Department of Mathematics
(incl. Math. Statistics)

Stockholm University

Syllabus

for course at advanced level

Bayesian Methods
Bayesianska metoder

7.5 Higher Education Credits
7.5 ECTS credits

Course code:	MT7003
Valid from:	Autumn 2007
Date of approval:	2006-09-27
Department	Department of Mathematics (incl. Math. Statistics)
Subject	Mathematical Statistics
Specialisation:	A1N - Second cycle, has only first-cycle course/s as entry requirements

Decision

This syllabus has been approved by the Board of the Faculty of Science at Stockholm University on 27 September 2006.

Prerequisites and special admittance requirements

Prerequisites for the course are 60 hp in mathematical statistics including the courses Statistical inference, FC, 7.5 hp (MT5003) and Linear statistical models, FC, 7.5 hp (MT5001) or equivalent. Also required is knowledge equivalent to Swedish upper secondary school course English B or equivalent to one of the following tests; Cambridge CPE and CAE: Pass, IELTS: 6.0 (with no part of the test below 5.0), TOEFL (paper based): 550 (with minimum grade 4 on the written test part), TOEFL (computer based): 213, TOEFL (internet based): 79.

Course structure

Examination code	Name	Higher Education Credits
S703	Bayesian Methods	7.5

Course content

The course covers Bayes' formula, informative and non-informative prior distributions, posterior distributions, single- and multiparameter distributions like binomial, multinomial och normal distributions, hierarchical models, linear models, Bayesian inference and goodness-of-fit measures and stochastic simulation with MCMC (Markov Chain Monte Carlo).

Learning outcomes

It is expected that the student after taking the course will be able to

* define Bayes' formula and derive posterior distributions

* choose suitable informative and non-informative prior distributions

* use stochastic simulation to estimate posterior distributions

* make correct conclusions from theoretical and estimated posterior distributions

* determine what model is best suited for analysis of a practical problem

Education
The education consists of lectures, exercises and computer exercises. Participation in the computer exercises is compulsory. An examiner may rule that a student is not obliged to participate in certain compulsory education if there are special grounds for this after consultation with the relevant teacher.

Forms of examination
a. Examination for the course is in the following manner: measurement of knowledge takes place through written examination.

b. Grading is carried out according to a 7-point scale related to learning objectives:
A = Excellent
B = Very Good
C = Good
D = Satisfactory
E = Sufficient
Fx = Fail
F = Fail

c. Grading criteria for the course will be distributed at the start of the course.

d. A minimum grade E is required to pass the course, together with pass of computer exercises.

e. Students who fail to achieve a pass grade in an ordinary examination have the right to take at least further four examinations, as long as the course is given. The term “examination” here is used to denote also other compulsory elements of the course. Students who have achieved a pass grade on an examination may not retake this examination in order to attempt to achieve a higher grade. Students who have failed to reach a pass grade on two occasions have the right to request that a different teacher be appointed to set the grade of the course. A request for such appointment must be sent to the departmental board.

Interim
Students may request that the examination is carried out in accordance with this syllabus even after it has ceased to apply. This right is limited, however, to a maximum of three occasions during a two-year-period after the end of giving the course. A request for such examination must be sent to the departmental board.

Limitations
The course may not be included in a degree together with the course "Bayesianska metoder" (MS 3180).

Misc
The course is a component of the Master Program in Biostatistics, and it can also be taken as an individual course.

Required reading
Course literature is decided by the departmental board and is described in an appendix to the syllabus.