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

AS 201: Financial Mathematics
Term 191 – Fall 2019

Instructor: Ali Nabi Duman
Office: Building 5 – Room 325
Phone: 2632
Email: aliduman@kfupm.edu.sa

Office Hours: MW 12:10 AM – 01:00 PM or by appointment

Time: MW 10:00 AM – 11:15 AM
Place: Building 6 – Room 211

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

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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. Unexcused 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: TBA , Time and Location TBA**	100 points (25%)
Exam 2 **Exam 2 Date: TBA, Time and Location TBA**	100 points (25%)
Class Work (Attendance + Quizzes) **In class**	60 points (15%)
Final Exam (Comprehensive) **Final Exam Date : TBA, Time: TBA**	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.

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 1st – Sept 5th**	**Chapter 1** 1.1 1.2	**Interest rate Measurement** Interest Accumulation and Effective Rates of Interest Present Value (excluding 1.2.1)	
2	**Sep 8th – Sept 12th**	1.3 1.4 1.5	Equation of Value Nominal rates of Interest Effective and Nominal Rates of Discount	
3	**Sep 15th – Sep 19th**	1.6 1.7 2.1	The force of Interest Inflation and the "Real" rate of Interest Level Payment Annuities	
4	**Sep 22rd – Sep 26th**	**Chapter 2** 2.1 Cont. 2.2	**Valuation of Annuities** Level Payment Annuities Level payment Annuities – Some Generalizations	**Sep 23rd: National Day Holiday**
5	**Sep 29th - OCT 3th**	2.3 2.4	Annuities with Non-Constant payment Applications and Illustrations (excluding 2.4.2 &2.4.3)	
6	**Oct 6th - Oct 10th**	**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 10th: Last day for dropping course(s) with grade of "W" thru KFUPM Portal***
7	**Oct 13th – Oct 17th**	**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)	**First Major Exam**
8	**Oct 20st – Oct 24th**	**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 27th – Oct 31st**	**Chapter 6** 6.1 6.3	**The term structure of interest rates** Spot Rates of Interest Forward rates of Interest	
10	**Nov 3th – Nov 7th**	**Chapter 7** 7.1	**Cash flow duration and Immunization** Duration of a set of Cash flows and Bond duration (excluding 7.1.6)	**Nov 7th: Last day for withdrawal from all courses with grade of "W" thru the Univ. Registrar Office***
11	**Nov 10th – Nov 14th**	7.2 **Chapter 8** 8.1	Asset-liability Matching and Immunization Additional Topics in Finance and Investment. The dividend discount model of stock valuation	
12	**Nov 17th – Nov 21nd**	SOA Exam FM Note	Using Duration and Convexity to approximate change in present value.	**Second Major Exam.**
13	**Nov 24th – Nov 28th**	SOA Exam FM Note	Interest Rate Swaps	
14	**Dec 1nd – Dec 5th**	SOA Exam FM Note	Determinants of Interest rates	**Dec 5th : Last day for withdrawal from all courses with grade of "WP/WF" thru the University Registrar Office***
15	**Dec 8th – Dec 12th**	SOA previous Exams	Review \ Exam FM Practice Problems	
Final Examination **Day: TBA Date: TBA Time: TBA Location: TBA**				