Title of Course: Introduction to Financial Mathematics Math4250.

Prerequisites: MATH:2850 or STAT:3120, or equivalent.

Start and end times: 3:30P - 4:20P MWF 105 MLH

Instructor: Palle Jorgensen
Department of Mathematics: https://math.uiowa.edu/

Course ICON site: To access the course site, log into Iowa Courses Online (ICON) https://icon.uiowa.edu/index.shtml using your Hawk ID and password.

Course Home
The College of Liberal Arts and Sciences (CLAS) is the home of this course, and CLAS governs the policies and procedures for its courses. Graduate students, however, must adhere to the academic deadlines set by the Graduate College.

Instructor: Palle Jorgensen palle-jorgensen@uiowa.edu or MLH 25B.
Contact info. Office location and office hours/Student drop-in hours: 25B MLH, hours 11:30-12:30 MWF, or by appointment. Just ask. We can also meet in the Muhly-Lounge room 3, down the hall in MLH from the Math office. Phone or E-mail me: office # 335-0782

Grader:

Steven Un MLH 325L steven-un@uiowa.edu

DEO Contact information: Professor Ryan Kinser, 14 MLH, ryan-kinser@uiowa.edu

Description of Course
Course topics: Option Pricing

1 Asset Pricing Basics
2 Continuous-Time Models
3 Black-Scholes formulas.
5 Introduction to Monte Carlo and Binomial Models


7 Forward, Futures, and Exchange Options.


9 More on Monte Carlo and Binomial Valuation

10 Finite Difference Methods


12 Introduction to Fixed Income Derivatives

13 Valuing Derivatives in the Extended Vasicek Model

14 Term Structure Models.

A Programming in VBA.


Click the yellow link, then Springer, then Mycopy. Credit card.

Fyi.: The book by K. Back is mandatory, but we will announce supplementary course material during the semester.

Message to students from Prof Elias S Shiu, elias-shiu@uiowa.edu in Stats & Actuarial Sci.

Addressed to students in Actuarial Sci and Stats: “Some of you wanted to take MATH:4250 in fall but its old schedule conflicted with ACTS:4280. Professor Jorgensen has kindly arranged a time change, now MWF at 3:30 pm. He invites actuarial students to take his course. In case you do not know, option pricing theory (which is a key topic in MATH:4250) has “moved” from IFM to FAM-L and ALTAM.”

Academic Honesty and Misconduct
All students in CLAS courses are expected to abide by the CLAS Code of Academic Honesty. Undergraduate academic misconduct must be reported by instructors to CLAS according to these procedures. Graduate academic misconduct must be reported to the Graduate College according to Section F of the Graduate College Manual.

Student Collaboration:
The homework for this course is designed to help you master your knowledge related to the topics covered during lecture. As such, you may work on the homework problems and other assignments with others or use online resources. However, please be aware that to master the skills needed for this class, practice is required and that to do well on the final exam you will need to work many of these problems multiple times without help. Be sure to test your knowledge by doing much of the homework on your own. Even if you collaborate with your colleagues when solving the homework problems, I strongly encourage you not to copy, mot-a-mot, the solutions from others but instead try to write them in your own understanding. This is an excellent exercise proven to help students with their material comprehension.

**Student Complaints**
Students with a complaint about a grade or a related matter should first discuss the situation with the instructor and/or the course supervisor (if applicable), and finally with the Director or Chair of the school, department, or program offering the course.

**Drop Deadline for this Course**
You may drop an individual course before the deadline; after this deadline you will need collegiate approval. You can look up the drop deadline for this course here. When you drop a course, a “W” will appear on your transcript. The mark of “W” is a neutral mark that does not affect your GPA. Directions for adding or dropping a course and other registration changes can be found on the Registrar’s website. Undergraduate students can find policies on dropping and withdrawing here. Graduate students should adhere to the academic deadlines and policies set by the Graduate College.

**Grading System.**
I will not use a +/- grading system. Final course grade will be assessed based on your performance in the following activities:

- **Homework:** 30% - on 10 assignments
- **Midterm I:** 20% - on 9/27, 6:30-8:30pm (location TBD)
- **Midterm II:** 20% - on 11/1, 6:30-8:30pm (location TBD)
- **Final:** 30% - TBD

As the class progresses, all grades will be recorded on ICON.

**Letter grades to point scores:**

A. 85-100.

B. 75-84.
C. 65-74.
D. 55-64.
F. less than 55.

Calendar of Course Assignments and Exams.

