

**Faculty of Science Course Syllabus**  
**Department of Mathematics and Statistics**  
**ACSC/STAT 4720**  
***Life Contingencies II***  
***Fall 2019***

**Instructor:** Iain Beaton                      ibeaton@dal.ca                      Chase 311

**Lectures:** MWF 11:35am-12:25pm                      LSC-PSYC P5260

**Office Hours:** Monday 10:00-11:25 in the Math Learning Centre (Chase 119) or by appointment.

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### Course Description

This course extends what was done in ACSC/STAT 3720 to deal with common additional features that affect life insurance policies. We introduce multiple-state models, pensions, interest rate risk and profit testing.

### Course Prerequisites

ACSC 3720 / STAT 3720

### Course Materials

- Textbook:
  - *Actuarial Mathematics for Life Contingent Risks* (Second Edition) by David C. M. Dickson, Mary R. Hardy and Howard R. Walters, published by Cambridge University Press, 2013
  - *Study Note: LTAM-21-18 Supplementary Note on Long Term Actuarial Mathematics.*
  - *Study Note: LTAM-22-19 Chapters 10, 11, and 14 from Loss Models, From Data to Decisions, 5<sup>th</sup> edition, 2018*
  - ***Both study notes will be provided on Brightspace.***
  
- Website: Brightspace

### Course Topics

Long Term Coverages in Health Insurance, Multiple State Models, Joint Life and Last Survivor Benefits, Mortality Improvement Modelling, Estimation from Empirical Data, Pension Mathematics, Emerging Costs for Traditional Life Insurance.

### Course Assessment

Component	Weight (% of final grade)	Date
<i>Quizzes</i>	20%	<i>Weekly</i>
<i>Midterm #1</i>	30%	<i>Friday November 1, 2019</i>
<i>Final</i>	50%	<i>(Scheduled by Registrar)</i>

**Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale**

A+ (90-100)	B+ (77-79)	C+ (65-69)	D	(50-54)
A (85-89)	B (73-76)	C (60-64)	F	(<50)
A- (80-84)	B- (70-72)	C- (55-59)		

**Course Policies**

- Quizzes will be held in class weekly. Each quiz will be 10 minutes long at the end of class. The quiz will be one or two questions chosen from a set of testable problems which will be posted on Brightspace the week prior. Your lowest quiz score will not be included in the average for your quiz component
- The midterm will be 50 minutes long and held in class on November 1<sup>st</sup>. The midterm will cover material from chapters 1-5 from the textbook.
- The final will be 3hrs long and scheduled by Registrar's Office during the examination period: December 5th to December 15th.
- Calculators are permitted for quizzes, midterms, and the exam so long as they are approved. (i.e. no graphing calculators). Ideally a student will use an SOA approved calculator.
- If you miss a midterm or quiz, a score of 0 will be assigned unless you have informed the instructor **beforehand**. In the case of a missed quiz, the missed quiz score will not be included in the average for that component. For a missed midterm, a make-up midterm will be scheduled.

**Weekly Readings**

To gain the full benefit from the lecture, I highly suggest reading the relevant sections in the textbook beforehand. The sections which are to be covered each class will be available on Brightspace.

**Course Content**

This is a tentative schedule for the semester. A more detailed version is available on Brightspace and will be updated regularly.

Dates	Topics	Chapters
Sept. 4-6	Long Term Coverages in Health Insurance	SN 1.1-1.6
Sept. 9-13	Multiple State Models	8.2, 8.4
Sept. 16-20	Multiple State Models	8.5-8.7
Sept. 23-27	Multiple State Models	8.8-8.13
Sept. 30-Oct. 4	Joint Life and Last Survivor Benefits	9.2-9.6
Oct. 7-11	Joint Life and Last Survivor Benefits, Mortality Improvement Modelling	9.6-9.7, SN 4.1-4.4
Oct. 14-18	Mortality Improvement Modelling, Estimation from Empirical Data	SN 4.4-4.6, LM 12.1
Oct. 21-25	Estimation from Empirical Data	LM 12.2-12.5
Oct. 28-Nov. 1	Estimation from Empirical Data, <b>Midterm (Nov. 1st)</b>	LM 12.7, 12.9
Nov. 4-8	Pension Mathematics	10.3-10.7
Nov. 11-15	<b>Reading Week (No Class)</b>	
Nov. 18-22	Emerging Costs for Traditional Life Insurance, Retiree health benefits	12.3-12.6, SN 6.1-6.4
Nov. 25-29	Emerging Costs for Traditional Life Insurance	12.7-12.8
Dec. 2-3	Review	

**Faculty of Science Course Syllabus (Section B)**  
Discrete Structures – ACSC/STAT 4720

**University Policies and Statements**

**This course is governed by the academic rules and regulations set forth in the University Calendar and by Senate**

**Academic Integrity**

At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect (The Center for Academic Integrity, Duke University, 1999). As a student, you are required to demonstrate these values in all of the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity.

