

**ACT475 - Insurance Products, Market, and Regulation with AXIS
(Winter 2026)**

Seminars:

Fridays, 11am- 1pm at PB 255 (Leslie Dan Faculty of Pharmacy, 144 College St).

Instructor:

Professor V. Zhang

Email: vickijing.zhang@utoronto.ca

Office: Room 9132, 700 University Avenue 9th floor

Course website (Quercus): <http://q.utoronto.ca>

Office hour:

Fridays, 1:15-2:15pm (with occasional time adjustment announced in class)

Additional office hour: by email appointment

Teaching Assistant:

Ivannia Irawan: ivannia.irawan@mail.utoronto.ca

Computer with AXIS installed:

You are highly recommended (but not required) to bring your laptop with AXIS installed to the Friday seminars. Installation instructions have been sent out via email on December 31, 2025. **AXIS only works with Windows systems. You must install AXIS version 20252400 (19 Dec 2025).**

Reference Book:

Zhang, V. & Ewener, J. *Uncalculated Risks: The transformation of insurance, the erosion of regulation, and the economic and social consequences*. Toronto: Canadian Scholar Press

E-books are available on Amazon and there are two copies at Robarts Library. To save you course expenses, I will post the relevant chapters from the book on Quercus weekly, so you don't need to purchase the book. Note that those are copyrighted materials, and you are not authorized to distribute them without my written permission.

Marking Scheme:

1- Three 1-page (single-spaced) reading comments/reflections (15%)

The comments are an opportunity to reflect upon the readings. Every week I will provide a few prompt questions for you to reflect upon as you read. You should structure your reflective comments around one or two prompt questions. You should not summarize the readings. Instead you should take a position or sketch an argument with regard to at least one of the prompt questions I posed. You are welcome to research and consult other sources to help form your opinions (if so please quote your source).

There are seven opportunities to write reading comments (based on the following book chapters: 2, 3, 4&6, 8, 11, 9, 14&15&16). You may choose which weeks you will be writing reading comments, as long as you write three comments in total throughout the semester.

2- Short open-book online quizzes on pre-recorded videos (40%)

You will be expected to display familiarity with pre-seminar videos (which are in-depth explanations of the readings) through answering quizzes.

Your lowest quiz mark will be dropped in the final grade calculation.

3- Take-home AXIS assignments (35%)

4- Students' Open Forum on AI & Insurance / Creative Artmaking (6%)

Active and informed participation in Open Forum on AI & Insurance. There are various ways to participate in the Forum. You can address one of the prompt questions (provided by me), or show us a piece of creative art you made related to AI in insurance (drawing/painting, song/music, video, 3D model, poem/short story, dance – the world is your oyster!) and share your reflections. The open forum will be individual lightning talks followed by a group discussion/debrief. More details will be posted on Quercus.

5- General attendance of Friday seminars (4%)

A Typical Week's To-do List:

1. For Week 3 to Week 10, watch the video that I will post on Quercus (posted by Monday of the week). When watching the videos, please take notes like you would in lectures, which can help you with your open-book quizzes. The video is to explain (in much greater details) the technical content in the weekly recommended reading, and the quizzes will be entirely based on the videos.
2. If you choose to write a one-page reflection/comment on the reading that week, you may do so. You need to write three (and *only* three) one-page comments in total for the semester.
3. For Week 3 to Week 10, the open-book quiz will be available on Quercus for a 48-hour window: from Wednesday 10am to Friday 10am. Each quiz is about 15-minute long and entirely based on video materials of that week.
4. If there is an AXIS assignment that week, do the assignment.
5. Attend Friday's seminar. Our seminars will focus on doing stuff in AXIS, but may include a debrief of the video/reading.

