

Course curriculum for STAM12 Statistical Theory

1. General information

1. Name: Statistical Inference
2. Level: Master level
3. Credit points: 15; ECTS-credits: 15
4. Approved by the Board of Directors at the Department of Statistics, School of Economics and Management, Lund University, June 2, 2008.

2. Course placement within the educational system

1. Subject: Statistics
2. This is a master level course and is mandatory in the two years masters programme in Statistics and in the PhD programme in Statistics.
3. The course is offered in English.

3. Learning outcomes

On successful completion of the course students will have

- acquired deeper knowledge of statistical theory.
- the ability to apply statistical theory to practical problems.
- the ability to determine how good an estimator or test procedure is on a number of criteria.
- appreciated how likelihood-based procedures operate in unusual practical situations
- experience of modern statistical methods that make use of the power of modern computers, especially those using simulation methods and bootstrap.

4. Course content

The course contains the body of basic principles, methods and results underlying the statistical analysis of data. In this course we introduce desirable properties that good estimators and hypothesis tests should enjoy and use them as criteria in the development of optimal estimators and test procedures.

Basic statistical concepts: test statistic, sufficiency, completeness, estimator.

Principles of data reduction: the sufficiency principle, the likelihood principle (weak and strong);

Point estimation: methods of finding estimators; methods of evaluating estimators.

Hypothesis testing: methods of finding tests; methods of evaluating tests.

Interval estimation: methods of finding interval estimators, methods of evaluating interval estimators.

Asymptotic evaluations: point estimation, robustness, hypothesis testing, interval estimation.

5. Teaching and assessment

The course is designed as a series of lectures, exercises and laboratory work with reports. Grading is based on individual performance, via written assignments, oral presentation as well as group activities.

Note

The university views plagiarism very seriously, and will take disciplinary actions 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 practice in examinations or assessments, includes suspension from the University for a specified period.

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.

7. Prerequisites

General prerequisites for the masters programme in Statistics.

8. Literature

See separate document.

Literature:

Statistical Inference. P H Garthwaite, I T Jolliffe and B Jones. Second edition, 2002, ISBN 0–19–857226–3. Oxford University Press, Oxford, xii + 328 pages.