



Actuarial Science 527

Life Contingencies III

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

**Main reference Text:** "Models for Quantifying Risk", by Robert Cunningham, Ph.D., FSA, Thomas N. Herzog, ASA, Ph.D., Richard L. London, FSA. The latest version of this text should be purchased. Your Professor will advise you further.

**Additional Reference Texts (NOT Required):**

"Actuarial Models for Life Contingent Risks", by Dickson, Hardy, and Waters. Cambridge.

"Actuarial Mathematics", second edition, by Bowers et.al. Society of Actuaries.

## Syllabus

### Topics

Chapter 12 (12.1-12.4,12.6-12.8): Multi-life models (including joint-life status, last survivor status, etc.)

Chapter 13 (13.1-13.6): Multiple decrement models (theory) (including discrete models, theory of competing risks, continuous models, uniform distribution of decrements, etc.)

Chapter 14 (14.1-14.3,14.5-14.6: Multiple decrement models (applications) (NB selected examples drawn from this chapter may be used in class or assigned as independent readings, at the instructor's discretion)

Chapter 15 (15.1-15.4, 15.5-15.6): Models with varying interest rates; topics from this chapter may be mentioned as time permits, or else assigned as independent reading. Most of these topics will be covered in more depth in Actuarial Science 425 and 539.04 in any case.

Very brief (1 or 2 lectures) introduction to Poisson processes, as an introduction to stochastic processes.

Chapter 3: Introduction to Markov chains (discrete-time, continuous-time, etc.)

Chapters 5-14: A selection of the relevant sections on multi-state model interpretation and representation will be covered as time permits, in order to illustrate Markov chain concepts and applications.

Note, most of Chapters 5-11 are assumed background knowledge. Those chapters may be reviewed very quickly at the start of term but this is not essential given that most students will have completed Actuarial Science 427 in the prior term.

The chapters listed above correspond to those in "Models for Quantifying Risk" text, 5th edition. If another text is used as the main text, the same topics should still be covered.

Time permitting, additional MLC related material from elsewhere in the text, or from other sources such as the recommended texts, may be introduced at the instructor's discretion.

It is intended that this course should cover a portion of the syllabus for that part of the professional actuarial examination concerned with Life Contingencies. Currently, this corresponds to most of the material listed from Chapters 3, 12-14, and those parts of earlier Chapters (i.e. 5-11) concerned with multi-state model interpretation and representation, on 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.

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