MAT 310 Life Contingencies

Summer 2024

Course Credits: 4
Contact Hours: 55 hours
Instructor: TBA
Email: TBA

COURSE OBJECTIVES

This is a course designed to provide students with a comprehensive understanding of actuarial science and the various aspects of life contingencies. The topics to be covered include basics of life insurance, life annuities, premium calculations; and will also cover some more advanced topics such as multiple state models and multiple life models under a Markovian framework, which are very similar to the credit risk issues in quantitative finance.

Upon Completion of this Course, students will be able to:

1. Assess risk inherent in cash flows resulting from these contingent events;
2. Describe the life insurance and life annuity products that may be available in the market;
3. State and apply contingent valuation concepts to practical situations;
4. Integrate and apply these technical skills to practical valuation problems in the life insurance and annuity markets.

PREREQUISITES

MAT 166 Differential and Integral Calculus, STAT 260 Theory of Interest

GRADING

Grades will be determined by accumulating points, with 100 points being the maximum, as follows:

ITEM	POINTS
2 Assignments	20 Points
2 Quizzes	20 Points

Midterm	25 Points
Final Exam	35 Points
Total	100 Points

Late submissions will be graded at the end of the course. Grades will be assigned according to the following rule:

$A \geq 90 > B \geq 80 > C \geq 70 > D \geq 60 > F$.

We reserve the right to make adjustments to the overall grading policy.

COURSE MATERIALS

Required Texts:

Actuarial Mathematics for Life Contingent Risks, 2nd Edition 2013, D. C. M. Dickson, M. R. Hardy and H. R. Waters.; Publisher: Cambridge University Press.

Recommended (Optional) Texts or Other Materials:

Models for Quantifying Risk, 5th Edition 2012, R. Cunningham, T. N. Herzog, and R. L. London; Publisher: Actex.

COURSE TOPICS

MODULE	TASKS
Module 1	**Topics:** Topic 1: Introduction to life insurance Topic 2: Life insurance and annuity contracts Topic 3: Survival models Topic 4: The force of mortality **Assessments:** Assignment #1
Module 2	**Topics:** Topic 5: Life tables Topic 6: Select and ultimate survival models Topic 7: Valuation of insurance benefits Topic 8: Variable insurance benefits **Assessments:** Quiz #1

Module 3	**Topics:** Topic 9: Annual life annuities Topic 10: Deferred annuities/Guaranteed annuities/Increasing annuities Topic 11: Evaluating annuity functions Topic 12: Premium calculation **Assessments:** Assignment #2 Midterm Exam
Module 4	**Topics:** Topic 13: Constant multiple of mortality rates Topic 14: Policies with annual cash flows Topic 15: Policy values with continuous cash flows Topic 16: Policy alterations **Assessments:** Quiz #2
Module 5	**Topics:** Topic 17: Assumptions and notation Topic 18: Multiple decrement models Topic 19: Emerging costs for traditional life insurance Topic 20: Emerging costs for equity-linked insurance **Assessments:** Final Exam

ATTENDANCE

1) Class attendance is required. Missing classes without permission will lead to decrease in overall grade.

Missing less than two classes: no penalty.

Missing more than two classes: 7% will be taken off from the overall grade.

If the instructor reports a student's frequent missing of class to the Soochow University Academic Administration Office, the student might get a written warning and might be prohibited from attending final exam.

2) Participants in this course are expected to arrive in class promptly and adequately prepared. The primary objective of this course is to critically engage with the readings and the subject matter. Therefore, course participants are expected to have completed the reading prior to class and prepare thoughtful reflections/commentaries to share with fellow colleagues.

LEARNING REQUIREMENTS

1) Late assignments are not acceptable and are subjected to grade deductions.
2) Assignments submitted in the wrong format will be counted as not submitted.
3) Failure to submit or fulfill any required course component results in failure of the class.
4) Make-up for midterm and final exams only with valid excuses, as defined by the University.
5) In order to earn a Certificate of Completion, participants must thoughtfully complete all assignments by stated deadlines and earn an average quiz score of 50% or greater.

TECHNOLOGY POLICY

The use of electronic devices in class is distracting, both for the user and for the rest of the class. Only non-programmable calculators can be used in the tests and exam. Any attempts to use cell phones and other electronic communication devices will be seemed as cheating. Laptops are discouraged, unless you use them for activities DIRECTLY related to the course (eg., note taking, reading course documents).

ACEDEMIC INTEGRITY POLICY

Soochow University highly values the academic integrity and aims to promote the academic fairness, honesty and responsibility. Any academic dishonesty behaviors and any attempts to cheats and plagiarism will be reported to the university administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.

DISABILITY ACCOMMODATION

Soochow University is committed to maintaining a barrier-free environment so that students with disabilities can fully access programs, courses, services, and activities at Soochow University. Students with disabilities who require accommodations for access to and/or participation in this course are welcome.

Note:

Please contact the University Administrative Office immediately if you have a

learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material.