

# Syllabus

for course at advanced level

**Sampling and Estimation**

**Urval och estimation**

**7.5 Higher Education**

**Credits**

**7.5 ECTS credits**

**Course code:** ST720A  
**Valid from:** Autumn 2014  
**Date of approval:** 2010-02-24  
**Changed:** 2014-03-12  
**Department** Department of Statistics

**Main field:** Statistics  
**Specialisation:** A1N - Second cycle, has only first-cycle course/s as entry requirements

## Decision

This syllabus was approved by the Board of the Department of Statistics on February 24, 2010.

## Prerequisites and special admittance requirements

90 ECTS credits in Statistics or equivalent and Swedish upper secondary school course English B or equivalent.

## Course structure

Examination code	Name	Higher Education Credits
11UE	Sampling and Estimation	7.5

## Course content

The course consists of one course unit:

### 1. Sampling and Estimation

Sampling methods treat how to make representative samplings and how to best use existing information in advance. The course covers the most commonly used sampling methods for a sampling survey: simple random sampling, stratified sampling, sampling with varying inclusion probabilities (known as ps), cluster sampling, multistage sampling and systematic sampling. The course also deals with sampling methods where the time aspect is important, for example longitudinal studies, rotating or panel sampling, and methods, which provide a good geographical or spatial distribution. It also discusses special designs whose primary purpose is to measure changes over time at both micro and macro level. It also discusses how to choose between the methods and how the plans are implemented. When a survey has been finished, the various parameters must be estimated, such as population totals, underlying entities, relationships and special dimensions. The course discusses different estimation procedures, particularly when there are different types of auxiliary information in the frame.

The course provides knowledge of great use for planning and assessment of different types of sampling surveys.

## Learning outcomes

After completing the course the student should be able to:

\* explain the advantages and disadvantages of standard sampling plans

- \* independently select appropriate sampling plans for different selection problems
- \* carry out estimation and precision estimation on data from different sampling plans, with and without auxiliary information, with the help of computers and for small samples, also without a computer
- \* analyse both model- and design-based sampling
- \* choose suitable estimators depending on the problem and the access to auxiliary information
- \* describe and use many common estimation methods for non-response problems, including multiple and single imputation, calibration
- \* independently and within a limited time, solve most problems in typical standard textbooks at this level
- \* describe the literature and account for the major journals in the field.

### **Education**

Teaching forms mainly consist of lectures, exercises and computer sessions. A visit to a workplace is mandatory. If necessary, instruction may be given in English.

### **Forms of examination**

- a. Examination will be done by assessing the learning outcomes. Examination will comprise written tests and written reports of 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 the course unit.
- 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**

The course may not be included in a degree together with the course Sampling and Estimation, 7,5 ECTS credits (ST700A).

### **Misc**

The course is mandatory within the Master's programme in Survey Methodology and Official Statistics but may also be taken as a freestanding course.

### **Required reading**

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