ACSC/STAT 4720, Life Contingencies II
Fall 2015
Toby Kenney

Instructor:	Toby Kenney Department of Mathematics and Statistics Chase Building, Room 202 email: tkenney@mathstat.dal.ca
Course Website:	`www.mathstat.dal.ca/~tkenney/4720/2015/`
Office Hours:	Monday 10:30-11:30, Wednesday 10:30-11:30 & Friday 14:30-15:30
Lectures:	MWF: 11:35-12:25 Chase 319
Topics:	Multiple State Models, Joint Life and Last Survivor Benefits, Pension Mathematics, Yield Rates and Non-diversifiable Risks, Emerging Costs in Traditional Life Insurance, Participating and Universal Life Insurance, Emerging Costs for Equity-Linked Insurance
Textbook:	"Actuarial Mathematics for Life Contingent Risks" (Second Edition) by David C. M. Dickson, Mary R. Hardy, and Howard R. Waters published by Cambridge University Press, 2013

Course Work and method of assessment

There will be a midterm exam and a final exam. The midterm will be held in class on Monday 2nd March, and should cover the material in Chapters 8–10. The content of this exam may be changed, depending on the progress in lectures. The final exam will be scheduled by the Registrar's Office during the examination period: 10–20th December.

There will also be (approximately) weekly homework assignments, which must be handed on Thursdays in the lecture. After this, I will put the model solutions on the course website. **No credit can be given for late homework.** The overall homework mark will be made up of an average of the weekly homework marks, with the exception of the worst mark for each student.

The homework sheet will be divided into 2 sections: The *basic questions* section tests the basic concepts covered in the course: everyone should be able to do all these questions. The *standard questions* section has questions where the concepts covered in the course can be applied to more realistic situations, or questions which involve a stronger theoretical insight; these questions are mostly straightforward, though there may be the occasional tricky question included. There may also be some *bonus questions* which are either more challenging, or else raise interesting or important issues that are not central to this course.

Sometimes a question will be started on one sheet, but continued on the following sheet, after the relevant material has been covered. In this case, the full question will be given on the earlier sheet, but the parts that should only be attempted with the later sheet are clearly marked, and are repeated on the later sheet. For some questions, I may occasionally give out a hint, rather than a complete model solution. Revised answers to these questions may then be submitted with the following week's homework.

Grades will be determined by performance in the exams and the weekly homeworks. The midterm exam counts for 30%, the final counts for 55%, while the homework counts for the remaining 15%. You must pass the final exam to obtain a passing grade in the course.

Weekly Readings

Since class time is limited, I will be using it for explaining concepts and going over examples, rather than reading through the textbook. You should therefore read through the relevant sections of the textbook *before* the lecture, in order to gain the full benefit from the lecture. The sections of the textbook that will be covered each lecture will be listed on the website. This list may be updated from time to time, depending on the progress made in earlier lectures. Here is the current plan.

Week	Monday	Wednesday	Friday
7th Sep			Introduction and Preliminaries, **8 Multiple State Models**,8.2 Examples
14th Sep	8.4 Assumptions and Notation, 8.5 Numerical Evaluation of Probabilities	8.6 Premiums, 8.7 Policy values and Thiele's differential equation	8.8 Multiple decrement models, 8.9 Multiple decrement tables
21st Sep	8.10 Constructing a multiple decrement table, 8.11 Comments on multiple decrement notation, 8.12 Transitions at exact ages	8.13 Markov multiple-state models in discrete time, **9 Joint Life and Last Survivor Benefits** 9.2 Joint Life and Last Survivor Benefits, 9.3 Joint Life Notation	9.4 Independent Future Lifetimes, 9.5 A Multiple State Model for Independent Future Lifetimes
28th Sep	9.6 A Model with Dependent Future Lifetimes, 9.7 The Common Shock Model	9.7 The Common Shock Model (cont.), **10 Pension Mathematics:**	10.3 The Salary Scale Function, 10.4 Setting the DC Contribution
5th Oct	10.5 The Service Table	10.6 Valuation of Benefits,10.7 Funding the Benefits Revision chapters 8–10	
12th Oct	THANKSGIVING	Revision chapters 8–10	Revision chapters 8–10
19th Oct	MIDTERM EXAM	**11 Yield Rates and Non-Diversifiable Risk:** 11.2 The Yield Curve (Revision), 11.3 Valuation of Insurances and Life Annuities	11.3 Valuation of Insurances and Life Annuities (cont.), 11.4 Diversifiable and Non-diversifiable Risk
26th Oct	11.4 Diversifiable and Non-diversifiable Risk (cont.), 11.5 Monte Carlo Simulation	11.5 Monte Carlo Simulation (cont.)	**12 Emerging Costs for Traditional Life Insurance:**, 12.3 Profit Testing a Term Insurance Policy
2nd Nov	12.3 Profit Testing a Term Insurance Policy (cont.), 12.4 Profit Testing Principles	12.5 Profit Measures, 12.6 Using the Profit Test to Calculate the Premium	12.7 Using the Profit Test to Calculate Reserves
9th Nov	12.8 Profit Testing for Multiple-State Models	REMEMBRANCE DAY	**13 Participating and Universal Life Insurance:** 13.3 Participating Insurance
16th Nov	13.4 Universal Life Insurance	13.5 Comparison of UL and Whole Life Insurance Policies	**14 Emerging Costs for Equity-Linked Insurance:** 14.2 Equity-Linked Insurance
23rd Nov	14.3 Deterministic Profit Testing for Equity-Linked Insurance	14.4 Stochastic Profit Testing	14.5 Stochastic Pricing
30th Nov	14.6 Stochastic Reserving	Revision	Revision
7th Dec	Revision		

Sections of the text covered

We expect to cover most of the material in Chapters 8–14 in the textbook.

Students with disabilities

Students with disabilities are encouraged to register as quickly as possible at the Student Accessibility Services if they want to receive academic accommodations. To do so, plese 'phone 494-2836, email access@dal.ca, drop in at the Killam, G28, or visit our website at www.studentaccessibility.dal.ca.

Plagiarism

Plagiarism is a serious academic offense which may lead to loss of credit, suspension or expulsion from the university. Please read the Policy on Intellectual Honesty contained in the Calendar or on the Dalhousie web site at: http://www.registrar.dal.ca/calendar/ug/UREG.htm#12.

Dalhousie Writing Centre

Writing expectations at university are higher than you will have experienced at high school (or if you are entering a master's or PhD program, the expectations are higher than at lower levels). The Writing Centre is a Student Service academic unit that supports your writing development. Make an appointment to discuss your writing. Learning more about the writing process and discipline-specific practices and conventions will allow you to adapt more easily to your field of study.