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:**

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**Course Aims**

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

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**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.

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**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

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**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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<td>School of Math and Comp Sci.</td>
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### LOCATION AND ASSESSMENT METHODS

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