

**Math 440 Fall 2016**  
**Mathematical Theory of Financial Economics**

**Instructor:** Dr. Kathy Temple

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**Office Hours:** MF 11 - 11:50 AM, TTh 3 - 3:50 PM, and by appointment.

**Course Goals:** The student will be able to give various constraints on the prices of options, use the binomial pricing model to price options, price European options using the Black-Scholes formula, apply the lognormal distribution to calculate probabilities for option values, apply Ito's Lemma and geometric Brownian motion to option prices, and apply various interest rate models (including the Vasicek and Cox-Ingersoll-Ross models). For more detailed outcomes, see the syllabus for Exam MFE/3F at <https://www.soa.org/Files/Edu/2016/edu-2016-11-mfe-syllabus.pdf>

**Prerequisite:** Math 418C and 411B, or permission.

**Required Text:** McDonald, *Derivatives Markets*, 3rd edition, Pearson. We'll be covering all or parts of Chapters 9, 10, 11, 12, 13, 14, 20, 21, 23, 24, and 25. Depending on time, we may skip some sections of these chapters; we'll discuss how we'll prioritize in class.

**Evaluation:**

- Homework (20%).
- Problem write-ups/presentations (10%); see below.
- Two midterm exams (20% each); tentative testing dates Tuesday, Oct. 11 and Tuesday, Nov. 8.
- Comprehensive final exam (30%), given Wednesday, Dec. 7, from noon-2PM.

**Course Conduct:**

- **Required Materials:** The textbook is required. You will also want to have at least a scientific 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, *stapled*, and written on clean-edged paper. Your work should be clear, in a logical order, and provide sufficient explanation. What's sufficient explanation? A good guide is to think about whether another student in the class who didn't know how to do this particular problem could understand your solution. This will also help you understand your solution later! 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. Credit will not be given for late homework.

I will also assign smaller homework assignments from time to time of the form, "Read this section in the book and respond to these questions." These will probably have a much shorter turn-around time than the regular homework assignments and, in particular, I may ask you to do this before the next class meeting. These responses will typically be posted to a discussion thread on Canvas.

- **Problem day write-ups/presentations:** As you may have noticed, we have 5 hours/week together. Around once/week or so we'll spend some time working on problems in class. At the end of class, students will be assigned to present or write up solutions to these problems. Time permitting, we'll have people present their solutions (using the doc cam) sometime in the next couple of class days. These problems must also be written up neatly and given to me either electronically or in a form suitable for scanning by class time on the third class day after the problems are distributed. You are required to present/write-up at least  $\lfloor N/3 \rfloor$  problems over the course of the quarter, where  $N$  is the number of problem days. When presenting or writing up a problem, remember that it needs to be understandable to your fellow students!
- **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.
- **Other Information:** Central Washington University is committed to creating a learning environment that meets the needs of its diverse student body. If you anticipate or experience any barriers to learning, discuss your concerns with the instructor. Students with disabilities should contact Disability Services to discuss a range of options to removing barriers, including accommodations. Student Disability Services is located in Hogue 126. Call (509) 963-2214 or email ds@cwu.edu for more information.

The usual homework assignments and problem session write-ups will be due in the last week of classes.

- **A Philosophical Comment:** You are now seniors (well, most of you!), and we're shortly going to be sending you out into jobs where you'll be responsible for learning new material on your own, either for actuarial exams or for job-related functions. Part of my goal for this quarter is to give you some practice in trying to put together material on your own - to help you be a more independent learner. We'll still try to be clear about what we're doing, where we're headed, and proceed in a somewhat linear fashion to get there; my goal is that by the end of the quarter you'll be able to help drive that process at least somewhat.