COURSE DETAILS

Course Code: F71SZ
Full Course Title: Stochastic Modelling
SCQF Level: 11
SCAF Credits: 7.5
Available as Elective: No

DELIVERY LEVEL

Undergraduate: Yes | Postgraduate Taught: Yes | Postgraduate Research: No

Additional Information:

COURSE AIMS

To introduce fundamental stochastic processes which are useful in insurance

LEARNING OUTCOMES – SUBJECT MASTERY

After studying this half course, students should be able to:

- Understand and use the Markov property
- Write down equations for the stationary distribution of a Markov chain and use, wherever possible, additional structure to solve them
- Write down first step equations and use them to compute the time to death, probability of absorption etc.
- Apply Markov chain modelling in several problems
- Understand long term behaviour and stationarity of a Markov chain
- Apply Chi-squared tests for contingency tables or goodness of fit.
- Carry out a one-way ANOVA.

LEARNING OUTCOMES – PERSONAL ABILITIES

At the end of the half course, students should be able to:

- Demonstrate the ability to learn independently
- Manage time work to deadlines and prioritise workloads
- Present results in a way which demonstrates that they have understood the technical and broader issues of stochastic processes

SYLLABUS
Conditional expectation.
Sequences of random variables and the Markov property
Review of matrix algebra
Review of summation notation and other useful concepts
Using the Markov property
Absorbing Markov chains with finite state space
First step (backwards) equations
Basic examples
Stationarity problem for finite state space chains
Tricks for the computation of the stationary distribution
Convergence to stationarity
Markov chains with infinite but countable state space
Examples
Simple point processes, Poisson and compound Poisson processes
Continuous time Markov processes
Chi-squared test for contingency tables and goodness of fit.
One-way ANOVA.

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Examination will be at least 60% and no more than 80%.

Y

Coursework will be at least 20% and no more than 40%.

Y

Re-assessment in the next academic year.