Syllabus
for course at advanced level

Bayesian Statistics I
Bayesiansk statistik I

7.5 Higher Education Credits
7.5 ECTS credits

Course code:	ST422A
Valid from:	Autumn 2015
Date of approval:	2010-05-19
Changed:	2015-02-25
Department	Department of Statistics
Main field:	Statistics
Specialisation:	A1N - Second cycle, has only first-cycle course/s as entry requirements

Decision
This syllabus was approved by the Board of the Department of Statistics on May 19, 2010, and revised on February 25, 2015.

Prerequisites and special admittance requirements
90 Higher Education Credits (HEC) in Statistics or equivalent. English B or equivalent.

Course structure

Examination code	Name	Higher Education Credits
11BE	Bayesian statistics I	7.5

Course content
The course consists of one course unit:
1. Bayesian Statistics I

In Bayesian inference, parameters are considered to be random variables and any previous knowledge about these parameters is expressed as a probability distribution, the so called a priori distribution. This prior distribution is then updated to a posterior distribution by using Bayes' theorem to combine it with the observed data which is expressed through the likelihood function. The a posterior distribution, thus, expresses evidence about the parameters after data has been observed.

This course provides an introduction to Bayesian analysis with emphasis on understanding the basic concepts and methods. Simple problems are studied in detail together with an overview and analysis of more complicated real-life problems. The course also provides an introduction to simulation-based computational methods such as the Markov Chain Monte Carlo (MCMC) which are often used in Bayesian inference.

The concepts and topics that will be dealt in more detail in the course are: subjective probabilities, likelihood, a priori and a posteriori distributions, model evaluation, MCMC.

Learning outcomes
To pass the course the student should be able to:
- give an account of the difference between various interpretations of probability
- formulate a statistical problem on the basis of Bayesian perspective
- solve standard statistical problem using Bayesian methods

- solve statistical problems using simulation-based computational methods

Education
The instruction consists of lectures and exercises.

Forms of examination
a. The course is examined by assessing the students' mastery of the expected outcomes. Assessment will be written and oral.

b. Students are graded according to a seven-point grading scale: A = Excellent, B = Very Good, C = Good, D = Satisfactory, E = Sufficient, Fx = Insufficient, F = Completely insufficient. Both Fx and F are failed grades that require re-examination.

c. The grading criteria are communicated in writing to the students at the start of the course.

d. To pass the entire course, a minimum grade of E is required.

e. For each course instance, at least two examination opportunities must be provided.

Students who fail either of the two tests are entitled to take additional tests as long as the course is offered in order to achieve a passing grade.

Students who have received a grade of E or higher, may not retake a test in order to obtain a higher grade.

Supplementary written hand-in assignments may be suggested to students who get Fx if the score of the student is close to the passing grade. Supplementary assignment work must be handed in within a specified time after the need for such work has been communicated by the examiner.

Students who have received the grade Fx or F twice by the same examiner have the right to have another examiner appointed at the next exam. A request to this effect must be sent in writing to the head of department.

Interim
When this syllabus is repealed, the student has the right to be examined once per semester according to the present syllabus during a completion period of three semesters. A request to this effect must be sent in writing to the Head of department.

Limitations
This course may not be part of a degree together with the course Bayesian Statistics I (ST402A), 7.5 HEC, or equivalent.

Required reading
The course literature is specified separately in an attachment.