COURSE OUTLINE

1. **Course:** ACSC 427, Life Contingencies II - Fall 2021
   Lecture 01: MWF 13:00 - 13:50 in MS 431

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Email</th>
<th>Phone</th>
<th>Office</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Alexandru Badescu</td>
<td><a href="mailto:abadescu@ucalgary.ca">abadescu@ucalgary.ca</a></td>
<td>220-3963</td>
<td>MS 576</td>
<td>M 15:00 - 16:00</td>
</tr>
</tbody>
</table>

   This course is accredited under the Canadian Institute of Actuaries (CIA) University Accreditation Program (UAP). Achievement of the minimum required grades in accredited courses may provide credit for preliminary exams. Please note that a combination of courses may be required to achieve exam credit.

   **In Person Delivery Details:**

   Unless otherwise indicated, all classes, term tests and final exam will be in person.

   **Re-Entry Protocol for Labs and Classrooms:**

   To limit the spread of COVID-19 on campus, the University of Calgary has implemented safety measures to ensure the campus is a safe and welcoming space for students, faculty and staff. The most current safety information for campus can be found [here](#).

   **Course Site:**

   D2L: ACSC 427 L01-(Fall 2021)-Life Contingencies II

   **Note:** Students must use their U of C account for all course correspondence.

2. **Requisites:**

   See section 3.5.C in the Faculty of Science section of the online Calendar.

   **Prerequisite(s):**

   Actuarial Science 327; Statistics 323; and 3 units from Mathematics 311, 313, 367 or 375.

3. **Grading:**

   The University policy on grading and related matters is described in F.1 and F.2 of the online University Calendar.

   In determining the overall grade in the course the following weights will be used:

<table>
<thead>
<tr>
<th>Component(s)</th>
<th>Weighting %</th>
<th>Date</th>
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<tbody>
<tr>
<td>Test 1</td>
<td>25%</td>
<td>October 20</td>
</tr>
<tr>
<td>Test 2</td>
<td>25%</td>
<td>November 24</td>
</tr>
<tr>
<td>Final Exam</td>
<td>50%</td>
<td>TBA</td>
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   Each piece of work (reports, assignments, quizzes, midterm exam(s) or final examination) submitted by the student will be assigned a grade. The student's grade for each component listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade.

   The conversion between a percentage grade and letter grade is as follows.

<table>
<thead>
<tr>
<th>Minimum % Required</th>
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<tr>
<td>A+</td>
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<tr>
<td>95 %</td>
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</table>

   This course will have a final exam that will be scheduled by the Registrar. [The Final Examination Schedule](#) will be
published by the Registrar’s Office approximately one month after the start of the term. The final exam for this course will be designed to be completed within 2 hours.

The University of Calgary offers a flexible grade option, Credit Granted (CG) to support student’s breadth of learning and student wellness. Faculty units may have additional requirements or restrictions for the use of the CG grade at the faculty, degree or program level. To see the full list of Faculty of Science courses where CG is not eligible, please visit the following website: https://science.ucalgary.ca/current-students/undergraduate/program-advising/flexible-grading-option-cg-grade

4. Missed Components Of Term Work:

The university has suspended the requirement for students to provide evidence for absences. Please do not attend medical clinics for medical notes or Commissioners for Oaths for statutory declarations.

In the event that a student legitimately fails to submit any online assessment on time (e.g. due to illness etc...), please contact the course coordinator, or the course instructor if this course does not have a coordinator to arrange for a re-adjustment of a submission date. Absences not reported within 48 hours will not be accommodated. If an excused absence is approved, one possible arrangement is that the percentage weight of the legitimately missed assignment could also be pro-rated among the components of the course. This option is at the discretion of the coordinator and may not be a viable option based on the design of this course.

There are no make-up tests for the term tests.

5. Scheduled Out-of-Class Activities:

There are no scheduled out of class activities for this course.

