

Math 418B Winter 2023
Financial Mathematics II

Instructor: Dr. Kathy Temple

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Office Hours: MTWTh 1 - 1:50PM, and by appointment. Office hours are available either in-person (mask required!) or over Zoom.

Meeting Times: 2 - 2:50PM MTWTh in SAMU 116.

Course Goals: This sequence of courses (418A and B) is designed to provide students with an understanding of the fundamental concepts of financial mathematics, and how those concepts are applied in calculating present and accumulated values for various streams of cash flows as a basis for future use in reserving, valuation, pricing, asset/liability management, investment income, capital budgeting, and valuing contingent cash flows. The sequence is designed to prepare students for Exam FM offered by the Society of Actuaries. This quarter, we will cover:

- basics of loan repayment and amortization;
- additional loan topics;
- bond valuation;
- term structure of interest rates;
- duration and immunization;
- additional financial topics.

Prerequisite: Math 418A.

Required Text: Vaaler, Harper, & Daniel, *Mathematical Interest Theory*, 3rd Edition. This quarter we will cover parts of chapters 5-9.

Evaluation:

- Two in-class exams (20% each); tentative testing dates: Tuesday, January 31, and *Wednesday*, February 22.
- Comprehensive final exam (25%); given Tuesday, March 14, from 12-2PM.
- Homework (25%).
- Case study (5%).
- Problem session write-ups (5%); see below for more information.

Grades will be assigned according to the following scale:

		A	93-100%	A-	90-92.99%
B+	87-89.99%	B	83-86.99%	B-	80-82.99%
C+	77-79.99%	C	73-76.99%	C-	70-72.99%
D+	67-69.99%	D	63-66.99%	D-	60-62.99%
		F	59.99%		and below

Course Conduct:

- **Required Materials:** The textbook is required. You will also need at least a scientific calculator. I strongly recommend a financial calculator, in particular either the BAII+ or the BAII+ Professional. I will assume on exams that you have access to such a calculator.
- **Homework:** Homework will be assigned often in class and due dates will be announced at the time of the assignment. Homework must be done neatly and written with reasonable amounts of white space for comments. Your work should be clear, in a logical order, use correct mathematical notation, and follow the guidelines for written work, below. Collaboration on homework is permitted, but **copying is not permitted**. A good rule of thumb is that you should write up a problem on your own, even if you worked with others to figure it out. Credit will not be given to any party for work which is identical. I reserve the right to change this syllabus, including evaluation procedures, if copying becomes a problem.
- **Problem Session write-ups/presentations:** We will have “problem sessions” most Tuesdays (occasionally we may use a different day), where instead of covering new material in class you will be given several problems to work on. You are encouraged to work on these with others in the class. At the end of class we may discuss the problems briefly, and then students will be assigned to write up solutions to each of the problems to be posted on Canvas for the rest of the class. You must write up 3 problems over the course of the quarter, and may not do more than one per week. Problems will be assigned first by taking volunteers among those who still have write-ups to complete and then, if there are no volunteers, choosing among that same group at random. When writing up a solution to a problem, remember that your fellow students are going to be reading it. This means that it needs to be legible – if you have particularly poor handwriting, this might be a good time to learn how to typeset mathematics – and provide enough detail that your fellow students can easily follow your solution. English words (or sentences!), pictures, etc. are encouraged. To receive credit, your correct solution must be submitted on Canvas by 5PM two business days after we work on the problems in class (so this will typically be 5PM on Thursdays). You are welcome, and in fact strongly encouraged, to discuss your solution with me before it is due, and I will be happy to read drafts, etc. Late solutions will be docked 20% per 24-hour period, so, for instance, in a typical week a solution that is turned in at noon on Friday will only give you 80% of the possible credit for that write-up. Credit will not be given until a solution is correct and reasonably well-written. Towards the end of the quarter, if we have extra problems available, you may volunteer to take on additional write-ups for extra credit; extra credit problems will be worth less than regular problems, however.

As time permits, we’ll also have people present their solutions to the class the following week (using the doc cam).
- **Exams:** Any changes to the tentative exam schedule will be announced in advance. Make-up arrangements must be made prior to an exam unless you can document an unexpected circumstance beyond your control that prevented you from taking the exam. All make-up exams must be requested as early as possible. Exams requested more than 24 hours after the scheduled exam will be given only in extreme extenuating circumstances (e.g. hospitalization, jail . . .) When a make-up exam cannot be taken in a timely manner, typically before exams are returned to the class, I reserve the right to instead replace that portion of the course grade with the final exam grade.
- **Case Study:** You’ll be completing a case study this quarter that will allow you to take some of the tools you’ve been developing and apply them to a real-life problem. We’ll be starting this fairly early in the quarter - more details will be coming soon! I expect that it will be due sometime during week 4 (Jan. 23 - 26).

