UNIVERSITY OF CALGARY

FACULTY OF SCIENCE

Department of Mathematics and Statistics

Actuarial Science 427 Life Contingencies II

(see Course Descriptions for the applicable academic year: http://www.ucalgary.ca/pubs/calendar/)

Syllabus:

Main reference Text: "Actuarial mathematics for life contingent risk (Second edition)", by David C.M. Dickson, Mary R. Hardy and Howard R. Waters

Syllabus

Topics

Chapter 7: Policy values

Chapter 8. Multiple state models

Chapter 9: Joint life and last survivor

Instructor may draw materials for assigned topics from an alternative text which uses the notation given in the main reference text.

It is intended that this course should cover an approximately one third of the syllabus for the Society of Actuaries Exam MLC – Models for Life Contingencies. This course syllabus should be updated as needed, with this objective in mind.

Course Outcomes

By the end of this course, students will be able to:

1. 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.

2. Calculate and interpret probabilities, means, percentiles and higher-order moments of random variables associated with these premiums, including loss-at-issue random variables.

3. Calculate and interpret benefits reserves, gross premium reserves, expense reserves and modified reserves.

4. 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.

5. Calculate and interpret asset shares. Calculate and interpret the effect of policy modifications.

6. Evaluate benefit reserves with continuous cash-flows using Thiele's differential equation.

7. 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.

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