



## Unit information 2009–10

# 133 Advanced statistics: distribution theory (half unit)

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

### Prerequisite

If taken as part of a BSc degree, units which must be passed before this half unit may be attempted:

04a Statistics 1 and 04b Statistics 2.

### Aims and objectives

The aim of this unit is to provide a thorough theoretical grounding in probability distributions.

The unit teaches fundamental material that is required for specialised courses in statistics, actuarial science and econometrics.

### Essential reading

Grimmett, G. and D. Stirzaker *Probability and Random Processes*. (OUP, 2001) third edition [ISBN 9780198572220].

Casella, G. and R.L. Berger *Statistical Inference*. (Duxbury, 2001) second edition [ISBN 9780534243128].

### Assessment

This half unit is assessed by a two hour unseen written examination.

### Learning outcomes

At the end of this half unit and having completed the essential reading and activities students should:

- ✓ be familiar with a large number of distributions and be competent working with their mass/density, distribution functions and moment generating function
- ✓ understand relationships between variables, conditioning, independence and correlation
- ✓ be able to put together the theory and method taught in the unit to solve practical problems.

Students should consult the *Programme Regulations for degrees and diplomas in Economics, Management, Finance and the Social Sciences* that are reviewed annually. The Prerequisites, Exclusions, and Syllabus are subject to confirmation in the *Regulations*. Notice is also given in the *Regulations* of any units which are being phased out and students are advised to check unit availability.

## Syllabus

This is a description of the material to be examined, as published in the *Regulations*. On registration, students will receive a detailed subject guide which provides a framework for covering the topics in the syllabus and directions to the essential reading.

**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.