

# ACTSCI 3431B/9007B COURSE OUTLINE

## LONG-TERM ACTUARIAL MATH III

### ❧ WINTER 2023 ❧

#### 1. Course information

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##### 1.1. The University Accreditation Program

This course is accredited under the Canadian Institute of Actuaries (CIA) University Accreditation Program (UAP). For more information, see Section 4.

##### 1.2. Lecture hours & location

Mon/Wed/Fri 8:30AM–9:30AM, Western Science Centre (WSC) RM 240

##### 1.3. Prerequisites

A minimum mark of 60% in AS3429A and a mini-

mum mark of 60% in SS3657A.

This course is restricted to students enrolled in any Actuarial Science module.

##### 1.4. Important

Unless you have either the requisites for this course or a 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 this course for failing to have the necessary prerequisites.

#### 2. Instructor information

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##### 2.1. Instructor, email & office

Ruixi Zhang, PH.D.  
rzhan56@uwo.ca  
Western Science Centre (WSC) RM 214A

##### 2.2. Regular office hours

Mon 10:30AM–11:30AM  
TA office hours are to be announced (TBA).

##### 2.3. Important

Students must use their Western email addresses (@uwo.ca) when contacting their instructor. Please indicate the course number (AS3431 or AS9007) in the subject line of your emails.

If my regular office hours don't suit your schedule, we can always try to work out some *additional* office hours. These are available upon email requests.

#### 3. Course materials

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##### 3.1. Textbook

*Actuarial Mathematics for Life Contingent Risks* (3rd edition) by D. C. M. Dickson, M. R. Hardy, and H. R. Waters. Relevant chapters: 8–11, 13–15, 17, and §18.6.

##### 3.2. OWL

Additional course materials (such as lecture handouts, assignments, and tables) will be posted on the course's OWL site at <https://owl.uwo.ca>.

##### 3.3. Important

Students are responsible for checking the course's OWL site on a regular basis for news and updates. Using OWL is the primary method by which information will be disseminated to all students in the class.

If you need assistance with the course's OWL site, you can seek support from OWL Help or contact the Western Technology Services Helpdesk by phone at 519-661-3800 or EXT. 83800.

#### 4. The Canadian Institute of Actuaries University Accreditation Program

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##### 4.1. Overview

This course is accredited under the Canadian Institute of Actuaries (CIA) University Accreditation Program (UAP).

The UAP is *course-based* for the 2022–23 academic year; it will switch to *program-based* starting next year. The implications are explained here.

##### 4.2. Honors Specialization in Actuarial Science

If you are in 2nd or 3rd year of the Honors Specialization Program (HSP) in Actuarial Science, you are covered under the new *program-based* UAP. If you graduate from HSP in Actuarial Science, this course will be one of the courses (that you will take) which 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'd need to do is graduate from HSP in Actuarial Science. You would then be eligible for the CIA *Capstone Exam*. Taking and passing this exam, along with an online module and a practice education course, would make you eligible to become an Associate of the Canadian Institute of Actuaries (ACIA).

If you are in 4th year of the HSP in Actuarial Science, you are covered under the *course-based UAP*. Achievement of the established exemption grade in this course may qualify you to be exempt from writing certain *Preliminary Exams*. This is the last year of the CIA *course-based UAP*.

#### 4.3. Major in Actuarial Science

If you are in major in Actuarial Science, the *program-based UAP* will not apply to you. If your plan is to become a fully qualified actuary working in Canada, you will need to continue writing and passing the *Preliminary Exams* of the SOA. However, the *course-based UAP* is still in effect, and achievement of the established exemption grade in this course may qualify you to be ex-

empt from writing certain *Preliminary Exams*. This is the last year of the CIA *course-based UAP*.

#### 4.4. Exemption grade

This course with a minimum mark of 80%, along with AS2427B (minimum mark of 75%) and AS3429A (minimum mark of 80%), can give you an exemption for the FAM-L and ALTAM exams.

#### 4.5. External links

Please see the following link for full details:

<https://www.cia-ica.ca/education/university-accreditation-program-home>

In addition to the university's internal policies on conduct, including academic misconduct, candidates who pursue 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*.

<https://www.cia-ica.ca/docs/default-source/2020/220065e.pdf>

## 5. Course syllabus

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### 5.1. Course description

Analysis of probability distributions and present values that are associated with multiple life models, multiple decrement models, and more general multi-state models. Applications to life insurance and other long-term coverages including disability income, pension plans, universal life insurance, equity-linked policies, and other health care coverages.

### 5.2. Course objectives

This course provides a thorough treatment of the concepts of tabular and parametric survival models for multiple lives, premium calculations, reserves for in-

surances and annuities, pension plans and retirement benefits, among other topics. The successful student will become adept at applying the techniques learned.

