Statistics and Data Science I

Single subject and programme course

7.5 credits

Statistik och dataanalys I

771A15

Valid from: 2018 Autumn semester

Determined by
The Quality Board at the Faculty of Arts
and Sciences

Date determined
2017-10-20

Main field of study

Computational Social Science

Course level

Second cycle

Advancement level

A1X

Course offered for

- Master´s Programme in Computational Social Science

Entry requirements

A bachelor's degree or equivalent in the humanities, social-, cultural-, behavioural-, natural-, computer-, or engineering-sciences.
English corresponding to the level of English in Swedish upper secondary education (English 6/B).

Intended learning outcomes

After completion of the course, the student should at an advanced level be able to:

- describe the fundamental postulates and theorems of applied probability;
- differentiate between discrete and continuous probability distributions and relate these to the concept of random variables;
- relate common probability distributions used in the social sciences to various social processes and outcomes.
- use statistical software to generate random samples from key probability distributions;
- explain the principles of Monte Carlo simulation, and implement simulations using appropriate computational tools;
- perform univariate hypothesis testing using data and appropriate computational tools and analyze the interpretation and robustness of hypothesis tests.

Course content

This course provides an overview of key results in probability and statistics relevant for social research and introduces programming tools for statistical analysis. Major probability distributions, including the binomial, normal, exponential, and Poisson distributions, used in social science research are introduced and their properties and applications are explored in intensive computer labs. Statistical software is used to simulate from these distributions. Computational methods, including Monte Carlo simulation, are used to explore key theorems under various conditions. Hypothesis tests for parameters and statistics related to common univariate distributions are introduced, and computational alternatives are considered.

Teaching and working methods

The teaching consists of readings, lectures, seminars, and interactive computer labs. Homework and independent studies are a necessary complement to the course.
Language of instruction: English.

Examination

The course is examined through written assignments, completed computer laboratories, and a final written individual assignment. Detailed information about the examination can be found in the course's study guide.

If the LiU coordinator for students with disabilities has granted a student the right to an adapted examination for a written examination in an examination hall, the student has the right to it. If the coordinator has instead recommended for the student an adapted examination or alternative form of examination, the examiner may grant this if the examiner assesses that it is possible, based on consideration of the course objectives.

Students failing an exam covering either the entire course or part of the course twice are entitled to have a new examiner appointed for the reexamination.

Students who have passed an examination may not retake it in order to improve their grades.

Grades

ECTS, EC

Other information

Planning and implementation of a course must take its starting point in the wording of the syllabus. The course evaluation included in each course must therefore take up the question how well the course agrees with the syllabus.

The course is carried out in such a way that both men´s and women´s experience and knowledge is made visible and developed.

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Department

Institutionen för ekonomisk och industriell utveckling