

## AS 2427 Long Term Actuarial Math I Course Outline

### 1. Course Information

#### Course Information

**Course name:** AS 2427B - Long Term Actuarial Math I  
**Academic Term:** Winter 2025  
**Lecture hours and location:** MWF 12:30pm - 13:30pm, WSC 240  
**Tutorial hour and location:** Tuesday 11:30am - 12:30pm, WSC 240

#### List of Prerequisites

**Prerequisites:** AS 2553A/B, Stats 2857A/B, and Cal 2402A (or Cal 2502) with a minimum grade of 60% in each of these courses

Unless you have either the requisites for this course or written special permission from your Dean's Designate (Department/Program Counsellors and Science Academic Counselling) to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

### 2. Instructor Information

Instructors	Email	Office	Office Hours
Dr. Shu Li (Instructor & Course Coordinator)	shu.li@uwo.ca	WSC 229	Monday 9:30am – 10:30am
(Teaching assistant)			
(Teaching assistant)			

Students must use their Western (@uwo.ca) email addresses when contacting their instructors, and indicate the course number (AS 2427) in the subject line. We strive to answer all emails within 2 business days.

### 3. Course Syllabus, Schedule, Delivery Mode

**Course Description:** Models for the time until death, single life annuity and life insurance present values and their probability distributions; introduction to equivalence principle and premium calculations.

**Learning Outcomes:** The course material supports part of the Learning Objectives/Outcomes from SOA Exam FAM–Fundamentals of Actuarial Mathematics (Long term) Syllabus.

Type	Mode	Dates	Time	Frequency
Lecture	In-person	MWF	12:30pm - 13:30pm	weekly
Tutorial	In-person	T	11:30am - 12:30pm	weekly

#### Tuesday Tutorial Schedules:

Jan 7 – no tutorial	Jan 14 – TA tutorial	Jan 21 – Quiz 1	Jan 28 – TA tutorial
Feb 4 – Test 1	Feb 11 – TA tutorial	Feb 18 – no tutorial (reading week)	Feb 25 – Quiz 2
March 4 – TA tutorial	March 11 – Test 2	March 18 – TA tutorial	March 25 – Quiz 3
April 1 – TA tutorial			

#### Key Sessional Dates

Classes begin: January 6, 2025;  
Spring Reading Week: February 15 – 23, 2025;  
Classes end: April 4, 2025;  
Exam period: April 7 – 30, 2025.

#### Other Important Dates: (no class)

- **January 17 (Friday): ASNA Convention.**

## 4. Course Materials

**Textbook:** Actuarial Mathematics for Life Contingent Risks (AMLCR) by Dickson, C.M.D., Hardy, M.R., and Waters, H.R., 2020, **Third Edition**. Cambridge University Press.

We will cover Chapters 1 to 5 and Chapter 6 Sections 6.1 to 6.5 of the AMLCR text including the following topics:

- Chapter 1 Introduction to life insurance
  - Brief introduction on the terminology and major types of life insurance, annuity and pension contracts.
- Chapter 2 Survival models
  - Future life time random variable, survival function, force of mortality, international actuarial notation (IAN), expected complete and curtate future lifetime
- Chapter 3 Life Tables and Selection (except Sections 3.11, 3.12)
  - Life tables, fractional age assumptions, life insurance, survival models, select & ultimate models, mortality trends
- Chapter 4 Insurance Benefits
  - IAN, PVRV and EPV (& variance) calculations for various types of life insurance with different death benefit payout timing assumptions
- Chapter 5 Life Annuities
  - IAN, PVRV and EPV (& variance) calculations for various types of life annuities that are paid at different frequency
- Chapter 6 Premium Calculation
  - PV and EPV (& variance) of net future loss random variable, equivalence principle for net premium calculation

### **Textbook information:**

- **The textbook costs: Hardcopy \$123.40; Ebook (permanent access) \$115.**
- **Students need to purchase this edition. Older editions will not be sufficient.**
- **Students may find the textbook from Western Bookstore <https://bookstore.uwo.ca/>.**
- **A solutions manual for the AMLCR text is also available.**

All course material will be posted to OWL: <https://westernu.brightspace.com/>

Students are responsible for checking the course OWL site (<https://westernu.brightspace.com/>) regularly for news and updates. This is the primary method by which information will be disseminated to all students in the class.

