UNIVERSITY OF CALGARY
FACULTY OF SCIENCE

Department of Mathematics & Statistics
MS 476
403 220-5210
mathinfo@ucalgary.ca

COURSE OUTLINE

1. **Course:** ACSC 427, Life Contingencies II - Fall 2020

   Lecture 01: MWF 13:00 - 13:50 - Online

Instructor	Email	Phone	Office	Hours
Dr Alexandru Badescu	abadescu@ucalgary.ca	220-3963	MS 576	W 13:00 - 14:00

   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.

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   Online Delivery Details:

   Some aspects of this course are being offered in real-time via scheduled meeting times. For those aspects you are required to be online at the same time.

   Most aspects of this course are being offered offline via a series of class notes and posted videos.

   Each 'class' is to have two components:

   1. Asynchronous Component:

   This consists of a series of pdf files with the notes for this course. I have created a series of videos in which I will go over these notes, show proofs of some of the results when necessary and solve a variety of related examples/problems.

   2. Synchronous Component:

   The term tests will take place online and during the allocated lecture time on the specified exam date. For more information please see the Examination Policy section.

   I will be offering Office Hours during the scheduled class time each Wednesday. They will be held through Zoom - coordinates to be provided in D2L. Your presence is not required, but you are always encouraged to participate and ask questions.

   Course Site:

   D2L: ACSC 427 L01-(Fall 2020)-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.

   Actuarial Science 327; Statistics 323; one of 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:

Component(s)	Weighting %	Date
Test 1	25%	October 16, 2020
Test 2	25%	November 20, 2020
Final Exam	50%	TBD

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.

	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
Minimum % Required	95 %	90 %	85 %	80%	75%	70 %	65 %	60%	55%	52 %	50 %

This course has a registrar scheduled final exam.

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, then the percentage weight of the legitimately missed assignment could also be pro-rated among the components of the 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):

David C.M. Dickson, Mary R. Hardy and Howard R. Waters,*Actuarial mathematics for life contingent risk (Second edition)*: Cambridge : Cambridge University Press, 2013..
Stuart Klugman, Harry H. Panjer and Gordon E. Willmot,*Loss models from data to decisions (fifth edition)*: Wiley.

Topics covered from the textbooks:

From the main text:

- 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 additional text:
- Chapter 14: Construction of empirical models.

A calculator is essential for working exercises, tests and final exam. The Texas Instruments BA II PLUS calculator is one of the calculators allowed on the Society of Actuaries examinations; it has the financial functions that would be needed for this course and is recommended.

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:**

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

1. All exams (midterms and final exam) 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. Students requiring accommodations for exceptional circumstances will need to arrange these with the instructor no less than 7 days before the exam.
2. There will be two (2) midterm exams administered through the course D2L website. They will be completed during the regularly scheduled class periods (i.e. synchronous) on the dates mentioned in the Grading section, and you will be expected to be available to write the exams during those times. The exams will be 45 minutes long, not including the 15 minute period for uploading.
3. The final exam date will be scheduled by the Registrar's Office and will have a duration of 2 hours, not including the 15 minute time for uploading the exam.
4. 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.

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 Center:** 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 (svsa@ucalgary.ca) or phone at 403-220-2208. The complete University of Calgary policy on sexual violence can be viewed at (https://www.ucalgary.ca/policies/files/policies/sexual-violence-policy.pdf)

d. **Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under Section K. Student Misconduct to inform yourself of definitions, processes and penalties. Examples of academic misconduct may include: submitting or presenting work as if it were the student's own work when it is not; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; collaborating in whole or in part without prior agreement of the instructor; borrowing experimental values from others without the instructor's approval; falsification/ fabrication of experimental values in a report. **These are only examples**.

e. **Academic Accommodation Policy:** Students needing an accommodation because of a disability or medical condition should contact Student Accessibility Services in accordance with the procedure for accommodations for students with disabilities available at procedure-for-accommodations-for-students-with-disabilities.pdf.

   Students needing an accommodation in relation to their coursework or to fulfill requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to the Associate Head of the Department of Mathematics & Statistics, Mark Bauer by email bauerm@ucalgary.ca or phone 403-220-4189. Religious accommodation requests relating to class, test or exam scheduling or absences must be submitted no later than **14 days** prior to the date in question. See Section E.4 of the University Calendar.

f. **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 placing their name on the front page and their ID number on each subsequent page. For more information, see Legal Services website.

g. **Student Union Information:** VP Academic, Phone: 403-220-3911 Email: suvpaca@ucalgary.ca. SU Faculty Rep., Phone: 403-220-3913 Email: sciencerep@su.ucalgary.ca. Student Ombudsman, Email: ombuds@ucalgary.ca.

h. **Surveys:** At the University of Calgary, feedback through the Universal Student Ratings of Instruction (USRI) 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.

i. **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.

j. **Canadian Institute of Actuaries Ethics:** In addition to the university's internal policies on conduct, including academic misconduct (Section K of the online calendar), 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
- Calculate and interpret probabilities, means, percentiles and higher-order moments of random variables 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

Electronically Approved - Sep 08 2020 13:08

Department Approval