

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

AS 288: Actuarial Science Problem Lab 1 (182)

Instructor: Abedalhay Elmughrabi
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Office Hours: UTR 10:00 AM – 10:50 AM or by appointment

Time: W 09:00 AM – 09:50 AM
Place: Building 59 – Room 1011

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

Prerequisite: AS 201

Course Description:

This problem lab is designed to prepare Actuarial majors for the second Society of Actuaries and Casualty Actuarial Society Examinations, FM/2 (Financial Mathematics). Participation in this course does not guarantee a student will pass the FM exam but this course provides a good start in preparing students towards that goal. The responsibility of passing the FM exam relies on the individual students.

Course Material:

1. Course Syllabus: (Posted on Blackboard)
2. Text: Hassett, M. J., Ratliff, M.I., Garcia, T. C., and Steeby, A. C. (2014). *ACTEX FM/2 Study Manual*, 2014 Edition. ACTEX.
3. Calculator: Texas BAII Plus Calculator or Texas BAII Professional

Supplemental Course Material:

1. References:
Mathematics of Investment and Credit, 5th edition, by Broverman, S.A., ACTEX Publications Inc. (2010).
2. Formula Sheets (Posted on Blackboard)
3. Flash Cards (Obtained from KFUPM Book Shop)
4. February, 2018 Exam FM Syllabus as given by SOA.
<https://www.soa.org/Files/Edu/2019/2019-02-exam-fm-syllabus.pdf>
5. Exam FM sample Questions:
<https://www.soa.org/Files/Edu/2018/2018-10-exam-fm-sample-questions.pdf>
<https://www.soa.org/Files/Edu/2018/2018-10-exam-fm-sample-solutions.pdf>
6. Exam FM Past Exams Questions:
<http://www.soa.org/education/exam-req/syllabus-study-materials/edu-multiple-choice-exam.aspx>

Attendance:

The student is responsible for all material presented in class. Some of the material presented in class might not be in the textbook and class notes. 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. Excessive unexcused absences will result in a grade of **DN** in accordance with University rules.

Grading:

Your course grade will be based on the total of points accumulated on the quizzes (60 points), 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% | ≥ 6 absences |

| Activity | Weight |
|--|------------------|
| Exam 1 Date: February 6th 2018. Time and Location: TBA | 100 points (25%) |
| Exam 2 Date: March 20th, 2018. Time and Location: TBA | 100 points (25%) |
| Professional Exam Preparation Project In class | 60 points (15%) |
| Final Exam (Comprehensive) Date: April 29th, 2018. Time: 8 AM Location: TBA | 140 points (35%) |

NOTES:

1. There is no quota on the number of students who can get an A+ or F grade.
2. 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.

Learning Objectives:

- <https://www.soa.org/Files/Edu/2019/2019-02-exam-fm-syllabus.pdf>

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.
- 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. In this course, you will earn credit for a solution to a problem only if you provide a detailed and clear explanation that shows you completely understand the solution.
- 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.
- Students are also expected to bring the book, take notes and organize their solved questions in a binder for easy retrieval to help them in study and review for class, exams, etc
- It is to the student's advantage to keep a binder for storing class notes, homework, and other graded assignments. Students who are organized will find it easier to find important materials when studying for exams.
- To successfully prepare for the SOA exams, students MUST solve problems regularly and with discipline. The selected assigned problems are specifically designed to prepare you for major and final exams. So, it is expected that you complete these problems step-by-step and with comprehension.
- If you happen to stumble upon a solution manual somewhere, remember 2 important points. (1) Due to publishing costs and deadlines, these solutions are brief and may have mistakes and (2) in your career as an actuary and your exams and quizzes in this class, you are expected to know every step to a problem and to know if a solution is incorrect. Thus, the best way to solve problem is without these brief solutions.
- Never round your intermediate results to problems when doing your calculations. This will cause you to lose calculation accuracy. Your answers may then be different from the SOA exam key even when you use the right procedure.
- For every exam, so 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 | Topics (Exam FM problems on) | Important Dates |
|------|---|---|--|
| 1 | Jan 6 th – Jan 10 th | Interest rate Measurement Interest Accumulation and Effective Rates of Interest Present Value (excluding 1.2.1) Equation of Value Nominal rates of Interest Effective and Nominal Rates of Discount | |
| 2 | Jan 13 th – Jan 17 th | The force of Interest Inflation and the “Real” rate of Interest Level Payment Annuities | |
| 3 | Jan 20 th – Jan 24 th | Valuation of Annuities Level Payment Annuities Level payment Annuities – Some Generalizations | |
| 4 | Jan 27 th – Jan 31 st | Annuities with Non-Constant payment Applications and Illustrations (excluding 2.4.2 & 2.4.3) | |
| 5 | Feb 3 rd – Feb 7 th | 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 | Feb. 6 th : First Major Exam |
| 6 | Feb 10 th – Feb 14 th | Bond Valuation Determination of Bond Prices Amortization of a Bond Applications and Illustrations (excluding 4.3.2) | |
| 7 | Feb 17 th – Feb 21 st | 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) | |
| 8 | Feb 24 th – Feb 28 th | The term structure of interest rates Spot Rates of Interest Forward rates of Interest | |
| 9 | Mar 3 rd – Mar 7 th | Cash flow duration and Immunization Duration of a set of Cash flows and Bond duration (excluding 7.1.6) | |
| 10 | Mar 10 th – Mar 14 th | Asset-liability Matching and Immunization Additional Topics in Finance and Investment. The dividend discount model of stock valuation | |
| 11 | Mar 17 th – Mar 21 st | Using Duration and Convexity to approximate change in present value. | Mar. 20 th : Second Major Exam |
| 12 | Mar 24 th – Mar 28 th | Interest Rate Swaps | |
| 13 | Mar 31 st – Apr 4 th | Determinants of Interest rates | |
| 14 | Apr 7 th – Apr 11 th | Review \ Exam FM Practice Problems | |
| 15 | Apr 14 th – Apr 18 th | Review \ Exam FM Practice Problems | |