

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

AS 250: Quantitative Financial Models for Actuaries
Term 202 – Spring 2020

Instructor: Ali N. Duman
Office: Building 5 – Room 325
Phone: 2632
Email: aliduman@kfupm.edu.sa
Office Hours: UT 8:00 AM – 8:50 AM, R 9:00 AM – 10:50 or by appointment

Time: UT 07:00 AM – 07:50 AM, R 07:00 AM – 08:50
Place: Online

Prerequisite: AS 201 & Stat 214
Credit Hours: (2-2-3)

Course Description:

Introductory Derivatives: Forwards and Futures. Options and Related Strategies. European put and call options. Put-call parity. Arbitrage opportunities. Rational valuation of derivative securities. Binomial tree and Black-Scholes Pricing Models. Actuarial Applications of Options Embedded in Insurance Products. Risk Management and Hedging. Introductory Stochastic differential equations. Ito's formula. Other SOA FM and IFM/MFE topics. Spreadsheet programming software.

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. Lab Manual: Selected chapters from **Simon Benninga, Financial Modelling.**

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, lab work, two major exams, and Final Exam. 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
Quizzes	60 points (15%)
Labwork	40 points (10%)
Class Work (Class participation+Attendance)	20 points (5%)
Midterm Date: TBA, Time and Location: TBA	120 points (30%)
Final Exam (Comprehensive) Final Exam Date : TBA Time: TBA	160 points (40%)

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.

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.
- For every exam, you need to bring with you *pens, pencils, a sharpener, an eraser, and a SOA approved calculator.*

Academic Integrity:

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

Week	Date	Section	Topics	Important Dates
1	Jan 17th – Jan 21th	McDonald 1.1, 1.2, 1.4	Introduction to Derivatives	
2	Jan 24th – Jan 28th	McDonald 1.5 2.1, 2.2	Introduction to Derivatives (cont.) An Introduction to Forwards and Options	
3	Jan 31st – Feb 4th	McDonald 2.3, 2.4 3.1, 3.2	An Introduction to Forwards and Options (cont.) Insurance, Collars, and Other Strategies	
4	Feb 7th – Jan 11st	McDonald 3.3, 3.4 4.1	Insurance, Collars, and Other Strategies (cont.) Introduction to Risk Management	
5	Feb 14th – Feb 18th	McDonald 5.1, 5.2, 5.3	Financial Forwards and Futures	
6	Feb 21rd – Feb 25th	McDonald 9.1, 9.3	Parity and Other Option Relationships	
7	Feb 28st – Mar 4th	McDonald 10.1, 10.2, 10.3	Binomial Option Pricing: Basic Concepts	
8	Mar 7th – Mar 11th	McDonald 10.4, 10.5, 10.6	Binomial Option Pricing: Basic Concepts (cont.)	Midterm:TBA
9	Mar 14th – Mar 18th	McDonald 11.1 121,12.2	Binomial Option Pricing: Selected Topics The Black-Scholes Formula	
10	Mar 21nd – Mar 25th	McDonald 12.3 Appendices A, B	The Black-Scholes Formula (cont.)	
11	Mar 28th – Apr 1st	McDonald 13.1, 13.2, 13.3	Market-Making and Delta-Hedging	
12	Apr 4th – Apr 8th	McDonald 13.4, 13.5, 13.6	Market-Making and Delta-Hedging (cont.)	
13	Apr 11st – Apr 15th	McDonald 14.1, 14.2, 14.3	Exotic Options: I	
14	Apr 18th – Apr 22th	McDonald 14.3, 14.4, 14.5	Exotic Options: I (cont.)	
15	Apr 25th – Apr 29th	McDonald 18.1, 18.2, 18.3, 18.4	The Lognormal Distribution	
Final Examination				
Day: TBA Date: TBA Time: TBA Location: TBA				