



School of Economics and Management

STAG21, Statistics: Statistical Theory, 7.5 credits

Statistik: Statistisk teori, 7,5 högskolepoäng
First Cycle / Grundnivå

Details of approval

The syllabus was approved by The Board of the Department of Statistics on 2018-06-04 and was last revised on 2022-08-29. The revised syllabus applies from 2023-01-16, spring semester 2023.

General Information

First cycle level course in statistics. The course is compulsory in a Bachelor degree in statistics. The course may also be taken as a single subject course or within other Bachelor and Master's programmes at Lund University.

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

- demonstrate knowledge and understanding in probability theory,
- demonstrate knowledge and understanding in estimation theory, and
- demonstrate knowledge and understanding in test theory.

Competence and skills

For a passing grade the student shall

- demonstrate the ability to calculate probabilities,
- demonstrate skills in deriving the statistical properties of random variables,
- demonstrate the ability to construct estimators and derive their statistical properties, and

- demonstrate the ability to construct tests and derive their statistical properties.

Judgement and approach

For a passing grade the student shall

- demonstrate the ability to make assessments when choosing distributions, and
- demonstrate the ability to make assessments with regard to efficiency and consistency.

Course content

The course provides in-depth knowledge of probability and inference theory, whereby the emphasis is placed on understanding and active application of fundamental mathematical and statistical principles. It includes an overview of mathematics relevant to the course.

The course covers definitions and functions of random variables in both the one- and multidimensional cases. The emphasis in one-dimensional random variables is on the continuous case and in multidimensional random variables on the discrete case. Important standard distributions are defined and described. In addition, the empirical distribution function, Markov's and Chebyshev's inequalities, the law of large numbers, and the central limit value theorem are introduced. Furthermore, bias, efficiency and consistency are addressed; least squares, moment and maximum likelihood estimators as well as significance level, power and p-value are covered.

Course design

The course is designed as a set of lectures, exercise sessions, and computer lab sessions.

Assessment

The examination consists of a written exam and assignments, which are reported in writing.

The University views plagiarism very seriously, and will take disciplinary actions against students for any kind of attempted malpractice in examinations and assessments. Plagiarism is considered to be a very serious academic offence. The penalty that maybe imposed for this, and other unfair practice in examinations or assessments, includes suspension from the University.

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 by the result on the written exam.

Entry requirements

General entry requirements and STAA40 Statistics: Basic Course, or the equivalent.

Subcourses in STAG21, Statistics: Statistical Theory

Applies from V19

- 1901 Examination, 6,5 hp
Grading scale: Fail, E, D, C, B, A
- 1902 Assignments, 1,0 hp
Grading scale: Fail, Pass