## MSG810    Mathematical Statistics and Discrete mathematics, 7.5 credits

Matematisk statistik och diskret matematik, 7,5 högskolepoäng

*First Cycle*

### Confirmation

This course syllabus was confirmed by Department of Mathematical Sciences on 2015-03-26 and was last revised on 2020-01-31 to be valid from 2020-08-31, autumn semester of 2020.

*Field of education:* Science 100%
*Department:* Department of Mathematical Sciences

### Position in the educational system

The course can be part of the following programmes: 1) Bachelor of Science in Physics (N1FYS), 2) Computer Science, Bachelor's Programme (N1COS) and 3) Medical Physicist Programme (N1SJU)

| *Main field of studies* | *Specialization* |
| --- | --- |
| Mathematical Statistics | G1F, First cycle, has less than 60 credits in first-cycle course/s as entry requirements |

### Entry requirements

Basic knowledge of discrete mathematics, linear algebra and calculus. Students on Fysik, kandidatprogram (N1FYS) and Sjukhusfysikerprogrammet (N1SJU) are exempted from the demand on discrete mathematics.

### Learning outcomes

On successful completion of the course the student will be able to:

- identify problems arising in technical studies and specifically in information technology for which the treatment requires use of fundamental concepts and methods from Probability theory and Mathematical statistics.

- describe and analyse such problems in terms of statistics and discrete mathematics.
- apply basic statistical methods such as parameter and interval estimation, testing of statistical hypotheses, and linear regression, in problem solving.

## Course content

The topics discussed are:

- Probability theory and Markov chains: random variables, expectation, variance, correlation, conditional probability, the law of large numbers, the central limit theorem.
- Statistics: point estimation, confidence intervals, hypotheses testing.
- Combinatorics: combinations, permutations, generating functions.

## Form of teaching

The teaching is built up around certain themes. The mathematical concepts involved are first outlined and then studied more deeply within the framework of the following course activities:

- Lectures which elucidate and explain the mathematical theory
- Exercise sessions where related problems are solved individually or in groups.

*Language of instruction:* Swedish and English
The course language may be either English or Swedish, depending on the course edition.

## Assessment

Written examination. Compulsory assignments.

If a student, who has failed the same examined component twice, wishes to change examiner before the next examination, a written application shall be sent to the department responsible for the course and shall be granted unless there are special reasons to the contrary (Chapter 6, Section 22 of Higher Education Ordinance).

In cases where a course has been discontinued or has undergone major changes, the student shall normally be guaranteed at least three examination occasions (including the ordinary examination) during a period of at least one year from the last time the course was given.

## Grades

The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U).

**Course evaluation**

The results of and possible changes to the course will be shared with students who participated in the evaluation and students who are starting the course.

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