

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

AS 483: Actuarial Risk Theory and Credibility  
Term 182 – Spring 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 08:00 AM – 08:50 AM  
**Place:** Building 6 – Room 166

**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 BAI Plus Calculator or Texas BAI Professional
5. SOA Exam STAM reading on Credibility <https://www.soa.org/Files/Edu/2018/2018-stam-23-18.pdf>

**Supplemental Course Material:**

1. Formula Sheets and Flash Cards: ( Posted on Blackboard)
2. February, 2018 Exam STAM Syllabus as given by SOA.  
<https://www.soa.org/Files/Edu/2019/2019-02-exam-stam-syllabi.pdf>
3. Tables for Exam STAM:  
<https://www.soa.org/Files/Edu/2019/2019-02-exam-stam-tables.pdf>
4. Exam STAM sample Questions (Only those related to AS 483 coverage of Exam STAM material):  
<https://www.soa.org/Files/Edu/2018/2018-04-exam-stam-questions.pdf>  
<https://www.soa.org/Files/Edu/2018/2018-04-exam-stam-solutions.pdf>
5. Exam STAM Past Exams Questions (Only those related to AS 483 coverage of Exam STAM material):  
<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. 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>Date: February 12<sup>th</sup>, 2019, Time: 6-8 PM &amp; Location: TBA</b>	100 points (25%)
Exam 2 <b>Date: March 19<sup>th</sup>, 2019, Time: 6:15-8:15 PM &amp; Location TBA</b>	100 points (25%)
Class Work <b>In class</b>	60 points (15%)
Final Exam (Comprehensive) <b>Final Exam Date: April 30<sup>th</sup>, 2018 , Time: 8 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/Files/Edu/2019/2019-02-exam-stam-syllabi.pdf>

**Academic Integrity:**

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

<b>Week</b>	<b>Date</b>	<b>Topic</b>	<b>Important Dates</b>
<b>1</b>	<b>Jan 6<sup>th</sup> – Jan 10<sup>th</sup></b>	<b>Probability Review &amp; Chapter 3: Basic Distributional Quantities</b>	
<b>2</b>	<b>Jan 13<sup>th</sup> – Jan 17<sup>th</sup></b>	<b>Chapter 3: Basic Distributional Quantities (Continued)</b>	
<b>3</b>	<b>Jan 20<sup>th</sup> – Jan 24<sup>th</sup></b>	<b>Chapter 4: Characteristics of Actuarial Models</b>	
<b>4</b>	<b>Jan 27<sup>th</sup> – Jan 31<sup>st</sup></b>	<b>Chapter 5: Continuous Models</b>	
<b>5</b>	<b>Feb 3<sup>rd</sup> – Feb 7<sup>th</sup></b>	<b>Chapter 6: Discrete Distributions</b>	
<b>6</b>	<b>Feb 10<sup>th</sup> – Feb 14<sup>th</sup></b>	<b>Chapter 8: Frequency &amp; Severity with Coverage modifications</b>	<b>Feb 12<sup>th</sup>: First Major Exam.</b>
<b>7</b>	<b>Feb 17<sup>th</sup> – Feb 21<sup>st</sup></b>	<b>Chapter 9: Aggregate Models</b>	
<b>8</b>	<b>Feb 24<sup>th</sup> – Feb 28<sup>th</sup></b>	<b>Chapter 9: Aggregate Models (Continued)</b>	
<b>9</b>	<b>Mar 3<sup>rd</sup> – Mar 7<sup>th</sup></b>	<b>Chapter 10: Review of Mathematical Statistics (New Material Only) &amp; Chapter 13: Frequentist Estimation.</b>	
<b>10</b>	<b>Mar 10<sup>th</sup> – Mar 14<sup>th</sup></b>	<b>Chapter 15: Bayesian Estimation.</b>	
<b>11</b>	<b>Mar 17<sup>th</sup> – Mar 21<sup>st</sup></b>	<b>Chapter 17: Introduction and Limited Fluctuation Credibility.</b>	<b>Mar 19<sup>th</sup> : Second Major Exam</b>
<b>12</b>	<b>Mar 24<sup>th</sup> – Mar 28<sup>th</sup></b>	<b>Chapter 18: Greatest Accuracy Credibility.</b>	
<b>13</b>	<b>Mar 31<sup>st</sup> – Apr 4<sup>th</sup></b>	<b>Chapter 19: Empirical Bayes Credibility.</b>	
<b>14</b>	<b>Apr 7<sup>th</sup> – Apr 11<sup>th</sup></b>	<b>Chapter 20: Simulation</b>	
<b>15</b>	<b>Apr 14<sup>th</sup> – Apr 18<sup>th</sup></b>	<b>Review</b>	
<b>Final Examination</b>			
<b>Day: Tuesday Date: April 30<sup>th</sup>, 2018 Time: 8 AM Location: TBA</b>			