F71SM Statistical Methods

COURSE DETAILS
Course Code: F71SM
Full Course Title: Statistical Methods
SCQF Level: 11
SCAF Credits: 15
Available as Elective: No

DELIVERY LEVEL
Undergraduate: Yes  Postgraduate Taught: Yes  Postgraduate Research: No

COURSE AIMS
This course aims to provide postgraduate students with broad knowledge of the principal areas of mathematical statistics and statistical methods widely used in actuarial science and finance. It is the intention that the course will be available to postgraduate students on other programmes who would benefit.

LEARNING OUTCOMES – SUBJECT MASTERY
On completion of this course the student should be able to:

• demonstrate knowledge of, and a critical understanding of, statistical methodologies (including the main concepts and methods of inference and modelling)
• understand and apply a range of statistical techniques based on the main theories and concepts which comprise the syllabus, including the central limit theorem
• perform basic probability calculations
• find/calculate moments and expected values of random variables and functions of random variables; use generating functions
• determine properties of estimators: efficiency, Cramer-Rao lower bound, (approx.) large sample distributions of MLEs
• perform inference on parameter estimates, including constructing confidence intervals and testing hypotheses on the values of parameters
• fit a linear regression model and critically evaluate other proposed models; test hypotheses concerning correlation coefficients

LEARNING OUTCOMES – PERSONAL ABILITIES
At the end of the course students should be able to:
1. Show an awareness of how different statistical models and techniques can be applied to financial problems.

2. Communicate meaningfully and productively with others (including practitioners and professionals in the financial services industry and elsewhere) on matters relating to and/or requiring the use of statistical methods.

**SYLLABUS**

- Data summary
- Probability
- Random variables, special distributions
- Multivariate distributions and linear combinations
- Sampling distributions, central limit theorem, t and F distributions
- Estimation – properties of estimators, methods of constructing estimators
- Interval estimation
- Hypothesis testing
- Linear relationships – regression and correlation

**COURSE RELATIONSHIPS**

N/A

**LOCATION AND ASSESSMENT METHODS**

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

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

Re-assessment in the next academic year.

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

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