

Title (Units): SCI7520 Actuarial Statistics (2,2,0)

Syllabus Reviewed by: Michael Ng

Prerequisite/Co-requisite: SCI7430 STATISTICAL SOFTWARE IN BUSINESS AND MANAGEMENT

Objectives: This subject introduces the mathematics of risk and insurance, life contingencies as applied to models including expenses, non-forfeiture benefits, dividends, and valuation theory for pension plans.

Calendar Description: This subject introduces the mathematics of risk and insurance, life contingencies as applied to models including expenses, non-forfeiture benefits, dividends, and valuation theory for pension plans.

References:

- 1) S. David Promislow, Fundamentals of Actuarial Mathematics, 2006.
- 2) N.L. Bowers, H.U. Gerber, J.C. Hickman, D.A. Jones and C.J. Nesbitt, Actuarial Mathematics, The Society of Actuaries, 1997.
- 3) F.E. Vyllder, Life Insurance Theory: actuarial perspectives, Kluwer Academic Publishers, 1997.
- 4) R.W. Batten, Life Contingencies: a guide for the actuarial student, ACTEX Publications, 1998.
- 5) M.M. Parmenter, Theory of interest and life contingencies, with applications: a problem-solving approach, ACTEX Publication, Winsted CT 1999.

Assessment: Continuous assessment (35%) and Final examination (65%)

Subject Content in Outline:

1. Introduction. (4 hours of teaching)
  - 1.1 Risk and insurance.
  - 1.2 Deterministic versus stochastic models.
  - 1.3 Finance and investments.
  - 1.4 Adequacy and equity.
  - 1.5 Reassessment.
2. The Life Table, Life Annuities and Insurance. (12 hours of teaching)
  - 2.1 Life expectancy
  - 2.2 Calculating annuity premiums.
  - 2.3 Calculating life insurance premiums.
  - 2.4 Insurance and annuity reserves.
  - 2.5 Fractional durations.
  - 2.6 Continuous life annuities.
  - 2.7 Differential equations for reserves.
  - 2.8 Multiple-life contracts.
  - 2.9 Multiple-decrement theory.
3. The Stochastic Model (12 hours of teaching)
  - 3.1 The stochastic approach to insurance and annuities.

3.2 Constant benefit contracts.

3.3 Ruin models.

3.4 Aggregate loss.