

STAG25, Statistics: Statistical Programming, 7.5 credits

Statistik: Statistisk programmering, 7,5 högskolepoäng

First Cycle / Grundnivå

Details of approval

The syllabus was approved by The Board of the Department of Statistics on 2021-06-09 to be valid from 2022-01-16, spring semester 2022.

General Information

Language of instruction: Swedish

Main field of studies

Statistics

Depth of study relative to the degree requirements

G1F, First cycle, has less than 60 credits in first-cycle course/s as entry requirements

Learning outcomes

Knowledge and understanding

For a passing grade the student shall

- be able to explain fundamental concepts in imperative and object-oriented programming,
- be able to explain and give examples of the use of basic data types and simple algorithms,
- be able to explain step by step what happens when a program is run,
- be able to explain fundamental principles of simulation and Monte Carlo methods,
- be able to explain fundamental principles of resampling methodology and stochastic optimisation, and
- be able to explain why certain methods are computationally intensive.

Competence and skills

For a passing grade the student shall

- be able to import, modify and export data in various formats,
- be able to construct and implement algorithms to solve statistical problems,
- be able to write, organise, document, and distribute code in a structured way according to conventions,
- be able to structure programs using functions, classes, and methods,
- be able to stepwise develop, test, and debug programs,
- be able to independently plan and execute a simulation study,
- be able to calculate estimates using resampling methods,
- be able to orally and in writing describe and discuss programming issues and how they can be solved.

Judgement and approach

For a passing grade the student shall

- be able to assess which data types, algorithms, and implementations are suited for solving different problems, and
- be able to use the documentation of the programming language to develop his or her competence.

Course content

The course gives an introduction to imperative and object oriented programming in general, and to programming aimed at solving statistical problems in particular. The course covers

- different data types,
- import, modification, and export of data,
- control flow using e.g. loops and conditional expressions,
- structures such as functions, methods, and classes,
- implementation of algorithms,
- good coding practices,
- random number generation, simulation, and Monte Carlo methods,
- an introduction to resampling (e.g. bootstrapping),
- an introduction to stochastic optimisation, and
- implementation of computationally intensive methods.

Course design

The course is designed as a set of lectures, exercises, and seminars.

Assessment

The examination consists of a written exam and assignments, which are presented in writing and orally at a seminar.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Subcourses that are part of this course can be found in an appendix at the end of this document.

Grades

Marking scale: Fail, E, D, C, B, A.

A (Excellent) 85-100 points/percent. A distinguished result that is excellent with regard to theoretical depth, practical relevance, analytical ability and independent thought.

B (Very good) 75-84 points/percent. A very good result with regard to theoretical depth, practical relevance, analytical ability and independent thought.

C (Good) 65-74 points/percent. The result is of a good standard with regard to theoretical depth, practical relevance, analytical ability and independent thought and lives up to expectations.

D (Satisfactory) 55-64 points/percent. The result is of a satisfactory standard with regard to theoretical depth, practical relevance, analytical ability and independent thought.

E (Sufficient) 50-54 points/percent. The result satisfies the minimum requirements with regard to theoretical depth, practical relevance, analytical ability and independent thought, but not more.

F (Fail) 0-49 points/percent. The result does not meet the minimum requirements with regard to theoretical depth, practical relevance, analytical ability and independent thought.

To pass the course, the students must have been awarded the grade of E or higher.

The grade is determined as a weighted sum of the results on the exam and the assignments.

Entry requirements

General entry requirements and STAA30 Statistics: Basic Course, or the equivalent.

Subcourses in STAG25, Statistics: Statistical Programming

Applies from V22

- 2201 Examination, 5,0 hp
Grading scale: Fail, Pass
- 2202 Assignments, 2,5 hp
Grading scale: Fail, Pass