



جامعة الملك فهد للبترول والمعادن
King Fahd University of Petroleum & Minerals

KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

DEPARTMENT OF MATHEMATICS & STATISTICS

DHAHRAN, 31261, Kingdom of Saudi Arabia

AS 201: Financial Mathematics

Term 161 – fall 2016

Instructor: Mr. Moenes Mellouli, MA MS MBA

Office: Building – 5, Room – 320 **Phone:** 7630 **E-mail:** mmellouli@kfupm.edu.sa

Office Hours: Sunday, Tuesday and Thursday: 8:00 – 9:40 am or by appointment.

Class meeting Days: UTR 14:10 – 15:00 pm. Building – 6, Room - 201

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

Course Descriptions:

The course concentrates on the theory of compound interest and the mathematics of investment and credit; however, life contingencies are also introduced toward the end of the semester. Major topics include the measurement of interest, annuities certain (level, non-level, and continuous), amortization schedules, sinking funds, investment yield rates, and valuation of bonds and other securities. A basic knowledge of calculus and probability is assumed. Methods of loan measurement and payments (Islamic and Conventional) are illustrated in amortization and sinking fund schedules. Islamic views on interest and investments will be discussed. This course is intended for Actuarial Science and Financial Mathematics majors' students, who are studying for the professional exam on (FM) given by the Society of Actuaries and the Casualty Actuarial Society.

Credit: (3 – 0 – 3).

Prerequisite: Math 102

Textbook & Package:

- 1- Mathematics of Investment and Credit, 5th edition, by Broverman, S.A., ACTEX Publications Inc. (2010).
 - 2- McDonald, R.L., Derivatives Markets (Third Edition), 2013, Pearson
 - 3- ACTEX SOA exam FM study manual, December 2014 edition, by Hasset M. J., and Rattliff M. I.
 - 4- Texas BAII plus calculator or Texas BAII professional or check for other SOA approved calculators
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Learning Objectives:

<https://www.soa.org/education/exam-req/edu-exam-fm-detail.aspx>

Activity Schedule:

Assessment for this course is based on a **set of quizzes**, **two major exams** and a **comprehensive final exam**, as described in the following table:

Activity
Quizzes (40%)
Major Exam I (15%) Date: Wednesday, October 26, 2016 Time: from 06:00 - 8:00 pm Location: Building 6-201
Major Exam II (15%) Date: Sunday, December 4, 2016 Time: from 06:00 - 8:00 pm Location: Building 6-201
Final Exam (Comprehensive) (30%) Date: TBA Time: TBA Location: TBA

Attendance, cell phone use & other penalties:

- ✓ Attendance on time is *very* important. A 1% will be deducted from your final grade if you enter the class when the door is closed. **No excuses will be accepted.**
- ✓ Notebook & pen/pencil are mandatory. A 1% will be deducted from your final grade if you enter the class without your Financial Mathematics notebook and something to write with. **No excuses will be accepted**
- ✓ Full attention in class - A 1% will be deducted from your final grade if you are seen using your cellphone for texting or surfing the web. **No excuses will be accepted.**
- ✓ In accordance with the University rules, "a grade of **DN** in a course is given if the student's unexcused absences are more than 20% of the lecture sessions scheduled for the course". Therefore, students who accumulate **12, or more, unexcused absences** will receive a **DN** grade.

Letter 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

Exam Questions:

- ❖ The questions of quizzes & major exams are based on the in class examples & at home practice problems.

Missing Exam I or Exam II or Exam III:

- 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 exams 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 class information:

- Students are required to carry a pen/pencil, notebook and a SOA approved calculator to EVERY lecture.
- Students are required to carry a pen/pencil, a sharpener, and eraser and a SOA approved calculator to every exam.

General SOA FM exam information:

- To successfully prepare for the SOA FM exam, students MUST solve problems regularly. The selected assigned problems are specifically designed to prepare you for quizzes, major and final exams and the SOA FM exam. So, it is expected that you complete these problems step-by-step and with comprehension.
- The SOA FM examination is a three-hour multiple-choice examination.

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

**AS 201 – Financial Mathematics
2016-2017 (161)**

Notes: The pace of coverage and material to be covered given in this table is tentative and may be modified when needed.

Week	Date	Sec.	
Interest Theory*			
1	Sep.18-22	Chapter 1 1.1 1.2	Interest Rate Measurement Interest Accumulation and Effective Rates of Interest Present Value (excluding 1.2.1)
2	Sep. 25-Sep. 29	1.3 1.4 1.5 1.6	Equation of Value Nominal rates of Interest Effective and Nominal Rates of Discount The force of Interest
3	Oct. 2-6	1.7 Chapter 2 2.1	Inflation and the “Real” rate of Interest Valuation of Annuities Level payment Annuities
4	Oct.9-13	2.2 2.3 2.4	Level payment Annuities – Some Generalisations Annuities with Non-Constant payment Applications and Illustrations (excluding 2.4.2 &2.4.3)
5	Oct. 16-20	Chapter 3 3.1 3.2 3.3 Chapter 4 4.1 4.2 4.3	Loan Repayment The amortization model of Loan Repayment Amortization of a Loan with Level Payments (excluding 3.2.1-2) The sinking Fund Method of Loan Repayment Bond Valuation Determination of Bond Prices Amortization of a Bond Applications and Illustrations (excluding 4.3.2)
6	Oct. 23-27 Oct. 27 – Last day to drop a course with W	Chapter 5 5.1 5.2 5.3	Measuring the Rate of Return of an Investment Internal Rate of Return defined and Net Present Value (excluding 5.1.4) Dollar-weighted and Time-Weighted Rate of return Applications and Illustrations (excluding the investment year portion of 5.3.1-3)
7	Oct. 30- Nov. 3	Chapter 6 6.1 6.3	The term structure of interest rates Spot Rates of Interest Forward rates of Interest
8	Nov. 6-10	6.4 Chapter 7 7.1	Cont. Cash flow duration and Immunization Duration of a set of Cash flows and Bond duration (excluding 7.1.6)
9	Nov. 20-24	7.2 Chapter 8 8.1	Asset-liability Matching and Immunization Additional Topics in Finance and Investment The dividend discount model of stock valuation
Financial Economics**			
10	Nov. 27- Dec. 1	Chapter 1	Introduction to Derivatives
11	Dec. 4-8	Chapter 2	An Introduction to Forwards and Options
12	Dec. 11-15	Chapter 3	Insurance, Collars, and Other Strategies
13	Dec. 18-22	Chapter 4	Introduction to Risk Management (excluding 4.5)
14	Dec. 25-29	Chapter 5	Financial Forwards and Futures (5.1 – 5.4 and appendix 5.B)
15	Jan. 1-5	Chapter 8	Swaps (8.1 – 8.3)
16	Jan 8	Last day of class	Review

* Mathematics of Investment and Credit Textbook

** Derivatives Markets Textbook