Math 3639
Actuarial Loss Models

Course Instructor

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Course Description

This course provides an introduction to actuarial loss models used in the pricing of short-term insurance policies such as property and casualty insurance policies. In particular, this course will introduce loss distribution models for claim frequency and severity, aggregate risk models, coverage modifications, risk measures, construction and selection of parametric models. This course is heavy in mathematics and calculus skills are essential to success in this course.

Learning Objectives

Upon completion of this course, students will be able to:

- Recognize classes of distributions and their relationships
- Build frequency, severity, and aggregate models
- Build loss models with coverage modifications
- Estimate and select loss models
- Understand and calculate risk measures

Prerequisites

- MATH 2610 or 3620; and
- MATH 3160 or 3165 or STAT 3375Q

Textbooks

No textbooks are required for this course. However, the following book is useful:
Loss Models: From Data to Decisions, 5th edition, by S.A. Klugman, H.H. Panjer and G.E. Will-mot, Wiley, 2019.
Actuarial Loss Models: A Concise Introduction, Guojun Gan, CRC Press, 2025

Homework and quizzes

A set of problems will be provided. Each week, you are expected to work on the problems corresponding to that week's lectures. Homework will not be collected; however, there will be ten 15-minute quizzes administered during Wednesday classes. Quiz questions will be very similar to the assigned problems.

Exams

This course has two midterm exams and a final exam. You can prepare a piece of paper (letter size) with notes on both sides and bring the notes to exams.

Course Assessment

Ten Quizzes	20%
Exam 1	20%
Exam 2	20%
Final exam	40%

Quizzes cannot be made up. Of the ten quizzes, the three lowest scores will be dropped.

Your final grade is determined as follows:

Grade	A	A-	B+	B	B-	C+
Points	[93, 100)	[90, 93)	[87, 90)	[83, 87)	[80, 83)	[77, 80)
Grade	C	C-	D+	D	D-	F
Points	[73, 77)	[70, 73)	[67, 70)	[63, 67)	[60, 63)	[0, 60)

Tentative Schedule

Week	Date	Lecture	Quiz
1	19-Jan-26	Holiday	
1	21-Jan-26	Probability theory	
2	26-Jan-26	Probability theory	
2	28-Jan-26	Probability theory	Quiz 1
3	2-Feb-26	Probability theory	
3	4-Feb-26	Frequency models	Quiz 2
4	9-Feb-26	Frequency models	
4	11-Feb-26	Frequency models	Quiz 3
5	16-Feb-26	Review	
5	18-Feb-26	Exam 1	
6	23-Feb-26	Severity models	
6	25-Feb-26	Severity models	Quiz 4
7	2-Mar-26	Severity models	
7	4-Mar-26	Severity models	Quiz 5
8	9-Mar-26	Aggregate Models	
8	11-Mar-26	Aggregate Models	Quiz 6
9	16-Mar-26	Spring break	
9	18-Mar-26	Spring break	
10	23-Mar-26	Aggregate Models	

10	25-Mar-26	Coverage modifications	Quiz 7
11	30-Mar-26	Review	
11	1-Apr-26	Exam 2	
12	6-Apr-26	Coverage modifications	
12	8-Apr-26	Model estimation	Quiz 8
13	13-Apr-26	Model estimation	
13	15-Apr-26	Model estimation	Quiz 9
14	20-Apr-26	Model Selection	
14	22-Apr-26	Model Selection	Quiz 10
15	27-Apr-26	Risk measures	
15	29-Apr-26	Review	
16	TDB	Final exam	

Missed Assessment Policy

I expect students to be present for all course assessments. If a midterm assessment is missed, the grade of the missed assessment will be made up by one of the following options:

- Scaling the grades of the remaining assessments to cover the missed assessment.
- A make-up assessment that is different from the original assessment.

For the final exam, the university rules (see `https://registrar.uconn.edu/undergraduate-final-exam-information/`) will be followed.

Academic, Scholarly, and Professional Integrity and Misconduct (ASPIM)

See `https://policy.uconn.edu/2023/07/11/academic-scholarly-and-professional-integrity-and-misconduct-aspim-policy-on/`