General Course Policies: Come to class. Do your own work. Work really hard; this class is likely to be quite difficult, but you will leave it with a useful set of skills, and a better understanding of financial mathematics!

Masks: Masks are welcome and encouraged at all course activities, and I will likely be masking throughout the quarter. Please note that I am *requiring* masks for in-person meetings in my office, since it's a small space. If you would prefer not to wear a mask, I would be happy to set up a Zoom appointment with you.

Written Work: All work handed in for the course must be written neatly, legibly, clearly, using correct mathematical notation, and with sufficient explanation. A good rule of thumb is to write your solution so that a classmate who knows roughly what's going on in the course but doesn't know how to do this particular problem can understand your solution. As a side benefit, this makes it much more likely that you will be able to understand your solution when you go back to study for exams! The bottom line: for any written work handed in for the course, including homework and exams, *you must show your work*.

Late Work: Homework assignments can be submitted late with a 20% penalty per 24-hour period, up until the time that graded assignments are returned to the rest of the class. Assignments submitted after graded work is returned to the rest of the class will not receive credit, however, the lowest homework score will be dropped. Please note that I tend to grade assignments shortly after they are submitted and almost always within 2 class days.

Submitting Work Electronically: All work for this course will be submitted electronically through Canvas.

- Homework assignments can be submitted in .pdf format ONLY.
- We will be using significant mathematical notation in this course, which will make typesetting with correct notation difficult. Therefore, I strongly suggest handwriting most of your homework. You have a few options for submission:
 - You can scan it to a PDF document using a cell phone camera. Some apps that do this (there are many others if you don't like these): Adobe (free) or CamScanner (free version) for Android phones; the Notes App (built-in) or CamScanner (free version) for iPhone.
 - You can take a well-lit, easy-to-read photograph, insert it into a Microsoft Word or OpenOffice Writer document, make sure that the photo is oriented correctly and easy to read, and then save the document as a .pdf file for upload to Canvas.
 - If your work is multiple pages, please upload it as a SINGLE file.

Whichever method you choose, please double-check that your image is oriented correctly. Images not oriented correctly or images that are not easy to read will lead to the assignment being returned without being graded.

Contingency Planning: In the event that we are unable to meet in person (this could be due to the university shifting entirely to remote coursework, inclement weather or wildfire smoke closures, or because I need to isolate), this course will convert for the necessary time period to a *synchronous* online course using Zoom. This means that you will be expected to continue attending class at the scheduled times, but we will meet using Zoom rather than in-person. In the event that a period of remote learning includes a course assessment, I may change the format of the assessment if necessary.

Illness: If you are feeling unwell for any reason, *please, please, please stay home*. Being vigilant about this will help prevent the spread of COVID-19 (and other bugs!) and allow us to continue in-person classes.

Academic Honesty: Consult university policies (CWUP 5-90-040(22), CWUR 2-90-040(22), and WAC 106-125-020) for student conduct, cheating, plagiarism, and other academic expectations. CWU's policies and recommendations for academic misconduct will be followed, leading to disciplinary action up to and including failing the course.

Inclusivity Statement: As a member of a peer learning community, a high degree of professionalism is necessary. **CWU expects every member of the university community to contribute to an inclusive and respectful classroom culture.**

Classroom Conduct: Students in this class are expected to interact with students and the professor professionally. Instances of disruptive conduct, obstructive conduct, or harassment (see definitions below from the Washington Administrative Code: WAC 106-125-020) will be referred to the Dean of Student Success.

Disability Support Services: Central Washington University is committed to creating a learning environment that meets the needs of its diverse student body. Students with disabilities should contact Disability Services to discuss a range of options to removing barriers, including accommodations: Hogue Hall 126, 509.963.2214, DS@cwu.edu

Is my absence excused? Excused absences will not lower your overall grade in this class and are determined on a case-by-case basis. Excused absences include illness, bereavement, and school-related activities. With the exception of illness, documentation is required. Excused absences do not include travel for holiday breaks, work, or non-emergency travel delays.

In compliance with RCW 28B.137.010, Central Washington University makes every effort to deal reasonably and fairly with students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. Students must present written notice to their instructor within the first two weeks of class listing the specific dates on which accommodations are required. Contact the Dean of Student Success at (509) 963-1515 for further information or questions.

Communication: While we all hope for a smooth quarter, we know that best-laid plans can go awry! Some of us may need to quarantine or isolate in the middle of the quarter. We all may need to shift entirely remote on short notice (and it may be worth thinking in advance about how you would make that work, both in terms of technology and in terms of being able to attend class and complete work remotely). In all things, communication is going to be key. If you have something going on, please let me know (no details you don't feel comfortable sharing, of course, just a general heads-up). As things need to change during the quarter, I will do my best to let you know as soon as I can. In all things, please extend grace to me and your classmates, and I will do my best to do the same.

I reserve the right to change the policies contained in this syllabus as dictated by developments during the quarter.