Faculty of Science

MASC02, Mathematical Statistics: Statistical Inference Theory, 7.5 credits

Matematisk statistik: Statistisk inferensteori, 7,5 högskolepoäng

First Cycle / Grundnivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2007-06-14 and was last revised on 2007-06-14. The revised syllabus applies from 2007-07-01, autumn semester 2007.

General Information

The course is an elective course for first-cycle studies for a Bachelor of Science in Mathematics

Language of instruction: Swedish and English

Main field of studies	*Depth of study relative to the degree requirements*
Mathematics	G2F, First cycle, has at least 60 credits in first-cycle course/s as entry requirements

Learning outcomes

The aim of the course is that students on completion of the course should have acquired the following knowledge and skills:

Knowledge and understanding

On completion of the course, the students are expected to:

- to be able to explain the meaning usage of concepts in statistical inference theory,
- to be able to explain Bayesian inference, and the what difference is compared to the frequentistic interpretation.

Competence and skills

On completion of the course, the students are expected to:

- to be able to integrate knowledge from the different parts of the when solving statistical problems.

Course content

Exact methods: sufficient statistics, factorization criteria, exponential families, Rao-Blackwells theorem, ancilliary statistics, Cramér-Rao's bound, Neyman-Pearson's lemma, permutation test and connection between hypothesis testing and confidence intervals. Asymptotic methods: maximum likelihood estimation, profile, conditional and penalized likelihood as well as hypothesis testing with likelihood ratio-, Wald- and score-method. Bayesian inference: estimation, hypothesis testing and confidence interval and the difference compared to frequentistic interpretation.

Course design

Teaching consists of lectures and exercises, which to a high degree involves active participation of the students. The students should therefore prepare to be able to participate in the discussions and problem solving.

Assessment

The examination consists of a written exam followed by an oral exam. Students who fail the regular exam are offered a re-examination shortly afterwards.

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

Grades

Marking scale: Fail, Pass, Pass with distinction.
For a passing grade on the entire course a passing grade on the written and oral exam. The grade is formed by weighing together the results on the parts which are included the examination.

Entry requirements

For admission to the course knowledge equivalent to the courses MASA01, Mathematical Statistics: Basic Course, 15 credits and MASC01, Mathematical Statistics: Probability Theory, 7.5 credits is required.

Subcourses in MASC02, Mathematical Statistics: Statistical Inference Theory

Applies from V08

0701 Exam, 7,5 hp
Grading scale: Fail, Pass, Pass with distinction