**COURSE DETAILS**

**Course Code:** F77SB  
**Full Course Title:** Introduction to Statistical Science B  
**SCQF Level:** 7  
**SCAF Credits:** 15  
**Available as Elective:** No

**DELIVERY LEVEL**

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

**Additional Information:**

**COURSE AIMS**

- To develop simple probability models for data
- To understand important features of these models

**LEARNING OUTCOMES – SUBJECT MASTERY**

After studying this course, students should be able to:

- Carry out probability calculations for basic discrete probability models
- Determine the distribution of a discrete random variable and carry out related probability calculations
- Compute the expected value, variance, and standard deviation of a discrete random variable
- Recognise the experimental situations that are modelled by Binomial, Geometric, Hypergeometric, and Poisson random variables
- Use indicator variables to calculate expected value and variance.
- Use probability inequalities to obtain probability bounds.

**LEARNING OUTCOMES – PERSONAL ABILITIES**

At the end of the module, students should be able to:

- Demonstrate the ability to learn independently
- Manage time, work to deadlines and prioritise workloads
- Use an appropriate computer package to investigate the properties of random samples and to present and describe data
- Provide coherent explanation for various standard calculations in discrete probability

**SYLLABUS**

- Introduction to discrete probability models including sample spaces, probability functions, axioms of probability and consequences of the axioms
- Conditional probability, Partition Theorem, Bayes’ Theorem and independence
- Special probability models for random experiments
F77SB Introduction to Statistical Science B

- Simple equally likely models
- Sampling without replacement from a finite populations
- Models for a sequence of independent sub-experiments, including Bernoulli trials, Binomial and Geometric models

- Fundamental discrete random variables: Binomial, Geometric, Negative Binomial, Hypergeometric, and Poisson random variables.
- The Poisson approximation of the Binomial and the Binomial approximation of the Hypergeometric
- Expected value, variance and standard deviation of a random variable and the properties of these quantities.
- Indicator variables and simple probability inequalities.

### COURSE RELATIONSHIPS

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<th>Level</th>
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<th>School</th>
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### LOCATION AND ASSESSMENT METHODS

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