

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

AS 201: Financial Mathematics
Term 181 – Fall 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 11:00 AM – 11:50 AM
Place: Building 3 – Room 206

Prerequisite: Math 102
Credit Hours: (3-0-3)

Course Description:

Theory of compound interest and the mathematics of investment and credit. Measurement of interest, annuities certain (level, non-level, and continuous), amortization schedules, sinking funds, investment yield rates, and valuation of bonds and other securities. Methods of loan measurement and payments (Islamic and Conventional) are illustrated in amortization and sinking fund schedules. Islamic views on interest and investments.

Course Material:

1. Course Syllabus: Posted on Blackboard.
2. Textbook: Broverman, S.A., Mathematics of Investment and Credit (Fifth Edition), 2010, ACTEX Publications, ISBN 978-1-56698-767-7.
3. Notes: Class Notes.
4. Calculator: Texas BA II Plus Calculator or Texas BA II Professional.
5. Reference 1: Daniel, J.W., and Vaaler, L.J.F., Mathematical Interest Theory (Second Edition), 2009, The Mathematical Association of America, ISBN: 978-0883857540.
6. Reference 2: Kellison, S.G., The Theory of Interest (Third Edition), 2009, Irwin/McGraw-Hill, ISBN: 125921544X or 978-1259215445.

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 (100 points: 20 points Homework & 80 Points Quizzes), two major exams (80 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 Exam 1 Date: October 17th, 2018, Time and Location TBA	80 points (20%)
Exam 2 Exam 2 Date: November 14th, 2018, Time and Location TBA	80 points (20%)
Class Work (20 points HW + 80 Points Quizzes) In class	100 points (25%)
Final Exam (Comprehensive) Final Exam Date : December 22nd, 2018, Time: 7 PM – 10:00 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/education/exam-req/edu-exam-fm-detail.aspx>

Academic Integrity:

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

Week	Date	Section	Topics	Important Dates
1	Sep 2 nd – Sept 6 th	Chapter 1 1.1 1.2	Interest rate Measurement Interest Accumulation and Effective Rates of Interest Present Value (excluding 1.2.1)	
2	Sep 9 th – Sept 13 th	1.3 1.4 1.5	Equation of Value Nominal rates of Interest Effective and Nominal Rates of Discount	
3	Sep 16 th – Sept 20 th	1.6 1.7 2.1	The force of Interest Inflation and the “Real” rate of Interest Level Payment Annuities	
4	Sep 23 rd – Sept 27 th	Chapter 2 2.1 Cont. 2.2	Valuation of Annuities Level Payment Annuities Level payment Annuities – Some Generalizations	Sep 23 rd : National Day Holiday Sep 29 th : Normal day classes.
5	Sep 30 th - OCT 4 th	2.3 2.4	Annuities with Non-Constant payment Applications and Illustrations (excluding 2.4.2 & 2.4.3)	
6	Oct 7 th - Oct 11 th	Chapter 3 3.1 3.2 3.3	Loan Repayment The amortization model of Loan Repayment Amortization of a Loan with Level Payments (excluding 3.2.1 & 3.2.2) The sinking Fund Method of Loan Repayment	Oct 11 th : Last day for dropping course(s) with grade of "W" thru KFUPM Portal*
7	Oct 14 th – Oct 18 th	Chapter 4 4.1 4.2 4.3	Bond Valuation Determination of Bond Prices Amortization of a Bond Applications and Illustrations (excluding 4.3.2)	Oct 17 th : First Major Exam
8	Oct 21 st – Oct 25 th	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, 5.3.2 & 5.3.3)	
9	Oct 28 th – Nov 1 st	Chapter 6 6.1 6.3	The term structure of interest rates Spot Rates of Interest Forward rates of Interest	
10	Nov 4 th – Nov 8 th	Chapter 7 7.1	Cash flow duration and Immunization Duration of a set of Cash flows and Bond duration (excluding 7.1.6)	Nov 8 th : Last day for withdrawal from all courses with grade of "W" thru the Univ. Registrar Office*
11	Nov 11 th – Nov 15 th	7.2 Chapter 8 8.1	Asset-liability Matching and Immunization Additional Topics in Finance and Investment. The dividend discount model of stock valuation	Nov 14 th : Second Major Exam.
12	Nov 18 th – Nov 22 nd	SOA Exam FM Note	Using Duration and Convexity to approximate change in present value.	
13	Nov 25 th – Nov 29 th	SOA Exam FM Note	Interest Rate Swaps	
14	Dec 2 nd – Dec 6 th	SOA Exam FM Note	Determinants of Interest rates	Dec 6 th : Last day for withdrawal from all courses with grade of "WP/WF" thru the University Registrar Office*
15	Dec 9 th – Dec 13 th	SOA previous Exams	Review \ Exam FM Practice Problems	
Final Examination Day: Saturday Date: December 22nd 2018 Time: 7 PM – 10:00 PM Location: TBA				