**Information:** [https://www.dal.ca/dept/university\\_secretariat/academic-integrity.html](https://www.dal.ca/dept/university_secretariat/academic-integrity.html)

**Accessibility**

The Advising and Access Services Centre is Dalhousie's centre of expertise for student accessibility and accommodation. The advising team works with students who request accommodation as a result of a disability, religious obligation, or any barrier related to any other characteristic protected under Human Rights legislation (Canada and Nova Scotia).

**Information:** [https://www.dal.ca/campus\\_life/academic-support/accessibility.html](https://www.dal.ca/campus_life/academic-support/accessibility.html)

**Student Code of Conduct**

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner—perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution.

**Code:** [https://www.dal.ca/dept/university\\_secretariat/policies/student-life/code-of-student-conduct.html](https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html)

**Diversity and Inclusion – Culture of Respect**

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness

**Statement:** <http://www.dal.ca/cultureofrespect.html>

**Recognition of Mi'kmaq Territory**

Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for guidance, counsel and support. Visit or e-mail the Indigenous Student Centre (1321 Edward St) ([elders@dal.ca](mailto:elders@dal.ca)).

**Information:** [https://www.dal.ca/campus\\_life/communities/indigenous.html](https://www.dal.ca/campus_life/communities/indigenous.html)

**Important Dates in the Academic Year (including add/drop dates)**

[https://www.dal.ca/academics/important\\_dates.html](https://www.dal.ca/academics/important_dates.html)

**University Grading Practices**

[https://www.dal.ca/dept/university\\_secretariat/policies/academic/grading-practices-policy.html](https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html)

**Missed or Late Academic Requirements due to Student Absence (policy)**

[https://www.dal.ca/dept/university\\_secretariat/policies/academic/missed-or-late-academic-requirements-due-to-student-absence.html](https://www.dal.ca/dept/university_secretariat/policies/academic/missed-or-late-academic-requirements-due-to-student-absence.html)

## **Student Resources and Support**

### **Advising**

**General Advising** [https://www.dal.ca/campus\\_life/academic-support/advising.html](https://www.dal.ca/campus_life/academic-support/advising.html)

**Science Program Advisors:** <https://www.dal.ca/faculty/science/current-students/academic-advising.html>

**Indigenous Student Centre:** [https://www.dal.ca/campus\\_life/communities/indigenous.html](https://www.dal.ca/campus_life/communities/indigenous.html)

**Black Students Advising Centre:** [https://www.dal.ca/campus\\_life/communities/black-student-advising.html](https://www.dal.ca/campus_life/communities/black-student-advising.html)

**International Centre:** [https://www.dal.ca/campus\\_life/international-centre/current-students.html](https://www.dal.ca/campus_life/international-centre/current-students.html)

### **Academic supports**

**Library:** <https://libraries.dal.ca/>

**Writing Centre:** [https://www.dal.ca/campus\\_life/academic-support/writing-and-study-skills.html](https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html)

**Studying for Success:** [https://www.dal.ca/campus\\_life/academic-support/study-skills-and-tutoring.html](https://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html)

**Copyright Office:** <https://libraries.dal.ca/services/copyright-office.html>

**Fair Dealing Guidelines** <https://libraries.dal.ca/services/copyright-office/fair-dealing.html>

### **Other supports and services**

**Student Health & Wellness Centre:** [https://www.dal.ca/campus\\_life/health-and-wellness/services-support/student-health-and-wellness.html](https://www.dal.ca/campus_life/health-and-wellness/services-support/student-health-and-wellness.html)

**Student Advocacy:** <https://dsu.ca/dsas>

**Ombudsperson:** [https://www.dal.ca/campus\\_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html](https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html)

### **Safety**

**Biosafety:** <https://www.dal.ca/dept/safety/programs-services/biosafety.html>

**Chemical Safety:** <https://www.dal.ca/dept/safety/programs-services/chemical-safety.html>

**Radiation Safety:** <https://www.dal.ca/dept/safety/programs-services/radiation-safety.html>

**Scent-Free Program:** <https://www.dal.ca/dept/safety/programs-services/occupational-safety/scent-free.html>