Faculty of Science

MASC01, Mathematical Statistics: Probability Theory, 7.5 credits

Matematisk statistik: Sannolikhetsteori, 7,5 högskolepoäng

First Cycle / Grundnivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2007-06-14 (N 2007/148) and was last revised on 2025-05-12 by The Education Board of Faculty of Science. The revised syllabus comes into effect 2025-05-12 and is valid from the spring semester 2026.

General information

The course is a mandatory course for first-cycle studies for a Bachelor of Science in mathematics.

Language of instruction: Swedish and English

Main field of study	*Specialisation*
Mathematics	G2F, First cycle, has at least 60 credits in first-cycle course/s as entry requirements

Learning outcomes

The overarching goal of the course is to give a deeper comptence within probability theory and to provide useful and general tools for solving problems within mathematical statistics.

Knowledge and understanding

On completion of the course, the students shall be able to:

- explain different concepts in stochastic convergence and how they relate to each other,
- explain the concepts of characteristic and moment generating functions and how these functions can be used,
- describe the multi dimensional normal distribution and the invariance properties under, e.g., linear combinations and conditioning,

- explain the definition and basic properties of the Poisson process.

Competence and skills

On completion of the course, the students shall be able to:

- show the ability to integrate knowledge from the different parts of the course when solving problems.

Course content

The course deepens and expands the basic knowledge in probability theory. Central concepts in the course are transforms of distributions, conditional expectations, multidimensional normal distributions, and stochastic convergence. Further, the concept of stochastic processes is introduced by a fairly thorough treatment of the properties of the Poisson process.

Course design

Teaching consists of lectures and exercises, which to a large extent is dependent on that the student actively participate. The students should therefore be prepared to be able to participate in discussions and problem solving. The exercises are not mandatory but highly recommended.

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.

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.

Grades

Grading scale includes the grades: Fail, Pass, Pass with distinction
For a passing grade on the entire course a passing grade on the written and oral exam are required.

The grade is given by the grade on the written exam.

Entry requirements

For admission to the course knowledge equivalent to the course MASA03, Mathematical Statistics: Basic Course, 15 credits is required.

Further information

The course is given by Centre for Mathematical Sciences, Lund University.

The course is read together FMSF05 Probility Theory which is a course given by Lund's engineering school LTH.

The examination of the course is scheduled according to LTH:s exam schedule.