Schedule of Topics:

1) January 9: Welcome and Introduction

- Some preliminary questions to discuss:
 - Personal stories related to the insurance industry – what do you know about the industry/product/market/regulation? Any experience to share as a consumer/policyholder, the child of someone working in the industry, an intern working for the industry, etc?
 - With or without direct contact with the industry, what do you think is the role of the industry in our economy and society?
- Speed networking among peers!
- AXIS:

- Introduction, general structure of AXIS
- 2) January 16: Chapter 1.
 - A brief and general history of financial deregulation (1970s-80s) (pre-recorded video)
 - AXIS: Whole life policy modeling Part I (Regular Life Module).
 - 3) January 23: Chapter 2.
 - Implications of new economic environment and financial deregulation on the insurance industry and the industry's responses (pre-recorded video)
 - AXIS: Whole life policy modeling Part II (Regular Life Module).
 - **AXIS take-home assignment #1**
 - 4) January 30: Chapter 3.
 - Insurance regulators' reactions to the industry changes in product offering and asset investments (pre-recorded video)
 - AXIS: Understanding AXIS Reports
 - 5) February 6: Chapters 4 & 6.
 - Enterprise Risk Management (ERM) - incentives and disincentives (pre-recorded video)
 - ERM technique 1: Reinsurance and "shadow (re)insurance" (pre-recorded video)
 - AXIS: Universal life policy modeling Part I (Universal Life Module).
 - **AXIS take-home assignment #2**
 - 6) February 13: Chapters 8.
 - Common use of derivatives by the insurance industry, derivatives regulation (pre-recorded video)
 - AXIS: Universal life policy modeling Part II (Universal Life Module).
 - **AXIS take-home assignment #3**

February 20: Reading week. No class, no office hour.

- 7) February 27: Chapters 7.
 - ERM technique 2: Derivative hedging (pre-recorded video)
 - AXIS: Introduction to Annuities Module.
 - **AXIS take-home assignment #4**
- 8) March 6: Chapter 11.
 - Modeling challenges in insurance industry: Market risk modeling of variable products (pre-recorded video)
 - AXIS: Variable Annuity modeling (Annuities Module).
 - **AXIS take-home assignment #5**
- 9) March 13: Chapters 9.
 - ERM technique 3: Insurance Securitization (pre-recorded video)
 - AXIS: Advanced topic 1 – Statutory and GAAP Reserves Methodologies in AXIS

10) March 20: Chapter 14 & 15 & 16

- Introduction on insurance regulation now and then (pre-recorded video)
- The “rules-based” model and “principles-based” model; implication of the regulatory paradigm shift (pre-recorded video)
- AXIS Advanced topic 2 – Derivative Hedging in AXIS (Moody’s guest lecture)

11) March 27:

- Advanced topic 3 – Demo of PathWise software, another major actuarial pricing/valuation software (Aon guest lecture)

April 3: Good Friday, University closed, no classes.

12) April 6: **ONLINE Student Open Forum** - AI/Predictive Modeling and Insurance

- The use of AI/predictive analytics in the insurance industry
- Student Open Forum on AI (individual lightning talks/creative art sharing + group discussion)

Missed Assignments or Quizzes

- There is no make-up for online quizzes, however, only the best performed 7 out of 8 quizzes will be counted towards your final mark.
- There is no make-up for reading comments or AXIS assignments.
- If you have extenuating circumstances that prevent you from submitting assignments on time, please reach out to me as soon as you can, preferably before the assignment is due and must be within three days after the assignment is due.

Academic Integrity

Academic integrity is fundamental to learning and scholarship at the University of Toronto. All assessments in this course are “open-book” in nature. However, unless specified otherwise, all work must be done by yourself, without help from others. Receiving help from anyone on an assessment, whether they are another student in the course or someone external to the course, is a serious academic offence. Providing help to another student in the course on an assessment is an equally serious academic offence. Posting or distributing questions from assessments is not permitted at any time.

Please further familiarize yourself with the University of Toronto’s Code of Behavior on Academic Matters available at <http://academicintegrity.utoronto.ca>.