**COURSE DETAILS**

<table>
<thead>
<tr>
<th>Course Code: F71SZ</th>
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<tbody>
<tr>
<td>Full Course Title: Stochastic Modelling</td>
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<tr>
<td>SCQF Level: 11</td>
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<tr>
<td>SCAF Credits: 7.5</td>
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<tr>
<td>Available as Elective: No</td>
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</tbody>
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**DELIVERY LEVEL**

<table>
<thead>
<tr>
<th>Undergraduate: Yes</th>
<th>Postgraduate Taught: Yes</th>
<th>Postgraduate Research: No</th>
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</thead>
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**ACADEMIC YEAR**

- 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.

<table>
<thead>
<tr>
<th>COURSE RELATIONSHIPS</th>
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<tbody>
<tr>
<td>Course Code</td>
<td>Level</td>
<td>Title</td>
</tr>
<tr>
<td>F71AE</td>
<td>11</td>
<td>Survival Models</td>
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</tbody>
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| LOCATION AND ASSESSMENT METHODS | | |
|----------------------------------|----------------|----------------|----------------|----------------|
| Edi | SBC | Ork | Dub | Malay | IDL | COLL | ALP | OTH | Method | Weight | Exam | Mins | Type | Diet | Semester | Synoptic | Course |
| Y | | | | | | | | | Examination | 60 | 180 | Assessment | | | 1 | F71AE |

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

Y | | | | | | | | | Coursework | 40 | | Assessment | | | | Semester 1 |

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

Y | | | | | | | | | Examination | 100 | 180 | Reassessment | | | | Semester 1 |

Re-assessment in the next academic year.