If students need assistance with the course OWL site, they can seek support on the [OWL Brightspace Help](#) page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

## 5. Methods of Evaluation

### Grading Scheme and Assessment Dates

The overall course grade will be calculated as listed below:

<b>Quizzes (3)</b>	<b>15%</b>	<b>(5% each)</b>
<b>Tests (2)</b>	<b>30%</b>	<b>(15% each)</b>
<b>Final Exam</b>	<b>55%</b>	

**Quizzes:** There will be three 30-minute quizzes to be held during the Tuesday tutorial timeslots on the following dates: **January 21, February 25 and March 25**. Each quiz will consist of a few short answer questions on recently covered lecture topics.

**Tests:** There will be two 50-minute tests held during the tutorial time.

Test 1 will be on **Tuesday February 4**. Test 2 will be on **Tuesday March 11**.

**Final Exam:** A 3-hour final exam will be scheduled by the Registrar's Office in the final examination period.

Note: All the above evaluations are **closed-book**.

Note: Students only have one week to request remarking their quizzes or tests after the papers are distributed back.

**Specific conditions** that are required to pass the course:

- a minimum **30%** of the evaluations must be completed before the final exam.

**Calculators:** Any non-programmable calculator may be used in this course.

**Practice questions:** Suggested practice questions will be posted on OWL. Solutions for some of them will be presented during the TA tutorial session. Assistance with solving them may also be obtained during the instructor's and TA's office hours.

**Attendance:** Attending lectures regularly is in your own interest. Attendance will be taken occasionally.

### **University Accreditation Program – Canadian Institute of Actuaries (CIA)**

#### **Honours Specialization in Actuarial Science**

If you graduate from Western with an HSP in Actuarial Science, this course will be one of the courses that you will take in your program that will allow you to be exempt from the preliminary exams of the Society of Actuaries (SOA). If your plan is to become a fully qualified actuary working in Canada, then all you would need to do is graduate from your HSP in actuarial science and you would then be eligible for the CIA Capstone Exam. Taking and passing this exam, along with completing two online modules and a practice education course, would make you eligible to become an ACIA (Associate of the Canadian Institute of Actuaries).

### Major in Actuarial Science

If you graduate from Western with a major in Actuarial Science, the CIA accreditation program will not apply to you. If your plan is to become a fully qualified actuary, then you will need to continue to write and pass the preliminary exams of the SOA.

Please see the following link for full details:

<https://www.cia-ica.ca/starting-your-journey/actuarial-education-in-canada/>

In addition to the university's internal policies on conduct, including academic misconduct, candidates pursuing credits for writing professional examinations shall also be subject to the **Code of Conduct and Ethics for Candidates in the CIA Education System**.

<https://www.cia-ica.ca/publications/223159e/>

### **General information about missed coursework**

Students must familiarize themselves with the *University Policy on Academic Consideration – Undergraduate Students in First Entry Programs* posted on the Academic Calendar:  
[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/academic\\_consideration\\_Sep24.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sep24.pdf),

This policy does not apply to requests for Academic Consideration submitted for **attempted or completed work**, whether online or in person.

The policy also does not apply to students experiencing longer-term impacts on their academic responsibilities. These students should consult [Accessible Education](#).

For procedures on how to submit Academic Consideration requests, please see the information posted on the Office of the Registrar's webpage:

[https://registrar.uwo.ca/academics/academic\\_considerations/](https://registrar.uwo.ca/academics/academic_considerations/)

All requests for Academic Consideration must be made within 48 hours after the assessment date or submission deadline.

All Academic Consideration requests must include supporting documentation; however, recognizing that formal documentation may not be available in some extenuating circumstances, the policy allows students to make one Academic Consideration request **without supporting documentation** in this course. However, the following assessments are excluded from this, and therefore always require formal supporting documentation:

- **Examinations scheduled during official examination periods (Defined by policy)**

When a student mistakenly submits their one allowed Academic Consideration request **without supporting documentation** for the assessments listed above or those in the **Coursework with Assessment Flexibility** section below, the request cannot be recalled and reapplied. This privilege is forfeited.

