

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

AS483: Actuarial Risk Theory and Credibility (142)

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.

We shall often refer to the description of SOA Exam C at:

<http://www.beanactuary.org/exams/preliminary/exams/syllabi/2013-02-exam-c.pdf>

Textbook and package:

1. Klugman, S. A., Panjer, H. H., and Willmot, G. E. (2012). Loss Models: from Data to Decisions 4th edition. John Wiley and Sons
2. Texas BAI Plus Calculator or Texas BAI Professional
3. R statistical package (whenever necessary)

Reference:

1. Computational Actuarial Science with R, Edited by Arthur Charpentier, Chapman and Hall, 2015.
2. SOA Exam C/CAS Exam 4 sample on the SOA official website.

Instructor: Dr. Mohammad H. Omar **Office:** Building 5-room 508 **Phone:** 2471

E-mail: omarmh@kfupm.edu.sa

Office Hours: UTR: 11:00 am - 11:55 am & UR 12.45pm - 2:00pm or by appointment.

Assessment

Assessment for this course will be based on attendance, homework, term paper report, two major exams and a comprehensive final exam, as in the following:

Activity	Weight
Attendance, homework and Term Paper Report	(2%+5%+15%)
Exam 1 (Chapters 3, 4, 5, & 6) Tuesday (Mar 3 – week 6) , 6.00 pm (venue TBA)	25%
Exam 2 (Chapters 8, 9, 10, & 15) Sunday (Apr 5- week 10), 7:00 pm (venue TBA)	23%
Final Exam (Comprehensive) ?day May ?? (as posted on registrar website)	30%

IMPORTANT NOTE on GRADES: There is no quota on the number of students who can get an A+ or F grade.

- ✓ **Attendance** on time is *very* important. Mostly, attendance will be checked within the *first five minutes* of the class. Entering the class after that, is considered as late (**2 lates= 1 Absence**) and
- ✓ **More than 10 minutes late = Absence** (regardless of any excuse).
- ✓ Excessive unexcused absences will result in a grade of **DN** in accordance with University rules.

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

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

General Notes:

- Students are required to carry **pens, note-taking equipment** and a **calculator** to **EVERY lecture and exams**. It is strongly recommended to keep a **binder** for class-notes.
- 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.
- Students should wait until completion of the next course AS482 before they attempt to take the professional exam MLC.

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Syllabus (Tentative)

Week	Sections	Topics	Notes
1 (Jan 25 –29)	Ch 3	Basic Distributional Quantities (Generating functions & sums of RV, Tails of distributions, Risk Measures)	
2 (Feb 1 – 5)	Ch 4	Characteristics of Actuarial Models	
3 (Feb 8 – 12)	Ch 5	Continuous Models	
4 (Feb 15 – 19)	Ch 6	Discrete Distributions	Declare your Term paper topic: Sunday Feb 15
5 (Feb 21 – 26)	Ch 8	Frequency & Severity with Coverage modifications	(2 wks): Midterm grade reports starts
Tuesday, Mar 3 – 1st Major Exam (chapters 3, 4, 5,& 6)			
6 (Mar 1 – 5)	Ch 9	Aggregate Loss Models	Excluding S9.6.1 &9.8.3
7 (Mar 8 – 12)	Ch9	Aggregate Loss Models (cont.)	
8 (Mar 15 – 19)	Ch10	Review of Mathematical Statistics	
Midterm Vacation March 22-26, 2014			
9 (Mar 29 – Apr 2)	Ch15	Bayesian Estimation	
Sunday, Apr 5 – 2nd Major Exam (chapters 8, 9, 10 & 15)			
10 (Apr 5 – 9)	Ch20	Simulation	
11 (Apr 12 – 16)	Ch17	Introduction and Limited Fluctuation Credibility	
12 (Apr 19 – 23)	Ch18	Greatest Accuracy Credibility	
13 (Apr 26 – 30)	Ch 19	Empirical Bayes Credibility	Sun May 3: Term Paper Report due to instructor.
14 (May 3 – 7)	Extra topic (if time permits)	Actuarial Computing	
15 (May 10 – 14)	Review	Review	
Final Exam (Comprehensive): Sun May 18 7pm			

Student Learning Outcomes: (From the Society of Actuaries Exam C) May change in 2016

As a summary, the number of SOA C learning outcomes per KFUPM course is as follows:

Course	# SOA C Learning Outcomes
STAT301	3
STAT302	4
AS475	23
AS483	34
AS475/AS483	1
Total	65

a) Post-2014 Outcomes with SOA weights of **40-55** discussed in this course

