 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

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.