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MATH39522

Contingencies 2

Unit code:	MATH39522
Credit Rating:	10
Unit level:	Level 3
Teaching period(s):	Semester 2
Offered by	School of Mathematics
Available as a free choice unit?:	N

Requisites

Prerequisite

- [MATH20962 - Contingencies 1 - Actuarial Science](#) (Compulsory)

Additional Requirements

MATH39522 pre-requisites

Aims

Provide further mathematical instruction in models using cashflows which depend upon survival, death and other uncertain factors.

Overview

This unit is a continuation of MATH20962 (Contingencies 1) and covers the remaining part of the material required in subject CT5 of the Actuarial Profession's examinations.

Assessment methods

- Other - 20%

- Written exam - 80%

Assessment Further Information

Coursework: weighting 20%

End of semester examination: two hours weighting 80%

Learning outcomes

Appreciate how the techniques from Contingencies I can be extended to the survival of either or both of two lives.

Be familiar with the concept of competing risks (e.g. retirement and death) and how these can be the subject of a Markov Model.

Understand the techniques involved in discounting emerging costs.

Appreciate the heterogeneous factors affecting mortality.

Carry out calculations involving joint lifetime random variables and functions and last survivor lifetime random variables.

Model healthy-ill active-retired-dead or schemes.

Carry out calculations using multiple-decrement tables.

Syllabus

This unit explores some further simple financial topics from a mathematical point of view.

1. Annuities and Assurances involving two lives. Single and joint life function. Last survivor functions. Present values of joint life and last survivor annuities, contingent assurances, reversionary annuities and annuities payable m times per year. [5 lectures]

2. Competing Risks. Multiple State modelling. Valuing benefits contingent upon competing risks. [2 lectures]

3. Discounted emerging cost techniques. Unit-linked contracts. Expected cashflows. Profit tests and profit criteria. Product pricing [3-4 lectures]

Determining reserves by zeroising negative cashflows [2-3 lectures]

Multiple decrement tables and their relationship to single decrement tables [2 lectures]

Multiple decrement service tables. Salary-related pensions benefit and contributions. Non-life contingencies [3-4 lectures]

4. heterogeneity. Factors affecting mortality, selection and the need for different mortality tables. Risk-classification. Single figure indices. [3-4 lectures]

Recommended reading

- Subject CT5 Contingencies Produced by the Actuarial Profession.
- Actuarial Mathematics N.L. Bowers, H.U. Gerber and J.C. Hickman, Society of Actuaries, 1997.

Feedback methods

Tutorials will provide an opportunity for students' work to be discussed and provide feedback on their understanding.

Study hours

- Lectures - 22 hours
- Tutorials - 11 hours
- Independent study hours - 67 hours

Teaching staff

Jonathan Ferns - Unit coordinator