

Syllabus

for course at first level

Statistics I
Statistik I

30.0 Higher Education
Credits
30.0 ECTS credits

Course code: ST107G
Valid from: Autumn 2011
Date of approval: 2010-10-06
Department: Department of Statistics
Subject: Statistics

Decision

This syllabus was approved by the Board of the Department of Statistics on October 6, 2010.

Prerequisites and special admittance requirements

Swedish upper secondary school courses English B, Mathematics C and Social Sciences A or equivalent.

Course structure

Examination code	Name	Higher Education Credits
11SM	Part 1	15
12SM	Part 2	15

Course content

The course consists of two course units:

1. Fundamentals of Statistics
2. Regression Analysis and Survey Methods

This course emphasizes the conceptual background of Statistics and its applications in empirical surveys, with special focus on descriptive statistics and statistical inference. The course also gives an orientation of the role of statistics in science. The model concept is discussed thoroughly with special focus on probability models and their applications within different fields. The course treats basic statistical methods and models for analysis of relationships among variables (regression analysis) and analysis of the development of variables over time (time series analysis). It also gives an introduction to time series analysis and predictions. The course also provides the student with basic knowledge on how to plan and conduct statistical surveys, sampling methods and survey methods.

The concepts that are more thoroughly treated are:

Knowledge building. Models, especially probability models. Basic probability theory. Discrete and continuous stochastic variables and their distributions. Data collection. Descriptive Statistics in the form of tables and diagrams. Index. Sampling distributions and the central limit theorem. Point estimation. Interval estimation. Hypothesis testing. Goodness-of-fit test and independence test. Regression. Statistical surveys. Decision theory. Simple and multiple linear regression are studied in detail, other models such as logistic and nonlinear regression are presented more generally. Model evaluation. Planning, conducting and presenting of a statistical survey. Different data collection methods and sources of information. Protection of statistical information. Questionnaire design. Different sampling methods and estimation methods. Different types of

error in a survey. Quality reporting. Practical examples from different areas of application and critical review.

Statistical software is used throughout the course.

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

Learning outcomes

After completing the course the student should be able to:

- critically review a statistical survey
- construct a model for a basic economical problem
- solve elementary problems according to the content of the course
- solve elementary problems for point estimation, confidence interval and hypothesis testing in a few basic and commonly occurring cases
- conduct a few basic data analyses using statistical software and present the results
- apply multiple linear regression analysis and basic time series analysis, with accompanying statistical inference and model evaluation
- account for more advanced regression models and time series models, such as logistical regression, decide when these models are applicable and analyse the results from studies where these methods have been used
- plan a statistical survey including designing a questionnaire
- justify and conduct different types of random samplings
- solve elementary problems in sampling theory and estimation theory
- account for concepts, methods and theories used when conducting statistical surveys

Education

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

Forms of examination

a. Examination will be done by assessing the learning outcomes. Examination will comprise written tests, written reports of an individual exercise and two compulsory group exercises.

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

- A = Excellent
- B = Very Good
- C = Good
- D = Satisfactory
- E = Adequate
- Fx = Inadequate
- F = Totally Inadequate

c. The assessment criteria for the course will be distributed at the beginning of the course.

d. In order to pass the course, the grade E or higher is required on all the course units.

e. Students who receive 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 still given.

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

Students who receive the grade Fx or F on an examination twice by the same examiner are entitled 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.

Limitations

Misc

The course has previously been given under the course code ST100G.
Registration for the course units is done in the same manner as for registering to free standing courses.

Required reading

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