

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

AS484: Actuarial Risk Theory and Credibility Lab– Term 242 8.00am T

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 ASTAM at:

<https://www.soa.org/globalassets/assets/files/edu/2020/2020-02-exam-stam-syllabi.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 studio statistical package (whenever necessary)
4. SOA Exam STAM reading on Credibility <https://www.soa.org/Files/Edu/2018/2018-stam-23-18.pdf>

Reference:

1. Computational Actuarial Science with R, Edited by Arthur Charpentier, Chapman and Hall, 2015.
2. SoA ASTAM sample on the SOA official website.
3. Tables for Exam ASTAM:
<https://www.soa.org/globalassets/assets/files/edu/2023/astam-formula-sheet.pdf>
4. Exam ASTAM sample Questions (Only those related to AS 484 coverage of Exam ASTAM material):
<https://www.soa.org/globalassets/assets/files/edu/2024/spring/questions/february-2024-astam-questions.pdf>
<https://www.soa.org/globalassets/assets/files/edu/2024/spring/solutions/february-2024-astam-solutions.pdf>

Instructor: Dr. Mohammad H. Omar **Office:** Bldg 5-rm 508 **Phone:** 2471 **E-mail:** omarmh@kfupm.edu.sa

Office Hours: UTR: 12.30pm-1:40pm (office) or by appointment on MS Teams chat

Assessment

Assessment for this course will be based on the following:

Activity	Weight	Marks
Attendance, and Lab Participation	10%	2
Lab Assignments and lab quizzes	30%	6
Lab Tests	60%	12
Total	100%	20

- ✓ **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 randomly during class to ensure sustained presence.
- ✓ **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.
- ✓ Most labs will have lab assignments that will be announced during the lab. So attendance in the lab is necessary in order to complete the assignment.
- ✓ Only official excuse from KFUPM student affairs office will be accepted. All other excuses (medical centers, governmental offices, etc) are not.

General Notes:

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

Lab Syllabus (Tentative)

Week	Dates	Sections	Topic	Notes
1	Jan 14		The R Studio program, the SRM, PA, and IFoA exams	
		Ch 3	Basic Distributional Quantities (Generating functions & sums of RV, Tails of distributions, Risk Measures)	
2	Jan 21	Ch 3	Basic Distributional Quantities (cont.)	
3	Jan 28	Ch 4	Characteristics of Actuarial Models	Declare your Term paper topic: Sun Jan 26

4	Feb 4	Ch 5	Continuous Models	
5	Feb 11	Ch 6	Discrete Distributions	(2 wks): Midterm grade reports starts
6	Feb 18	Ch 8	Frequency & Severity with Coverage modifications	
Tuesday, Feb 18 – Midterm Exam (chapters 3, 4, 5, & 6)				
7	Feb 25	Ch 9	Aggregate Loss Models	
8	Mar 4	Ch 9	Aggregate Loss Models (cont.)	
9	Mar 11	Ch 17	Introduction and Limited Fluctuation Credibility Lab Midterm Exam (ch 3, 4, 5, & 6)	
Sunday, Apr 13 – Term Paper due to instructor				
10	Mar 18	Ch 15	Bayesian Estimation (Review)	
11	Apr 8	Ch 18	Greatest Accuracy	
12	Apr 15	Ch 19	Empirical Bayes Credibility	
13	Apr 22	Ch 20	Simulation (Note: Not in ASTAM but in practice)	
14	Apr 29	STAM review if time permits	Practice format from SOA ASTAM exam	
15	May 6	Review	Review Lab Final Exam (chap 17, 18, 19, 20)	