6. Course Materials:

Required Textbook(s):


Recommended Textbook(s):


Topics covered from the textbooks:

From the Actuarial mathematics for life contingent risks textbook:

Chapter 7: Policy Values
Chapter 8.8-8.11: Multiple decrement models
Chapter 9.1-9.4: Joint and last survivor benefits (excluding multiple state models)

From the Loss Models textbook:

Chapter 14: Construction of empirical models

In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology:

- A computer with a supported operating system, as well as the latest security, and malware updates;
- A current and updated web browser;
- Webcam/Camera (built-in or external);
- Microphone and speaker (built-in or external), or headset with microphone;
- Current antivirus and/or firewall software enabled;
- Stable internet connection.

For more information please refer to the UofC ELearning online website.
7. **Examination Policy:**

No aids are allowed on tests or examinations.

You will be required to sign the following statement based on honor on each assessment “I understand that this assessment is part of an accredited course under the University Accreditation Program of the Canadian Institute of Actuaries (CIA). In addition to the University rules governing academic integrity, I understand that I am subject to the Code of Conduct and Ethics for Candidates in the CIA Education System and related policy. I swear on my honor to have completed the work on my own and in accordance with the assessment’s rules and instructions."

Students should also read the Calendar, Section G, on Examinations.

As this course is a CIA accredited course, we need to follow two of the preferred practices given in the CIA UAP.

1. Exams will be published online at the same time for all candidates, with a total publication and completion time limit corresponding to the exam duration plus a limited period of about 15 minutes for upload if paper answers are to be uploaded. Exceptions will be made only to students who have SAS accommodations and/or students who are living in different time zones; these will be handled on a case by case basis.

2. You will be required to sign the following statement based on honor on each assessment:

"I understand that this assessment is part of an accredited course under the University Accreditation Program of the Canadian Institute of Actuaries (CIA). In addition to the University rules governing academic integrity, I understand that I am subject to the Code of Conduct and Ethics for Candidates in the CIA Education System and related policy. I swear on my honor to have completed the work on my own and in accordance with the assessment’s rules and instructions."

8. **Approved Mandatory And Optional Course Supplemental Fees:**

There are no mandatory or optional course supplemental fees for this course.

9. **Writing Across The Curriculum Statement:**

For all components of the course, in any written work, the quality of the student's writing (language, spelling, grammar, presentation etc.) can be a factor in the evaluation of the work. See also Section E.2 of the University Calendar.

10. **Human Studies Statement:**

Students will not participate as subjects or researchers in human studies.

See also Section E.5 of the University Calendar.

11. **Reappraisal Of Grades:**

A student wishing a reappraisal, should first attempt to review the graded work with the Course coordinator/instructor or department offering the course. Students with sufficient academic grounds may request a reappraisal. Non-academic grounds are not relevant for grade reappraisals. Students should be aware that the grade being reappraised may be raised, lowered or remain the same. See Section I.3 of the University Calendar.

a. **Term Work:** The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within ten business days of either being notified about the mark, or of the item's return to the class. If the student is not satisfied with the outcome, the student shall submit the Reappraisal of Graded Term work form to the department in which the course is offered within 2 business days of receiving the decision from the instructor. The Department will arrange for a reappraisal of the work within the next ten business days. The reappraisal will only be considered if the student provides a detailed rationale that outlines where and for what reason an error is suspected. See sections I.1 and I.2 of the University Calendar.

b. **Final Exam:** The student shall submit the request to Enrolment Services. See Section I.3 of the University Calendar.

12. **Other Important Information For Students:**

a. **Mental Health** The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre, Mental Health Services Website) and the Campus Mental Health Strategy website (Mental Health).

b. **SU Wellness Services:** For more information, see www.ucalgary.ca/wellnesscentre or call 403-210-9355.
c. **Sexual Violence:** The Sexual Violence Support Advocate, Carla Bertsch, can provide confidential support and information regarding sexual violence to all members of the university community. Carla can be reached by email ([sysa@ucalgary.ca](mailto:sysa@ucalgary.ca)) or phone at [403-220-2208](tel:403-220-2208). The complete University of Calgary policy on sexual violence can be viewed at ([https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Sexual-and-Gender-Based-Violence-Policy.pdf](https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Sexual-and-Gender-Based-Violence-Policy.pdf)).