### 5.3. Contingency plan for pivoting to online learning

In the event of a COVID-19 resurgence during the course which necessitates the course delivery moving away from face-to-face interaction, all the remaining course content will be delivered *entirely online*, either synchronously (i.e., at indicated times in 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.

## 6. Methods of evaluation

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### 6.1. Grading scheme

Assignments	16% = 4 × 4%
Midterm tests	34% = 2 × 17%
Final exam	50%

### 6.2. Assignments

There will be 4 assignments, each worth 4%. The assignments will be posted and due on the dates shown on the right (*all Wednesdays*).

Assign. №	Posted on	Due on
1	Jan 18	Jan 25
2	Feb 8	Feb 15
3	Mar 8	Mar 15
4	Mar 29	Apr 5

### 6.3. Penalties on late assignment submissions

If you miss the due date of an assignment, *late submission is still accepted* but it will be subject to a penalty. *Without valid accommodations* from Academic Coun-

selling, late submissions will be subject to a penalty of 20% per day or portion thereof, and assignments submitted 5 or more days late will not be graded.

If you have valid accommodations from Academic Counselling, your assignments should be submitted within 24 hours from the end of the accommodation period, after which they will be subject to a penalty of 20% per day or portion thereof, and assignments submitted 5 or more days late will not be graded.

#### 6.4. Midterm tests

There will be two 50-minute in-class midterm tests, each worth 17%. Both midterm tests are closed-book (life tables will be provided), and they are scheduled during *lecture hours* (8:30AM–9:20AM, WSC 240) on the dates shown below (*all Wednesdays*).

Midterm №	Date	Lectures covered
1	Feb 8	Up to & including Feb 1's
2	Mar 22	Up to & including Mar 15's

## 7. Student absences

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If you are unable to meet a course requirement due to illness or other serious circumstances, please follow the procedures below.

#### 7.1. Course components worth less than 10%

For course components worth less than 10% of the overall grade—each of the 4 assignments—the mechanism for dealing with late/missed assignments was explained in detail in Sections 6.2 and 6.3.

#### 7.2. Course components worth 10% or more

For course components worth 10% or more of the overall grade—the two midterm tests and final exam—you must provide valid medical or supporting documentation to the Academic Counselling office of your Faculty of Registration as soon as you are able to do so. For further information, please consult Western's medical illness policy at [https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/accommodation\\_medical.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf).

The Student Medical Certificate is available at [http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/appeals/medicalform.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/appeals/medicalform.pdf).

## 8. Accommodation and accessibility

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#### 8.1. 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

#### 6.5. Policy on missed midterm test(s)

There will be no make-up test to either midterm test 1 or midterm test 2. If you miss either test *and* if you have valid accommodations from Academic Counselling, the weight of your missed midterm test(s) will be moved to the final exam.

#### 6.6. Final exam

The final exam, worth 50%, will be a three-hour cumulative closed-book examination. It will be scheduled by the Office of the Registrar (Apr 13–30).

#### 6.7. Policy on missed final exam

If you miss the final exam, you may be eligible to write a make-up final exam, usually scheduled in May by the School of Mathematical and Statistical Sciences. For more information, see Section 7.3.

[s://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/medicalform.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf).

The mechanism for dealing with missed midterm tests was explained in detail in Section 6.5.

#### 7.3. Absences from the final exam

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 Western to a make-up final exam).

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

#### 7.4. Important

Any missed course components can only be excused through one of the mechanisms above.

Being asked not to attend an in-person course requirement due to potential COVID-19 symptoms is not sufficient on its own.

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 Western's list of recognized religious holidays (updated annually) at <https://multiculturalcalendar.com/ecal/index.php?s=c-univwo>.

## 8.2. Accommodation policies

Students with disabilities are encouraged to contact Accessible Education. They provide 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%20Accommodation\\_disabilities.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic%20Accommodation_disabilities.pdf).

## 9. Academic policies

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The website for Registrarial 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 Western at their official university

address is attended to in a timely manner.

During the midterm tests and final exam, only non-programmable calculators are permitted, and all other electronic devices are strictly prohibited.

Scholastic offences are taken seriously and students are directed to read the appropriate policy ([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)), specifically, the definition of what constitutes a scholastic offence.

## 10. Support services

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Please feel free to visit the Science & Basic Medical Sciences Academic Counselling website 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 in emotional/mental distress should refer to Health and Wellness at Western University (<https://www.uwo.ca/health/>) for a complete list of options about how to obtain help.

Western University 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 experi-

enced 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://academic-support.uwo.ca/accessible\\_education/index.html](http://academic-support.uwo.ca/accessible_education/index.html) if you have any questions regarding accommodations.

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