

## Bayesian Statistics

Bayesiansk statistik

7.5 credits

Programme course

732G43

Valid from: 2023 Autumn semester

<b>Determined by</b>	<b>Main field of study</b>	
The Quality Board at the Faculty of Arts and Sciences	Statistics	
<b>Date determined</b>	<b>Course level</b>	<b>Progressive specialisation</b>
2017-09-22	First cycle	G2F
<b>Revised by</b>	<b>Disciplinary domain</b>	
Course and Programme Syllabus Board at the Faculty of Arts and Sciences	Natural sciences	
<b>Revision date</b>	<b>Subject group</b>	
2022-09-13	Statistics	
<b>Offered first time</b>	<b>Offered for the last time</b>	
Autumn semester 2017		
<b>Department</b>	<b>Replaced by</b>	
Institutionen för datavetenskap		

## Course offered for

- Bachelor's Programme in Statistics and Data Analysis

## Entry requirements

- General entry requirements for undergraduate studies and Social Studies, English and Mathematics corresponding to the level in Swedish upper secondary education (Samhällskunskap 1b or 1a1 and 1a2, Engelska 6, Matematik 3b or 3c)
- 60 ECTS credits passed from semester 1 and 2 and at least 30 ECTS credits passed from semester 3 and 4 Bachelor's Programme in Statistics and Data Analysis

## Intended learning outcomes

After completion of the course, the student should be able to:

- explain the main concepts in Bayesian statistics
- explain the differences between frequentist and Bayesian statistics
- use the most common statistical methods within Bayesian inference
- choose relevant models for Bayesian inference of various practical problems
- apply Bayesian inference using statistical software

## Course content

The course consists of general concepts and methods in Bayesian statistics. In addition, MCMC is implemented as a tool to estimate more complicated models in which an analytical form of the posterior is not possible.

Contents of the course:

- subjective probabilities
- Bayes' theorem
- prior distribution
- sensitivity analysis of prior distributions
- likelihood function
- posterior distribution
- credible interval
- model evaluation
- model selection
- MCMC

## Teaching and working methods

The teaching comprises lectures, tutorials, seminars, and computer sessions. Homework and independent study are a necessary complement to the course.

## Examination

The course is examined by

- individually written computer exam, grading scale: VG
- individually written assignments, grading scale: UG

Pass is required for each form of examination to obtain Pass as a final grade. In addition, grade Pass with distinction is required on the individually written computer exam to obtain Pass with distinction as a final grade. Detailed information about the examination can be found in the courses study guide.

If special circumstances prevail, and if it is possible with consideration of the nature of the compulsory component, the examiner may decide to replace the compulsory component with another equivalent component.

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 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.

An examiner may also decide that an adapted examination or alternative form of examination if the examiner assessed that special circumstances prevail, and the examiner assesses that it is possible while maintaining the objectives of the course.

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

Three-grade scale, U, G, VG

## 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 conducted in such a way that there are equal opportunities with regard to sex, transgender identity or expression, ethnicity, religion or other belief, disability, sexual orientation and age.

If special circumstances prevail, the vice-chancellor may in a special decision specify the preconditions for temporary deviations from this course syllabus, and delegate the right to take such decisions.