**Keep in mind that it is NOT a requirement for students to use any SRA's. It is advisable for students to write the exams on the date and time they are scheduled unless you really are sick and unable to write.**

With this in mind, here is information about what to do if you miss any of the required work in this course:

### **Quiz 1, Quiz 2, Quiz 3, Test 1**

- Students may use an SRA (as long as it has not already been used before)
- OR they can provide documentation to academic counselling
- For those using an SRA, or with counseling approval, the weight of the quiz (or test) will be reassigned to the final exam.

### **Test 2**

- Students may NOT use an SRA
- Students must provide documentation to academic counselling
- For those with counseling approval, the weight of the midterm (20%) will be reassigned to the final exam.

**SRA's are NOT allowed to be used for the final exam.**

### **Evaluation Scheme for Missed Assessments**

**Missed Quiz or Test:** There will be **no make-up exams** for a missed quiz/test. For those that do legitimately miss a quiz/test and their Academic Consideration has been granted, the standard practice will be that the weight of the quiz/test will be reassigned to the final exam. If the Academic Consideration is not granted, then you will receive a mark of 0.

When a student misses the Final Exam and their Academic Consideration has been granted, they will be allowed to write the Special Examination (the name given by the University to a makeup Final Exam). See the Academic Calendar for details (under [Special Examinations](#)), especially for those who miss multiple final exams within one examination period.

### **Essential Learning Requirements**

Even when Academic Considerations are granted for missed coursework, the following are deemed essential to earn a passing grade.

**Specific conditions that are required to pass the course:**

- a minimum **30%** of the evaluations must be completed before the final exam.

## **6. Additional Statements**

### **Religious Accommodation**

When conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request an accommodation for their absence in writing to the course instructor

and/or the Academic Advising office of their Faculty of Registration. This notice should be made as early as possible but not later than two weeks prior to the writing or the examination (or one week prior to the writing of the test).

Please visit the Diversity Calendars posted on our university's EDID website for the recognized religious holidays:

<https://www.edi.uwo.ca>.

### **Accommodation Policies**

Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at:

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/Academic\\_Accommodation\\_disabilities.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf).

### **Academic Policies**

The website for Registrar Services is <https://www.registrar.uwo.ca/>.

In accordance with policy,

[https://www.uwo.ca/univsec/pdf/policies\\_procedures/section1/mapp113.pdf](https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf),

the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at their official university address is attended to in a timely manner.

**Scholastic offences** are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_discipline\\_undergrad.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf).

**[If Remote Proctoring Software may be used in this course, including in the event of health lock-down]**

Tests and examinations in this course will be conducted using a remote proctoring service. By taking this course, you are consenting to the use of this software and acknowledge that you will be required to provide **personal information** (including some biometric data) and the session will be **recorded**. Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. More information about this remote proctoring service, including technical requirements, is available on Western's Remote Proctoring website at:

<https://remoteproctoring.uwo.ca>.

### **Support Services**

Please visit the Science & Basic Medical Sciences Academic Advising webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic-related matters: <https://www.uwo.ca/sci/counselling/>.

Students who are in emotional/mental distress should refer to Mental Health@Western (<https://uwo.ca/health/>) for a complete list of options about how to obtain help.

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced

sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at

[https://www.uwo.ca/health/student\\_support/survivor\\_support/get-help.html](https://www.uwo.ca/health/student_support/survivor_support/get-help.html).

To connect with a case manager or set up an appointment, please contact [support@uwo.ca](mailto:support@uwo.ca).

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Accessible Education at

[http://academicsupport.uwo.ca/accessible\\_education/index.html](http://academicsupport.uwo.ca/accessible_education/index.html)

if you have any questions regarding accommodations.

Learning-skills counsellors at Learning Development and Success (<https://learning.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: <https://www.uwo.ca/se/digital/>.

Additional student-run support services are offered by the USC, <https://westernusc.ca/services/>