



Course syllabus

Faculty of Technology

Department of Mathematics

1MA202 Stokastiska processer, 7,5 högskolepoäng

1MA202 Stochastic processes, 7.5 credits

Main field of study

Mathematics

Subject Group

Mathematics

Level of classification

First Level

Progression

G1F

Date of Ratification

Approved 2009-12-01

Revised 2013-12-18 by Faculty of Technology. Literature list and course evaluation are revised.

The course syllabus is valid from autumn semester 2014

Prerequisites

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

Objectives

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 queuing 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 continuous time, brief introduction to weakly stationary processes, somewhat on the Brownian motion
- Applications in e.g. life-death processes, queueing 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

A course evaluation will be carried out and compiled after the course is completed. The compilation will be presented to the current board as well as to the students and filed.

Required Reading and Additional Study Material

Required reading

Papoulis, A. & Pillai, S.U., *Probability, random variables, and stochastic processes*
McGraw-Hill, latest edition