

AS2427B Long Term Actuarial Mathematics Course Outline

1. Course Information

Course Information

Course Name: Long Term Actuarial Mathematics

Course Number: AS 2427B

Term: Winter

Location: B&GS-0165 (Online delivery for at least the month of January)

Lecture hour: Mon, Wed, Fri 12:30 PM – 1:30 PM

Tutorial: Tue 2:30 PM – 3:30 PM

List of Prerequisites

AS2553A/B, Stats2857A/B, and Cal2402A (or Cal2502 + 2503) with a minimum grade of 60% in each of these courses

List of Antirequisites

The former Actuarial Science 3429 A/B or 3431 A/B

Unless you have either the requisites for this course or written special permission from your Dean 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	Phone	Office Hours
Kyle Leistner	kleistne@uwo.ca	WSC272		Via zoom – book through email
Pouya Faroughi	pfarough@uwo.ca			

Students must use their Western (@uwo.ca) email addresses when contacting their instructors.

3. Course Syllabus, Schedule, Delivery Mode

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.

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

- Calculate and interpret standard functions including survival and mortality probabilities, force of mortality, and complete and curtate expectation of life.
- Calculate and interpret probabilities, means, variances, and percentiles.
- Calculate and interpret the effect of changes in underlying assumptions such as mortality and interest.
- Apply appropriate approximation methods such as uniform distribution of deaths, constant force, Woolhouse, and Euler.
- Calculate and interpret probabilities, means, variances, and percentiles of random variables associated with a premium, including loss-at-issue random variables

Type	Mode	Dates	Time	Frequency
Lecture	In-person	M/W/F	12:30PM to 1:30PM	weekly
Tutorial	In-person	Tue	2:30 to 3:30	weekly

Week	Dates	Topic	Instructor
			KL
1	Jan 10 – 14	Introduction to life insurance	KL
2	Jan 17 – 21	Future lifetime random variables, survival functions, force of mortality, International Actuarial Notation, expected complete and curtate future lifetime	KL
3	Jan 24 – 28	Life tables, fractional age assumptions Select and ultimate mortality models, mortality trends (Quiz 1)	KL
4	Jan 31 – Feb 4	Select and ultimate mortality models, mortality trends	KL
5	Feb 7 – 11	Valuation of insurance benefits – continuous case (Midterm test 1)	KL
6	Feb 14 – 18	Valuation of insurance benefits – annual case (Quiz 2)	KL
7	Feb 21 – 25	Reading Week	NA
8	Feb 28 – Mar 4	Valuation of insurance benefits – 1/m ^{thly} case	KL
9	Mar 7 – Mar 11	Varying Life Insurance (non-level benefit) (Midterm test 2)	KL
10	Mar 14 – 18	Review of annuity-certain formulas, annual life annuities (Quiz 3)	KL
11	Mar 21 – 25	Life annuities payable 1/mthly and other annuities (Quiz 4)	KL

12	Mar 28 – Apr 1	Premium calculations	KL
13	Apr 4 – Apr 8	Final exam review	KL

Classes begin: January 10, 2021

Reading Week: February 19–27, 2022

Classes end: April 8, 2022

University Accreditation Program

This course is accredited under the Canadian Institute of Actuaries (CIA) University Accreditation Program (UAP) for the 2021-22 academic year. Achievement of the established exemption grade in this course may qualify a student from exemptions from writing certain preliminary exams.

Please see the following link for full details:

<http://www.cia-ica.ca/membership/university-accreditation-program---home>

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** and the associated **Policy on Conduct and Ethics for Candidates in the CIA Education System**.

Act Sci 2427B

This course with a minimum mark of 75%, along with Actuarial Science 3429A (minimum mark of 80%) and Actuarial Science 3431B (minimum mark of 80%), can give you an exemption for the LTAM exam.

Contingency plan for an in-person class pivoting to 100% online learning

In the event of a COVID-19 resurgence during the course that necessitates the course delivery moving away from face-to-face interaction, all remaining course content will be delivered entirely online, either synchronously (i.e., at the times indicated in the timetable) or asynchronously (e.g., posted on OWL for students to view at their convenience). The grading scheme will **not** change. Any remaining assessments will also be conducted online as determined by the course instructor.

4. Course Materials

Textbook: Actuarial Mathematics for Life Contingent Risks (AMLCR) by Dickson, C.M.D., Hardy, M.R., and Waters, H.R., 2013, Third Edition.

It is available at the bookstore in both hard copy and ebook:

https://bookstore.uwo.ca/textbook-search?campus=UWO&term=W2020B&courses%5B0%5D=001_UW/ASC2427B

A solutions manual for the Actuarial Mathematics text has been published and this can be purchased online from Amazon.

