ACSC 4720/STAT 4720 Life Contingencies II

The course is open to anyone who has successfully completed ACSC 3720/STAT 3720.

Calendar description:

ACSC 3720/STAT 3720 covers the basics of life contingencies in a simple standard situation. In this course we extend this to deal with a number of common additional features that affect life insurance policies. We introduce multiple-state models, pensions, interest rate risk and profit testing.

Course description:

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 8–11, which is 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.

Evaluation:

6–8 assignments (15%), midterm (30%), closed-book final exam (55%)

Textbook

Actuarial Mathematics for Life Contingent Risks, 2nd Edition 2013, D. C. M. Dickson, M. R. Hardy and H. R. Waters.; Publisher: Cambridge University Press

Another possibly useful reference (not required) is

Models for Quantifying Risk, 5th Edition 2012, R. Cunningham, T. N. Herzog, and R. L. London; Publisher: Actex

Topics

This course covers the fundamentals of life contingencies. The topics covered correspond to chapters 8–11 of the required text and the study notes from SOA for Exam MLC. They include the following:

1. Multiple state models: Kolmogorov's equations; numerical evaluation of probabilities; premiums; policy values and Thiele's differential equation; multiple decrement models; joint life and last survivor benefits; transitions at specified ages

2. Pension Mathematics: the salary scale function; setting the DC contribution; the service table; valuation of benefits; funding plans

3. Interest rate risk: the yield curve; valuation of insurances and life annuities; diversifiable and non-diversifiable risk; Monte-Carlo simulation

4. Emerging costs for traditional life insurance: profit testing for traditional life insurance; profit measures