Linnæus University

Course syllabus

Faculty Board of Science and Engineering
School of Computer Science, Physics and Mathematics

1MA202 Stokastiska processer, 7,5 högskolepoäng
Stochastic processes, 7.5 credits

Main field of study
Mathematics

Subject Group
Mathematics

Level of classification
First Level

Progression
G1F

Date of Ratification
Approved by Organisational Committee 2009-12-01

The course syllabus is valid from autumn semester 2010

Prerequisites
1MA201 Probability Theory and Statistics, 7,5 hec or the equivalent basic course in mathematical statistics, 7,5 hec.

Expected learning outcomes
After successfully completing the course, the student is anticipated to be able to:

- define and account for Markov chains and Markov processes
- compute stationary distributions for the studied stochastic processes
- compute extinction probability for branching processes
- formulate and do computations for the applied problems in queeing and reliability in a reasonable mathematical setup
- define and account for elementary properties of some elementary time series
- compute covariance functions and spectral densities for AR-processes and cosines processes
- perform computer simulations of the studied stochastic processes.

Content
The course comprises the following parts:

- Markov chains in discrete time, Markov processes in continuos time, brief introduction to weakly stationary processes, somewhat on the Brownian motion
- Applications in e.g. life-death processes, queeing systems, reliability, filtering
- fundamental concepts are introduced such as transition matrix, intensity matrix,

survival function, covariance function, spectral density.

Type of Instruction

Lectures, laborations and assignments. Compulsory assignments may be given during the course.

Examination

The course is assessed with the grades Fail (U), Pass (G) or Pass with Distinction (VG).
On request, students may have their credits translated to ECTS-marks. Such a request must be sent to the examiner before the grading process starts.

The student's knowledge is assessed in the form of oral and/or written examinations and presentation of mandatory assignments. Assessments are both individual and in groups. The principal assessment method for the course is determined at the beginning of the course.

Course Evaluation

After the course a written evaluation of the course will take place according to the University guidelines.

Required Reading and Additional Study Material

Required reading

Bhat, U.N & Miller, G.K *Elements of Applied Stochastic Processes*, Wiley, 2003. 319 (488) pages.

Compendium, DFM, Linnæus University, present year.

Recommended supplementary reading

Blom, G*Sannolikhetsteori med tillämpningar, bok A*, 1984

Leon-Garcia A *Probability, Statistics, and Random Processes For Electrical Engineering*, Prentice Hall, 2008

Yates, R. & Goodman, D.J *Probability and Stochastic Processes: A friendly Introduction for Electrical and Computer Engineers*, Wiley, 2004