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>August 21</td>
<td><strong>Opening of Classes.</strong></td>
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<tr>
<td>September 4</td>
<td>Labor Day - University Holiday -- No Classes; Offices Closed</td>
</tr>
<tr>
<td>November 19 - 26</td>
<td>Fall Break</td>
</tr>
<tr>
<td>November 23 - 24</td>
<td>University Holidays, Offices Closed</td>
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<tr>
<td>November 27</td>
<td>Classes resume</td>
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<tr>
<td>December 8</td>
<td>Close of Classes</td>
</tr>
<tr>
<td>December 11 - 16</td>
<td>Final Examination Week.</td>
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*Week-by-week plan. Rough outline, detailed TOC below.*
- **Week 1**, *ch 1*. Fundamental Concepts.
- **Week 2, ch 2**. *Tools from math and statistics.*
- **Week 3, ch 2**. Stochastic calculus. Important.
- **Week 4, ch 3**. Options. Theory & practice.
- **Week 5, ch 3**. Hedging.
- **Week 6, ch 4**. Stochastic Volatility Models.
- **Week 7, ch 5**. Monte Carlo simulation, algorithms and VBA code.
- **Week 8, chs 6-7**. **Exotic Options**.
- **Week 9, chs 8-9**. Path-Dependent Options. More difficult.
- **Week 10, ch 10-11**. **American Options** and more.
- **Week 11, ch 12-13**. **Fixed Income Derivatives and more**.
- **Week 12, ch 14**, and Appendices. VBA.
- **Week 13 review**.

**COMMENTS ABOUT CODES USED IN THE COURSE.** You will not need to know codes; there are lots of scripts readily available. VBA/Excel, matlab etc. The appendix covers the basics you will need. Some Exercises can be done with VBA/Excel. But you will have the choice of anyone of your favorites, Matlab etc. So even without prior experience with VBA you are still ok; the idea is just to imitate the discussion from inside the chapter; the parts that are relevant to the particular Exercise from the book. If you look carefully inside the chapter, you will find the reasoning needed for justify the conclusion in the exercise, also without a program. Some of you have played with VBA, and perhaps you can team up; this will be perfectly fine.
Course attendance: Attendance is expected for each class meeting, as it will help you better understand the concepts covered in lectures. If you miss a class, you are responsible for any assignments/announcements made/material covered.

Participation in class discussions: I strongly encourage you to actively participate in class discussions; ask questions or ask for more explanations whenever you feel confused; in this class there is NO stupid question! Also, as a general rule, for each lecture you should spend at least two hours on reading/homework/repeating the material, etc. You should start working over the homework problems right after the relevant sections are covered. If you encounter any difficulties, I strongly recommend you seek help immediately! Don't postpone it until one day before the exam! Also remember this: small deficiencies at the beginning tend to rapidly grow into big ones.

Assignments: There will be weekly homework assigned primarily of problems from the book and other problems of my choosing. As the semester progresses, the assignments and their due dates will be announced during the lecture time and will be also posted on ICON. The lowest homework score will be dropped. Solutions for the homework problems will be posted on the ICON. No late homework will be accepted unless extraordinary circumstances are encountered. The HW must be submitted typed in Latex (or similar). For example, you could use Overleaf to generate it---is fairly easy to use and there is a pretty good option free of charge. Keep in mind that learning Latex as early as possible is an excellent skill which will serve you well throughout your career as a mathematician (or any other type of scientist). In any case, the HW you turn in should look neat and professional. The following guidelines should be followed:

- It must be typed on an 8.5x11 inch white paper using black ink.
- It should be stapled. (There is no stapler in the classroom.)
- The problems must be answered linearly in the order they are assigned.
- It should look need with, with space left between margins and in the margins.
- It should not have scratch work or scribbles on it.
- Your solutions should clearly indicate your reasoning, credit will not be given if you do not show your work.
- The problems statements must appear on your HW directly before your solutions. You do not need to write the problems word by word, but it should be clear enough so someone can understand the problems without having to consult the book.

Date and Time of the Final Exam
TBD
College of Liberal Arts and Sciences (CLAS) Course Policies

Attendance and Absences

Course attendance: Attendance is expected for each class meeting, as it will help you better understand the concepts covered in lectures. If you miss a class, you are responsible for any assignments/announcements made/material covered. University regulations require that students be allowed to make up examinations which have been missed due to illness or other unavoidable circumstances (e.g., involvement in other UI authorized activities or sports, etc). So, students that missed an exam or assignment due to any of these reasons must notify the instructor immediately. They are also strongly encouraged to use the CLAS absence form on ICON under the Student Tools. Students with mandatory religious obligations or UI authorized activities must discuss their absences with me as soon as possible. Religious obligations must be communicated within the first three weeks of classes.

Exam Policies

Communication: UI Email
Students are responsible for all official correspondences sent to their UI email address (uiowa.edu) and must use this address for any communication with instructors or staff in the UI community.

Other Expectations of Student Performance

Cell phones policy: I am expecting you to NOT use your cell phones, i-pads, or computers during the lecture time for other purposes than class related.

Changing grade policy: If I change your grade on a homework or exam you should always remind me in the same day by e-mail that I have changed your grade.

Where to Get Help

Students will find the following resources useful for this course:

Writing Center: http://www.uiowa.edu/~writingc/

Speaking Center: http://clas.uiowa.edu/rhetoric/for-students/speaking-center

Math Tutorial Lab: 125 MLH http://www.math.uiowa.edu/math-tutorial-lab

Tutor Iowa: https://tutor.uiowa.edu/
University Policies

Accommodations for Students with Disabilities
Basic Needs and Support for Students
Classroom Expectations
Exam Make-up Owing to Absence
Free Speech and Expression
Mental Health
Military Service Obligations
Non-discrimination
Religious Holy Days
Sexual Harassment/Misconduct and Supportive Measures
Sharing of Class Recordings