



Course information 2011–12

ST3133 Advanced statistics: distribution theory (half course)

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.

Prerequisite

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

ST104a Statistics 1 and ST104b Statistics 2.

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.

Essential reading

For full details, please refer to the reading list

Grimmett, G. and D. Stirzaker *Probability and Random Processes*. (OUP)
Casella, G. and R.L. Berger *Statistical Inference*. (Duxbury)

Assessment

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

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.

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 courses which are being phased out and students are advised to check course 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.