

Syllabus

for course at first level

Statistical Theory with Applications
Statistisk teori med tillämpningar

**15.0 Higher Education
Credits**
15.0 ECTS credits

Course code:	ST211G
Valid from:	Autumn 2012
Date of approval:	2012-03-14
Department	Department of Statistics
Subject	Statistics

Decision

This syllabus was approved by the Board of the Department of Statistics on April 09, 2008.

Prerequisites and special admittance requirements

Fundamentals of Statistics, basic level, 15 ECTS credits and Regressionanalysis and Survey Methods, basic level, 15 ECTS credits, or Statistics I, basic level, 30 ECTS credits, or equivalent.

Course structure

Examination code	Name	Higher Education Credits
11ST	Statistical theory with applications I, examination	6
12SI	Compulsory exercise, statistical theory with applications I	1.5
21ST	Statistical theory with applications II, examination	6
22SI	Compulsory exercise, statistical theory with applications II	1.5

Course content

Introduction to mathematical analysis. Basic concepts in probability theory, random variables and probability distributions. Discrete and continuous distributions, univariate as well as multivariate. Moment-generating functions, the law of large numbers and the Central Limit Theorem. Order statistics. Methods for point estimation like the method of moments, the least square method and the method of maximum likelihood. Properties of estimators like efficiency of estimators and sufficient statistics. Confidence intervals. Tests of statistical hypotheses. The lemma of Neyman-Pearson, Likelihood ratio tests. The Kolmogorov-Smirnov test. Run tests. Bayesian inference and resampling methods.

The content of the course gives extended knowledge of great use in applications of statistical methods in several fields.

Learning outcomes

After completing the course, students should be able to:

- Solve and interpret problems in probability.
- Show good knowledge of the foundations of the theory of inference.
- Solve and interpret more advanced problems regarding distributions and tests.
- Formulate simple statistical models in some concrete situations.
- Compute and interpret point- and interval-estimates and test hypotheses regarding parameters in statistical models

Education

Teaching forms may consist of lectures, exercises, seminars, computer sessions and tutoring. Some compulsory attendance and other mandatory elements may occur.

Forms of examination

a. Examination will be done by measuring the knowledge of the learning outcomes. Examination will comprise written tests and written reports of one individual compulsory exercise and one group compulsory exercise.

b. Grading is done according to a 7-point scale related to the specified learning outcomes:

A = Excellent

B = Very Good

C = Good

D = Satisfactory

E = Sufficient

Fx = Insufficient

F = Completely insufficient

c. Grading criteria will be distributed at the beginning of the course.

d. To pass the entire course, a minimum grade of E for parts 1 and 2 is required.

e. Students who have received the grade Fx or F on an examination are entitled to at least four additional examinations to achieve the lowest grade E as long as the course is given.

Students who have received the grade E on an examination may not retake this examination in order to attempt to achieve a higher grade.

Students who have received the grade Fx or F on an examination on two occasions by the same examiner have the right to request that a different examiner be appointed to set the grade of the examination. Such a request must be in writing and sent to the head of the department.

Here, the term examination denotes all compulsory elements of the course.

Interim

Students can request examination in accordance with this syllabus up to three times during a period of two years after the course is no longer given. Such a request must be in writing and sent to the head of the department.

Here, the term examination denotes all compulsory elements of the course.

Required reading

The course literature is described in an appendix to the syllabus.