**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

**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
• 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>School</th>
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LOCATION AND ASSESSMENT METHODS

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