   ![Image of human figure]

   **Research Integrity:**

   Students shall also be subject to the Code of Conduct and Ethics for Candidates in the CIA, including academic misconduct.

   ![Image of checkmark]

   **Student Handbook on Academic Integrity**

   Student Academic Misconduct Policy and Procedure

   Research Integrity Policy

   Additional information is available on the [Student Success Centre Academic Integrity page](https://www.ucalgary.ca/student-life/student-success/academic-integrity).

   ![Image of checkmark]

   **Academic Accommodation Policy:**

   It is the student’s responsibility to request academic accommodations according to the University policies and procedures listed below. The student accommodation policy can be found at: [https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Student-Accommodation-Policy.pdf](https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Student-Accommodation-Policy.pdf).

   Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: [https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf](https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf).

   Students needing an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, by filling out the [Request for Academic Accommodation Form](https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Student-Accommodation-Policy.pdf) and sending it to Mark Bauer by email [bauerm@ucalgary.ca](mailto:bauerm@ucalgary.ca) preferably 10 business days before the due date of an assessment or scheduled absence.

   **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). Students should identify themselves on all written work by places their name on the front page and their ID number on each subsequent page. For more information, see [Legal Services](https://www.ucalgary.ca/legal-services) website.

   **Student Union Information:** [VP Academic](https://www.ucalgary.ca/student-life/student-union), Phone: [403-220-3911](tel:403-220-3911) Email: [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca). [SU Faculty Rep.](https://www.ucalgary.ca/student-life/student-union), Phone: [403-220-3913](tel:403-220-3913) Email: [sciencerep@su.ucalgary.ca](mailto:sciencerep@su.ucalgary.ca). [Student Ombudsman](https://www.ucalgary.ca/student-life/student-union), Email: [ombuds@ucalgary.ca](mailto:ombuds@ucalgary.ca).

   **Surveys:** At the University of Calgary, feedback through the Universal Student Ratings of Instruction ([USRI](https://www.ucalgary.ca/student-life/student-union)) survey and the Faculty of Science Teaching Feedback form provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses. Your responses make a difference - please participate in these surveys.

   **Copyright of Course Materials:** All course materials (including those posted on the course D2L site, a course website, or used in any teaching activity such as (but not limited to) examinations, quizzes, assignments, laboratory manuals, lecture slides or lecture materials and other course notes) are protected by law. These materials are for the sole use of students registered in this course and must not be redistributed. Sharing these materials with anyone else would be a breach of the terms and conditions governing student access to D2L, as well as a violation of the copyright in these materials, and may be pursued as a case of student academic or non-academic misconduct, in addition to any other remedies available at law.

   **Canadian Institute of Actuaries Ethics:** In addition to the university's internal policies on conduct, including academic misconduct ([Section K of the online calendar](https://www.ucalgary.ca/student-life/student-union)), 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. For more information, please visit Obtaining UAP Credits and the CIA FAQ

**Course Outcomes:**

- Evaluate net and gross premiums for insurance policies and annuities based on different premium principles, such as the equivalence principle and the portfolio-premium principle.
- Calculate and interpret probabilities, means, percentiles and higher-order moments of random variables associated with these premiums, including loss-at-issue random variables.
- Calculate and interpret benefits reserves, gross premium reserves, expense reserves and modified reserves associated with these reserves, including future-loss random variables. Evaluate benefit reserves using recursive formulae.
- Calculate and interpret asset shares. Calculate and interpret the effect of policy modifications.
- Evaluate benefit reserves with continuous cash-flows using Thiele's differential equation.
- Describe the behavior of discrete-time Markov chain models, identify possible transitions between states, and calculate and interpret the probability of being in a particular state and transitioning between states. Calculate premiums and reserves for multi-state models.