MATH 4513 / RMBI 4220 Life Contingencies Models and Insurance Risk

Spring 2024-2025

Instructor: Shuoqing Deng

Class hours:	Tuesdays and Thursdays, 13:30-14:50PM, in Room 1409
Tutorial hours:	Mondays, 18-18:50PM, in Room 1410
Office hours:	(Tentative) Thursdays 3-4PM, in Room 3485
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Course description This is an undergraduate-level one-semester course on life contingencies models and insurance risk. The course also prepares students to take the Exam LTAM (Long-Term Actuarial Mathematics) of the Society of Actuaries and the Exam 3L (Models for Life Contingencies and Statistics) of the Casualty Actuarial Society.
Topics intended to be covered are:

- Survival models and survival distributions, life tables.
- Life insurance: insurance payable at the moment of death, insurance payable at the end of the year of death, other types of life insurance, some related recursive relationship and differential equations.
- Life annuities: continuous life annuities, discrete life annuities.
- Net premiums: fully continuous premiums, fully discrete premiums, other types of premiums and benefits.
- Benefit reserves: fully continuous benefit reserves, fully discrete benefit reserves, benefit reserves on a semi-continuous basis.
- Multiple life functions and multi-state models: joint distribution of future lifetimes, the joint-life status, the last-survivor status, dependent lifetime models, insurance and annuity benefits, special mortality assumptions.

Recommended textbook *Study Guide for the Society of Actuaries Exam LTAM* by S. Broverman, 2018 edition.

Prerequisites The prerequisites of the course are

- *Required:* ELEC 2600(Probability and Random Processes in Engineering), or ISOM 3540(Introduction to Probability), or MATH 2421(Probability), or MATH 2431(Honor Probability).
- *Recommended:* MATH 2511(Fundamental of Actuarial Mathematics).

Course website If you are registered for the course, you should see "MATH 4513" or "RMBI 4220" on your dashboard on Canvas. I will post lecture notes, announcements, homework assignments, and other resources there. Please check the webpage regularly.

Teaching/Learning Methodology: The subject will be delivered mainly through lectures and tutorials. The teaching and learning approach is mainly problem-solving oriented. The approach aims at the development of mathematical techniques and how the techniques can be applied to real problems. Students are encouraged to adopt a deep study approach by employing high level cognitive strategies, such as critical and evaluative thinking, relating, integrating and applying theories to practice.

Grading

Ingredient	Date	Percentage of final grade
Homework($\times 6$)	To be announced	15%
Quiz ($\times 2$)	March 4th, April 22nd (tentative dates)	10%
Midterm exam	Thursday, March 20th (tentative date)	30%
Final exam	To be announced	45%

The grading scale will be decided after the final numerical grades are calculated.