Department of Statistics

Stockholm University

Syllabus

for course at advanced level

Theory and Methodology of Statistical Science
Statistisk vetenskapsteori och metod

7.5 Higher Education Credits
7.5 ECTS credits

Course code:	ST5501
Valid from:	Spring 2022
Date of approval:	2021-01-20
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 January 20, 2021.

Prerequisites and special admittance requirements

90 ECTS credits first-cycle (basic level) courses in Statistics. English 6 or equivalent.

Course structure

Examination code	Name	Higher Education Credits
11VT	Exam	4.5
11VI	Mandatory home assignment	3

Course content

The course consists of one part and is examined through two tests in accordance with the exam codes above, 11VT which is referred to as Test 1 and 11VI as Test 2.

The course deals with some basic scientific theoretical approaches to knowledge formation in an empirical way as well as statistical problem solving and modeling from an applied perspective. A consistent theme in the course is the role of models in empirical science.

The course starts with some basic scientific theoretical approaches to knowledge formation, e.g. how scientific knowledge is generated and changed. Different classical theoretical approaches to science are related to different statistical methods (eg hypothesis testing, Bayesian statistics, likelihood methods), in order to shed light on the relationship between philosophical questions about science and statistical inference and evidence / results.

Furthermore, the course provides an in-depth understanding of experimental and non-experimental research methods, especially with regard to validity, causal conclusions, control of sources of error, management of confounders. The course also provides tools for independently examining scientific theoretical assumptions behind different statistical methods.

The course also discusses ethical aspects and the statistician's role and responsibility towards clients, respondents, users and the surrounding society.

Learning outcomes

To pass the course, the student must be able to:

- account for some central epistemological approaches and their relationship to statistical methods
- discuss the advantages and disadvantages of experimental and non-experimental methods in specific situations
apply statistical methods for causal conclusions, control of sources of error and management of confounders
- account for ethical aspects and reason about these in specific situations.

Education

The instruction consists of lectures and seminars. The language of instruction is English.

More detailed information may be found in the course description. The course description is posted on the Department of Statistics' website www.statistics.su.se/utbildning no later than one month before the start of the course.

Forms of examination

a) The course is examined by assessing the students' mastery of the expected outcomes. Test 1 is examined by means of a written individual exam. Test 2 is examined by means of an individual written home assignments. The examination is in English.

b) Test 1 is graded according to a seven-point grading scale: A = Excellent, B = Very Good, C = Good, D = Satisfactory, E = Sufficient, Fx = Insufficient, F = Completely insufficient. Both Fx and F are failed grades that require re-examination.

Test 2 is graded according to a two-point grading scale: U = Fail, G = Pass.

c) The grading criteria for Test 1 and Test 2, respectively, are communicated in writing to the students at the start of the course.

d) In order to pass the entire course, a minimum grade of E on Test 1 and grade G on Test 2 is required. The final grade for the entire course is equal to the grade on Test 1. Examination assignments that are not submitted on time will not be assessed. Parts of courses that have been transferred and credited are excluded when determining the final grade.

e) For each course instance, at least two examination opportunities must be provided for all tests. During a semester when the course is not offered, at least one examination opportunity must be provided for all tests.

Students who fail either of the two tests are entitled to take additional tests as long as the course is offered in order to achieve a passing grade.

Students who have received the grade Fx or F on Test 1 or the grade U on Test 2 twice in a row by one and the same examiner have the right to have another examiner appointed at the next exam, unless there are special reasons that militate against it. A request to this effect must be sent in writing to the head of department.

Students who have received a grade of E or higher, may not retake a test in order to obtain a higher grade.

f) It is not possible for students who have received the grade Fx to increase the grade to a passing grade by submitting supplementary assignments.

Interim

When this syllabus is repealed, the student has the right to be examined once per semester according to the present syllabus during a completion period of three semesters. A request to this effect must be sent in writing to the Head of department.

Limitations

The course may not be included in a degree together with the course Statistical Theory of Science, 7.5 ECTS credits (ST742A) or the course Statistical Methods (ST728A) 15 ECTS credits or any other course which fully or partially conforms with the contents of this course.

Misc

The course replaces the course Statistical Theory of Science, 7.5 ECTS credits (ST742A).

Required reading

The course literature is specified separately in an attachment. The current course literature (and other teaching resources) is posted on the Department of Statistics' website, www.statistics.su.se/utbildnin, no later than two months before the start of the course.