UNIVERSITY OF LONDON

Course information 2024-25

ST2133 Advanced Statistics: Distribution Theory

General information

MODULE LEVEL: 5

CREDIT: 15

NOTIONAL STUDY TIME: 150 hours

MODE: Locally Taught, Independent Learner Route and Online Taught

Summary

This half-course is intended for students who already have some grounding in statistics. It provides the basis for an advanced course in statistical inference.

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 course is to provide a thorough theoretical grounding in probability distributions. The course teaches fundamental material that is required for specialised courses in statistics, actuarial science and econometrics.

Learning outcomes

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

- recall a large number of distributions and be a competent user of their mass/density and distribution functions and moment generating functions
- explain relationships between variables, conditioning, independence and correlation
- relate the theory and method taught in the unit to solve practical problems.

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. Adaptability and resilience

Essential reading

For full details, please refer to the reading list

Casella, G. and R.L. Berger Statistical Inference. (Duxbury, 2008) second edition [ISBN 978-8131503942]

Assessment

This course is assessed by a two-hour and fifteen-minute closed-book written examination.

Syllabus

Probability: Probability measure. Conditional probability. Bayes' theorem.

Distribution Theory: Distribution function. Mass and density. Expectation operator. Moments, moment generating functions, cumulant generating functions. Convergence concepts

Multivariate Distributions: Joint distributions. Conditional distributions, conditional moments. Functions of random variables.