Students are responsible for checking the course OWL site (<http://owl.uwo.ca>) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class.

All course material will be posted to OWL: <http://owl.uwo.ca>.

If students need assistance with the course OWL site, they can seek support on the OWL 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

The overall course grade will be calculated as listed below:

Quizzes (4)	20%
Midterm 1	15%
Midterm 2	15%
Final Exam	50%

Quizzes: There will be four 30-minute quizzes to be held during the Tuesday tutorial timeslot on the following dates: **Tuesday January 25, February 15, March 15 and March 21**. Each quiz will consist of a few short answer questions on recently covered lecture topics.

Midterms or Tests: There will be two one-hour tests held during the tutorial time. The dates of these tests will be announced on the course website.

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

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

All evaluations are closed book.

Accommodated Evaluations

- The weight of a missed test or quiz will be transferred to the final exam
- If a make-up assessment is missed, the student will receive an INC and complete the task the next time the course is offered

Rounding of Marks Statement

Across the Sciences Undergraduate Education programs, we strive to maintain high standards that reflect the effort that both students and faculty put into the teaching and learning experience during this course. All students will be treated equally and evaluated based only on their actual achievement.

Final grades on this course, irrespective of the number of decimal places used in marking individual assignments and tests, will be calculated to one decimal place and rounded to the nearest integer, e.g., 74.4 becomes 74, and 74.5 becomes 75. Marks WILL NOT be bumped to the next grade or GPA, e.g. a 79 will NOT be bumped up to an 80, an 84 WILL NOT be bumped up to an 85, etc. The mark attained is the mark you achieved, and the mark assigned; requests for mark "bumping" will be denied.

6. Student Absences

Academic Consideration for Student Absences

Students who experience an extenuating circumstance (illness, injury or other extenuating circumstance) sufficiently significant to temporarily render them unable to meet academic requirements may submit a request for academic consideration through the following routes:

- (i) Submitting a Self-Reported Absence (SRA) form provided that the conditions for submission are met. To be eligible for a Self-Reported Absence:
 - an absence must be no more than 48 hours
 - the assessments must be worth no more than 30% of the student's final grade
 - no more than two SRAs may be submitted during the Fall/Winter term
- (ii) For medical absences, submitting a Student Medical Certificate (SMC) signed by a licensed medical or mental health practitioner to the Academic Counselling office of their Faculty of Registration.
- (iii) Submitting appropriate documentation for non-medical absences to the Academic Counselling office in their Faculty of Registration.

Note that in all cases *other than an SRA*, students are required to contact their instructors within 24 hours of the end of the period covered, unless otherwise instructed in the course outline.

Students should also note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds, or for other reasons. **All documentation required for absences that are not covered by the Self-Reported Absence Policy must be submitted to the Academic Counselling office of a student's Home Faculty.**

For the policy on Academic Consideration for Student Absences – Undergraduate Students in First Entry Programs, see:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_illness.pdf

and for the Student Medical Certificate (SMC), see:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf.

Religious Accommodation

When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in writing at least two weeks prior to the holiday to the course instructor and/or the Academic Counselling office of their Faculty of Registration. Please consult University's list of recognized religious holidays (updated annually) at

<https://multiculturalcalendar.com/ecal/index.php?s=c-univwo>.

Absences from Final Examinations

If you miss the Final Exam, please contact the Academic Counselling office of your Faculty of Registration as soon as you are able to do so. They will assess your eligibility to write the Special Examination (the name given by the University to a makeup Final Exam).

You may also be eligible to write the Special Exam if you are in a “Multiple Exam Situation” (e.g., more than 2 exams in 23-hour period, more than 3 exams in a 47-hour period).

If a student fails to write a scheduled Special Examination, the date of the next Special Examination (if granted) normally will be the scheduled date for the final exam the next time this course is offered. The maximum course load for that term will be reduced by the credit of the course(s) for which the final examination has been deferred. See the Academic Calendar for details (under [Special Examinations](#)).

7. Accommodation and Accessibility

Accommodation Policies

Students with disabilities work with Accessible Education (formerly SSD), 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,

8. Academic Policies

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

In accordance with policy,

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 his/her official university address is attended to in a timely manner.

Any non-programmable calculator is permitted to be used during evaluations.

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:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

In the event of a health lock-down where delivery is moved to online format, 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>.

9. Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling 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/>.

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 (519) 661-2147 if you have any questions regarding accommodations.

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/>.

Learning-skills counsellors at the Student Development Centre (<http://www.sdc.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.

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

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