

KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF MATHEMATICS & STATISTICS
DHAHRAN, SAUDI ARABIA

AS 498: Topics in Actuarial Science and Financial Mathematics
Term 182 – Spring 2018

Instructor: Abedalhay Elmughrabi, MS Actuarial Science & MS Mathematics
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Office Hours: UTR 10:00 AM – 10:50 AM or by appointment

Time: UTR 09:00 AM – 09:50 AM
Place: Building 6 – Room 211

Prerequisite: AS 288 & Stat 301
Credit Hours: (3-0-3)

Course Description:

Rational valuation of derivative securities. Put-call parity. European put and call options. Arbitrage opportunities. European and American option valuation using the binomial model and the Black-Scholes option-pricing model. Comparison of European and American options. Option Greeks. Properties of a lognormal distribution. Exotic Options.

Course Material:

1. Course Syllabus: Posted on Blackboard.
2. Textbook: Robert L. McDonald. (2013). **Derivatives Markets 3rd Edition. Pearson.**
3. Notes: Class Notes.
4. Calculator: Texas BA II Plus Calculator or Texas BA II Professional.
5. Reference 1: Berk, J. and DeMarzo, P. (2017). **Corporate Finance Fourth Edition. Pearson. ISBN: 978-0-13408-327-8.**

Attendance:

The student is responsible for all material presented in class. Some of the material presented in class might not be in the textbook. Generally, attendance will be checked once the teacher enters the class room. Entering the class after that, is considered as late where two late cases will be considered as one Absence. Students' late more than 10 minutes will be considered absent regardless of any excuse. Unexcused absences and late cases might be penalized by grade deductions as announced by the instructor. Excessive unexcused absences will result in a grade of DN in accordance with University rules.

Communication:

For regular announcements, students are advised to check Blackboard regularly.

Grading:

Your course grade will be based on the total of points accumulated on class work (60 points: 20 points Homework & 40 Points Quizzes), two major exams (100 points each), and Final Exam (140 points). The following scale gives the cut-off points for the course grades.

Letter grade	A+	A	B+	B	C+	C	D+	D	F	DN
Cut-off	90%	85%	80%	75%	67%	60%	55%	50%	<50%	> 9 absences

Activity	Weight
Exam 1 Date: February 17th, 2019, Time and Location: TBA	100 points (25%)
Exam 2 Date: March 24th, 2019, Time and Location: TBA	100 points (25%)
Class Work (20 points HW + 40 Points Quizzes)	60 points (15%)
Final Exam (Comprehensive) Final Exam Date : April 30th, 2018 Time: 7 PM	140 points (35%)

Missing Exam I or II:

No makeup exam will be given under any circumstance. When a student misses Exam I or Exam II for a legitimate reason (such as medical emergencies), his grade for this exam will be determined based on the existing formula, which depends on his performance in the non-missed exam and in the final exam. It is to the professor's discretion whether to accept or refuse the student's excuse for missing an exam.

Exam Questions:

The questions of the common exams are based on class examples and at home practice problems.

General Comments:

- It is essential that you keep up with the material as it is presented. This, unfortunately, is not one of those course where it is possible to catch up the last minute. In particular, it is important to do the problems as the material is presented.
- I encourage you to discuss the assigned problems with other students and work on them in groups. Discussing the assigned problems with others will also help you explain them clearly in the quizzes or exams.
- Students are required to carry pens, note-taking equipment and a calculator to EVERY lecture and exam. It is strongly recommended to keep a binder for class-notes.
- Bonus points might be awarded for showing alertness and participation in class discussions.
- The schedule is tentative and might be adjusted based on the progress of the class.
- To successfully prepare for the SOA exams, students MUST solve problems regularly. The selected assigned problems are specifically designed to prepare you for major and final exams, and SOA Exam FM. So, it is expected that you complete these problems step-by-step and with comprehension.
- For every exam, you need to bring with you *pens, pencils, a sharpener, an eraser, and a SOA approved calculator.*

Student Learning Outcomes:

<https://www.soa.org/Files/Edu/2019/2019-03-exam-ifm-syllabi.pdf>

Academic Integrity:

All KFUPM policies regarding **ethics** and **academic honesty** apply to this course.

Week	Date	Section	Topics	Important Dates
1	Jan 6 th – Jan 10 th	Chapter 1 Sections: 1,2,4,5 Chapter 2 Sections: 1-4	Introduction into Derivatives & An Introduction into Forwards and Options	
2	Jan 13 th – Jan 17 th	Chapter 3 1, 2, 3, 4	Insurance, Collars and Other Strategies	
3	Jan 20 th – Jan 24 th	Chapter 5 1, 2, 3 (through middle of page 182), 4 (Through top of page 189)	Financial Forwards and Futures	
4	Jan 27 th – Jan 31 st	Chapter 9 1 (through the bottom of page 283), 3	Parity and Other Option Relationships	
5	Feb 3 rd – Feb 7 th	Chapter 10 Sections: 1,2	Binomial Option Pricing: Basic Concepts	
6	Feb 10 th – Feb 14 th	Chapter 10 Sections: 3,4,5, 6 (through the middle of page 329) Chapter 11: Section 1	Binomial Option Pricing: Basic Concepts (Continued) & Binomial Option Pricing: Selected Topics	
7	Feb 17 th – Feb 21 st	Chapter 12 Sections: 1, 2	The Black-Sholes Formula	Feb 17 th : First Major Exam.
8	Feb 24 th – Feb 28 th	Chapter 12 Sections: 3 Appendices A, B	The Black-Sholes Formula (Continued)	
9	Mar 3 rd – Mar 7 th	Chapter 13 Sections: 1-4, 5 (beginning at the bottom of page 410)	Market Making and Delta-Hedging	
10	Mar 10 th – Mar 14 th	Chapter 18 Sections: 1-4 Appendix A, Appendices B.1, C	The lognormal Distribution	

11	Mar 17th – Mar 21st	Chapter 14 Sections: 1, 2(through the bottom of page 427), 3 (through the bottom of page 430), 4 (through the bottom of page 433),	Exotic Options	
12	Mar 24th – Mar 28th	Chapter 14 5 (through Figure 4 on p. 437), 6, Exercises 14.2 and 14.21 on p. 429	Exotic Options (Continued)	Mar 24th : Second Major Exam
13	Mar 31st – Apr 4th		Selected Topics on Derivatives and Investment	
14	Apr 7th – Apr 11th		Selected Topics on Derivatives and Investment	
15	Apr 14th – Apr 18th		Selected Topics on Derivatives and Investment	
Final Examination				
Day: Saturday Date: April 30th, 2019 Time: 7 PM Location: TBA				