Department of Statistics

Syllabus

for course at first level

Statistik och dataanalys för data- och systemvetenskap **15.0 Higher Education Credits**
Statistics and Data Analysis for Computer and Systems Sciences **15.0 ECTS credits**

Course code:	ST1601
Valid from:	Autumn 2024
Date of approval:	2023-12-07
Changed:	2024-03-08
Department:	Department of Statistics
Subject group:	Statistics
Specialisation:	G1N - First cycle, has only upper-secondary level entry requirements
Main field:	Statistics

Decision

Finalized by: prefekt vid Statistiska institutionen, 2023-12-07

Prerequisites and special admittance requirements

English course 6, Mathematics course 3b or 3c, Social studies course 1b or 1a1+1a2

Course structure

Examination code	Name	Higher Education Credits
11ST	SDA I, exam 1	4.5
12SI	SDA I, home assignment 1	3.0
13ST	SDA 1, exam 2	6.0
14SI	SDA I, home assignment 2	1.5

Course content

The course provides knowledge of classical and modern statistical methods for data analysis as well as its theoretical foundations. Central is understanding of the entire process of analysis from data sources and data collection, data management, estimation, inference, prediction and practical applications. Great emphasis is placed on practical data handling, visualization and analysis through programming in R. Throughout, emphasis is placed on using a critical approach when using statistical methods and interpreting results.

The course covers;

- data collection methods and data sources
- different data types such as numerical and categorical but also text, image and spatial data

- graphical and numerical descriptions of data
- regression analysis; models with one and more explanatory variables, assumptions, estimation, inference, prediction, model evaluation. Time series analysis and forecasting. The connection to modern data analysis methods such as machine learning is addressed.
- probability theory; basic concepts, probability models, discrete and continuous random variables, probability distributions, expected value and variance, covariance and correlation, some different standard distributions, linear combinations of several random variables, sampling distributions and the central limit theorem.
- statistical inference; point and interval estimation, hypothesis testing, p-values and prediction, and introduction to likelihood.

Learning outcomes

To pass the course, students should be able to:

Knowledge and comprehension:

- account for different data collection methods and data sources
- explain basic statistical concepts

Skills and Abilities:

- process data, describe data numerically and graphically and perform analyzes through basic programming in R.
- formulate statistical models and solve basic problems in probability theory and inference
- perform regression and time series analysis and select the appropriate model for a few different types of cases

Evaluation ability and approach:

- interpret, evaluate and critically review results with regard to relevant scientific aspects.

Education

The teaching consists of lectures, exercises, and computer exercises.

The teaching language will be Swedish or English according to an announcement for each course occasion.

The course will be online or on campus according to an announcement for each course occasion. When the course is given on campus there may be elements of online or digital teaching.

For detailed information, see the course description. The course description is published on the Department of Statistics web page www.statistics.su.se/utbildning at least one month prior to the start of the course.

Forms of examination

a) The course is examined through an individual exam and two home assignments, carried out in groups.

- Exam 1 (exam code 11ST): SDA I, exam 1
- Exam 2 (exam code 12SI): SDA II, home assignment 1
- Exam 3 (exam code 13ST): SDA I, exam 2
- Exam 4 (exam code 14SI): SDA II, home assignment 2

For students who have a certificate from Stockholm University with a recommendation for special pedagogical support, the examiner can decide to adapt the teaching, give an adapted exam or let the student complete the exam in an alternative way.

b) Exam 1 and 3 are graded according to a seven-point goal-related grading scale:

A = Excellent

B = Very good

C = Good

D = Satisfactory

E = Adequate

Fx = Inadequate

F = Completely Inadequate

Both Fx and F are failing grades and require re-examination.

Exam 2 and 4 are graded according to a two-grade scale:

G = Passed

U = failed

An assessment of each individual's performance, within the group, must be enabled and documented.

c) The written grading criteria for each exam will be communicated to the students no later than at time for course start.

d) For a passing grade on the course, a minimum grade of E on Exam 1 ans 3 and a grade of G on Exam 2 and 4 are required.

The combined grade for the entire course is determined by a weighted average of the results of Exam 1 and 3. The letter grades A-E are converted to the numbers 5–1 and added together to form an average grade where the sub-courses are weighted with the number of university credits that each exam makes up of the number of points for Exam 1 and 3 together. Rounding is done to the nearest whole number.

Examination assignments that are not submitted on time, will not be graded.

e) For each course, at least two examination occasions must be offered for all exams. If there is no course occassions during a semester, at least one examination accasion must be offered for all examinations.

Students who have received a failing grade on any of the exams have the right to undergo additional exams as long as the course is given, to achieve a passing grade.

Students who have received a failing grade on an exam twice in a row by the same examiner have the right to have another examiner appointed at the next examination occasion for the exam in question, unless there are special reasons against it. The request for this must be made in writing to the head of the Department of Statistics.

Students who have received a grade of E or higher may not undergo a renewed examination for a higher grade.

f) Possibility of supplementing the grade Fx up to a pass grade is not allowed on this course.

Interim

When the syllabus is withdrawn, the student has the right to be examined once per semester according to the present syllabus during a liquidation period of three semesters. In the event that such an examination occasion has not been determined, the request for this must be made in writing to the head of the Department of statistics.

Limitations

The course may not be included in a degree together with another course whose content fully or partially corresponds to the content of this course.

The course may not be included in a degree together with any of the courses Grundläggande statistik för ekonomer, 15 hp (STE101), Statistik och dataanalys I, 15 hp (ST1101) eller Statistik och dataanalys för business administration, 15 hp (ST1501).

Misc

The course is part of the Master's program in data science, statistics and decision analysis.