

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

AS 483: Actuarial Risk Theory and Credibility  
Term 171 – Fall 2017

**Instructor:** Abedalhay Elmughrabi, MS Actuarial Science & MS Mathematics  
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**Office Hours:** UTR 12:00 PM – 12:50 PM or by appointment

**Time:** UTR 01:00 PM – 1:50 PM  
**Place:** Building 4 – Room 259

**Prerequisite:** STAT 416  
**Credit Hours:** (3-0-3)

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**Course Description:**

Distribution of aggregate claims associated with insurance including analysis of the risk due to variations in expected claim numbers and amounts. Frequency and severity distributions, individual and collective models, ruin theory, continuous-time compound Poisson surplus processes, reinsurance, dividend formulas, credibility models, and simulation. An introduction to empirical Bayes and statistical distributions used to model loss experience. Application of risk theory to the operation of insurance and Takaful system and assessment of the credibility of data for ratemaking.

**Course Material:**

1. Course Syllabus: ( Posted on Blackboard)
2. Text: **Klugman, S. A., Panjer, H. H., and Willmot, G. E. (2012). Loss Models: from Data to Decisions 4th edition. John Wiley and Sons.**
3. Class Notes: ( Posted on Black Board)
4. Calculator: Texas BAII Plus Calculator or Texas BAII Professional
5. SOA Exam C reading selection for credibility (1) <http://www.soa.org/files/pdf/C-21-01.pdf>
6. SOA Exam C reading selection for credibility (2) <http://www.soa.org/files/pdf/c-24-05.pdf>

**Supplemental Course Material:**

1. Formula Sheets and Flash Cards: ( Posted on Blackboard)
2. October, 2017 Exam C Syllabus as given by SOA.  
<https://www.soa.org/education/exam-req/edu-exam-c-detail.aspx>
3. Tables for Exam C:  
<https://www.soa.org/education/exam-req/edu-exam-c-detail.aspx>
4. Exam C sample Questions (Only those related to AS 483 coverage of Exam C material):  
<https://www.soa.org/Education/Resources/Cae/edu-soa-sponsored-study-resources.aspx>
5. Exam C Past Exams Questions (Only those related to AS 483 coverage of Exam C material):  
<https://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. 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 (60 points: 20 points Homework & 40 Points Quizzes), 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%	≥ 9 absences

Activity	Weight
Exam 1 <b>Exam 1 Date: October 22<sup>nd</sup>, 2017 , Time and Location TBA</b>	100 points (25%)
Exam 2 <b>Exam 2 Date: November 30<sup>th</sup>, 2017 , Time and Location TBA</b>	100 points (25%)
Class Work <b>In class</b>	60 points (15%)
Final Exam (Comprehensive) <b>Final Exam Date: January 2<sup>nd</sup>, 2018, Time: 8:00 AM–11:00 AM</b>	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, so 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-c-detail.aspx>

**Academic Integrity:**

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

Week	Date	Topic	Important Dates
1	Sep 17th – Sept 21st	Probability Review & Chapter 3: Basic Distributional Quantities	
2	Sep 24th – Sept 28st	Chapter 3: Basic Distributional Quantities (Continued)	Sep 24 <sup>th</sup> : <b>National Day Holiday</b> Sep 28 <sup>th</sup> : <b>Last day for dropping courses without permanent record.</b>
3	Oct 1st – Oct 5th	Chapter 4: Characteristics of Actuarial Models	
4	Oct 8th – Oct 12th	Chapter 5: Continuous Models	Saturday Oct 7 <sup>th</sup> : <b>Normal Sunday Classes</b>
5	Oct 15th – Oct 19th	Chapter 6: Discrete Distributions	
6	Oct 22nd – Oct 26th	Chapter 8: Frequency & Severity with Coverage modifications	Oct 26 <sup>th</sup> : <b>Last day for dropping course(s) with grade of "W" thru KFUPM Portal*</b>  Oct 22 <sup>nd</sup> : <b>First Major Exam.</b>
7	Oct 29th – Nov 2nd	Chapter 9: Aggregate Models	
8	Nov 5th – Nov 9th	Chapter 9: Aggregate Models (Continued)	
9	Nov 12th – Nov 16th	Chapter 10: Review of Mathematical Statistics (New Material Only) & Chapter 13: Frequentist Estimation.	
10	Nov 19th – Nov 23rd	Chapter 15: Bayesian Estimation.	Nov 23rd: <b>Last day for withdrawal from all courses with grade of "W" thru the Univ. Registrar Office*</b>
11	Nov 26th – Nov 30th	Chapter 17: Introduction and Limited Fluctuation Credibility.	November 30th: <b>Second Major Exam</b>
12	Dec 3rd – Dec 7th	Chapter 18: Greatest Accuracy Credibility.	
13	Dec 10th – Dec 14th	Chapter 19: Empirical Bayes Credibility.	
14	Dec 17th – Dec 21st	Chapter 20: Simulation	Dec 21 <sup>st</sup> : <b>Last day for withdrawal from all courses with grade of "WP/WE" thru the University Registrar Office*</b>
15	Dec 24th – Dec 28th	Review	

**Final Examination**

**Day: Tuesday Date: January 2nd, 2018 Time: Location: TBA**