**Course Details**

**Course Code:** F11MT  
**Full Course Title:** Modelling and Tools  
**SCQF Level:** 11  
**SCAF Credits:** 15  
**Available as Elective:** No

**Delivery Level**

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**Additional Information:**

**Course Aims**

The course aims to provide postgraduate students with a knowledge and critical understanding of applied mathematics and tools for solving mathematical problems.

**Learning Outcomes – Subject Mastery**

By the end of the course, students should be able to:

- develop appropriate Python programs to investigate and visualise mathematical problems.  
- deal with fundamental deterministic and probabilistic modeling techniques and the application of these to real-life problems.  
- understand Random variables, Mean, Variance, Covariance, independence.  
- understand Standard distributions - eg Normal, uniform, Poisson.  
- understand the Central Limit Theorem, Law of Large Numbers  
- perform basic Monte-Carlo simulations and Gillespie type simulations.

**Learning Outcomes – Personal Abilities**

- Demonstrate the ability to learn independently  
- Demonstrate knowledge of an area of mathematics.  
- Manage time, work to deadlines and prioritise workloads

**Syllabus**

Introduction to Python: Providing/reviewing the basics of Python. This will include labwork. This will allow the development of appropriate Python programs in the following sessions.


Review of probability theory, Modelling and Simulation: Basic probability and random variables. Examples such as random
walks and optimal stopping. Using Python to solve probability problems.

COURSE RELATIONSHIPS

N/A

LOCATION AND ASSESSMENT METHODS

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