Course curriculum for STAM 11 Probability Theory

1. General information

1.1. Course title: Probability Theory
1.2 Level: Master's Level/Doctoral Level
1.3 Credit points: 15 ECTS
1.4 Approval: Approved by the Board of Directors at the Department of Statistics, School of Economics and Management, Lund University, June 2, 2008.

2. Course level and placement within the educational system

2.1. Subject: Statistics
2.2. This is a Master's level course/Doctoral level course and is obligatory in the two year Master's programme in Statistics and in the PhD programme.
2.3. The course is offered in English.

3. Learning outcomes

After the course students are expected to be able to apply advance probability theory to building probability models in applications, to have an understanding of important theorems within probability theory, to be able to solve complicated probabilistic problems and explain various convergence concepts in probability

4. Course content

This course gives a solid background in and understanding of the basic results and methods in probability theory at an advanced level. It deals with random variables in one and several dimensions, conditional distributions, moment generating functions and characteristic functions, multivariate normal distributions, quadratic forms, order statistics, convergence criteria for random variables, the Borel-Cantelli lemmas, convergence via transforms, the central limit theorem and strong law of large numbers. Also studied are Poisson processes; conditioning on the number of occurrences or on occurrence times, thinning of Poisson process and the compound Poisson process.

5. Teaching and assessment

The course is designed as a series of lecturers and problem solving sessions. Grading is based on individual performance via oral presentations and an end-of-course written exam.

Note

The University views plagiarism very seriously, and will take disciplinary action against students for any kind of attempted malpractice in examinations and assessments. Plagiarism is considered to be a very serious academic offence. The penalty that may be imposed for this and other unfair practices in examinations or assessments includes suspension from the University.

6. Grading scale

The following grades are used: Pass with distinction, Pass and Fail. All courses are as a supplement also graded according to the ECTS scale A-F.

6. Prerequisites

General prerequisites for the Masters programme in Statistics

7 . Literature

See separate document.

Literature

A. Gut, *An Intermediate Course in Probability Theory*, Springer-Verlag 1995.

References:

An optional textbook that is somewhat harder

A. Gut, *Probability: A Graduate Course Series*: Springer Texts in Statistics 1st ed. 2005. 2nd Corr. printing, 2007