to providing reasonable accommodations and auxiliary services to students, staff, faculty, job applicants, applicants for admissions, and other beneficiaries of University programs, services and activities with documented disabilities in order to provide them with equal opportunities to participate in programs, services, and activities in compliance with sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990 and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008. Reasonable accommodations will be made unless it is determined that doing so would cause undue hardship on the University. Students requesting an accommodation based on a disability must register with the UTEP Center for Accommodations and Support Services (CASS). Contact the Center for Accommodations and Support Services at 915-747-5148, or email them at cass@utep.edu, or apply for accommodations online via the CASS portal.

SCHOLASTIC INTEGRITY

Academic dishonesty is prohibited and is considered a violation of the UTEP Handbook of Operating Procedures. It includes, but is not limited to, cheating, plagiarism, and collusion. Cheating may involve copying from or providing information to another student, possessing unauthorized materials during a test, or falsifying research data on laboratory reports. Plagiarism occurs when someone intentionally or knowingly

represents the words or ideas of another as ones' own. Collusion involves collaborating with another person to commit any academically dishonest act. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. All suspected violations of academic integrity at The University of Texas at El Paso must be reported to the [Office of Student Conduct and Conflict Resolution \(OSCCR\)](#) for possible disciplinary action. To learn more, please visit [HOOP: Student Conduct and Discipline](#).

COPYRIGHT STATEMENT FOR COURSE MATERIALS

All materials used in this course are protected by copyright law. The course materials are only for the use of students currently enrolled in this course and only for the purpose of this course. They may not be further disseminated.

Course Resources:

UTEP provides a variety of student services and support:

Technology Resources

- [Help Desk](#): Students experiencing technological challenges (email, Blackboard, software, etc.) can submit a ticket to the UTEP Helpdesk for assistance. Contact the Helpdesk via phone, email, chat, website, or in person if on campus.

Academic Resources

- [UTEP Library](#): Access a wide range of resources including online, full-text access to thousands of journals and eBooks plus reference service and librarian assistance for enrolled students.
- [University Writing Center \(UWC\)](#): Submit papers here for assistance with writing style and formatting, ask a tutor for help and explore other writing resources.
- [Math Tutoring Center \(MaRCS\)](#): Ask a tutor for help and explore other available math resources.
- [History Tutoring Center \(HTC\)](#): Receive assistance with writing history papers, get help from a tutor and explore other history resources.
- [RefWorks](#): A bibliographic citation tool; check out the RefWorks tutorial and Fact Sheet and Quick-Start Guide.

Individual Resources

- [Military Student Success Center](#): Assists personnel in any branch of service to reach their educational goals.
- [Center for Accommodations and Support Services](#): Assists students with ADA-related accommodations for coursework, housing, and internships.
- [Counseling and Psychological Services](#): Provides a variety of counseling services including individual, couples, and group sessions as well as career and disability assessments.

Tentative Schedule and Outline (I reserve the right to revise it)

Week	Topic
1	Syllabus eText (Cardinal, T): Chapter 9 Bonds Coaching Actuaries: Bond Basics and Pricing (4.1)
2	eText (Cardinal, T): Chapter 9 Bonds Coaching Actuaries: Bond Basics and Pricing (4.1)
3	eText (Cardinal, T): Chapter 9 Bonds Coaching Actuaries: Bond Basics and Pricing (4.1) & Premium and Discount (4.2)
4	eText (Cardinal, T): Chapter 9 Bonds Coaching Actuaries: Bond Amortization (4.3), Review 1
5	Exam 1 (February 13: Chapter 9) eText (Cardinal, T): Chapter 10 Bonds Part II Coaching Actuaries: Callable Bonds (4.4)
6	eText (Cardinal, T): Chapter 13 Term Structure – Rate Curves Coaching Actuaries: Callable Bonds (4.4), Spot and Forward Rates (5.1)
7	eText (Cardinal, T): Chapter 13 Term Structure – Rate Curves Coaching Actuaries: Spot and Forward Rates (5.1)
8	eText (Cardinal, T): Chapter 14 Asset Liability Management & Chapter 15 Time-Price Sensitivity Measures Coaching Actuaries: Duration (5.2)
9	Spring Break (March 11- March 15)
10	eText (Cardinal, T): Chapter 14 Asset Liability Management & Chapter 15 Time-Price Sensitivity Measures Coaching Actuaries: Duration (5.2), Review 2
11	Exam 2 (March 28: Chapter 10, Chapter 13, Chapter 14 Asset Liability Management (exclude Convexity) & Chapter 15.1 Macaulay and Modified Duration)
12	eText (Cardinal, T): Chapter 14 Asset Liability Management, Chapter 15 Time-Price Sensitivity Measures & Chapter 16 Asset Liability Management Basics II Coaching Actuaries: Convexity (5.3) & Redington and Full Immunization (5.4)
13	eText (Cardinal, T): Chapter 14 Asset Liability Management, Chapter 15 Time-Price Sensitivity Measures & Chapter 16 Asset Liability Management Basics II Coaching Actuaries: Redington and Full Immunization (5.4)
14	eText (Cardinal, T): Chapter 14 Asset Liability Management, Chapter 15 Time-Price Sensitivity Measures & Chapter 16 Asset Liability Management Basics II Coaching Actuaries: Immunization by Exact Matching (5.4)
15	Excel VBA project
16	Final Review
17	Final Exam (TBA)