UNIVERSITY OF LONDON

Course information 2025-26

ST104B Statistics 2

General information

MODULE LEVEL: 4

CREDIT: 15

NOTIONAL STUDY TIME: 150 hours

MODE: Locally Taught, Independent Learner Route and Online Taught

Summary

The course provides a precise and accurate treatment of probability, distribution theory and statistical inference at the introductory level.

Conditions

Please refer to the relevant programme structure in the EMFSS Programme Regulations to check:

- where this course can be placed on your degree structure; and
- details of prerequisites and corequisites for this course.

You should also refer to the Exclusions list in the EMFSS Programme Regulations to check if any exclusions apply for this course.

Aims and objectives

The aim of this half course is to develop students' knowledge of elementary statistical theory. The emphasis is on topics that are of importance in applications to econometrics, finance and the social sciences. Concepts and methods that provide the foundation for more specialised courses in statistics are introduced.

Learning outcomes

At the end of this half course, and having completed the recommended reading and activities, students should be able to:

- compute probabilities of events, including for univariate and multivariate random variables.
- apply and be competent users of standard statistical operators and be able to recall a variety of well-known distributions.

- derive estimators of unknown parameters using method of moments, least squares and maximum likelihood estimation techniques, and analyse the statistical properties of estimators.
- be familiar with the fundamental concepts of statistical modelling, with an emphasis on analysis of variance models.

Employability skills

Below are the three most relevant employability skills that students acquire by undertaking this course which can be conveyed to future prospective employers:

1. Complex problem-solving
2. Decision making
3. Communication

Essential reading

A comprehensive subject guide will provide all the essential reading this course. A recommended textbook for additional exposition and practice problems is:

Larsen, R.J. and M.J. Marx (2017) An Introduction to Mathematical Statistics and Its Applications, Pearson Education, 6th edition.

Assessment

This course is assessed by a two-hour and fifteen-minute closed-book written examination (80%) and a sixty-minute Multiple Choice Question assessment (20%). The Multiple Choice Question assessment will examine students' knowledge on Chapters 1 – 4 of the Subject Guide (Locally Taught and Independent Learner students) and up to an including unit 4 (Online Taught students).

Syllabus

Probability theory: Set theory: the basics; Axiomatic definition of probability; Classical probability and counting rules; Conditional probability and Bayes' theorem.

Discrete probability distributions: Probability distribution; Binomial distribution, Cumulative distribution function; Poisson distribution; Poisson approximation to the binomial; Expected value of a discrete random variable; Variance of a discrete random variable; Distributions related to the binomial distribution.

Continuous probability distributions: Probability density function and cumulative distribution function; Continuous uniform distribution; Exponential distribution; Normal distribution; Normal approximation to the binomial.

Multivariate random variables: Joint probability functions; Marginal distributions; Conditional distributions; Covariance and correlation; Independent random variables; Sums of random variables.

Sampling distributions of statistics: Random samples; Statistics and their sampling distributions; Sample mean from a normal population; The central limit theorem; Some common sampling distributions.

Estimator properties: Estimation criteria – bias, variance and mean squared error; Unbiased estimators.

Point estimation: Method of moments estimation; Least squares estimation; Maximum likelihood estimation.

Analysis of variance: One-way analysis of variance; Two-way analysis of variance.