



LUND UNIVERSITY
Faculty of Science

SYLLABUS

Date
15 February 2016

Reg. Nr.
U 2016/91

Syllabus for the course History-dependent random processes, NAMS003

Swedish title: Historieberoende slumpmässiga processer

The course syllabus was confirmed by the Faculty board for graduate studies 15 February 2016. The course is in the third cycle and amounts to 5 credits.

The course syllabus is formally approved in Swedish. This is a translation.

Learning outcomes

Knowledge and Understanding

Upon completion of the course, the doctoral student shall be able to:

- Describe the principles and methods behind history-dependent random processes
- Describe the characteristics of such processes
- Interpret the relationship as well as the differences between history-dependent random processes and Markov chains

Competences and Skills

Upon completion of the course, the doctoral student shall be able to:

- Identify the difference between Markov processes and history-dependent random processes
- Apply the toolbox developed during the course to solve typical problems that arise in history-dependent processes
- Prove mathematical theorems for history-dependent processes
- Present the analysis and conclusions of the model in a written report.

Judgement and Approach

Upon completion of the course, the doctoral student shall be able to:

- Formulate various history-dependent random models
- Analyze such models in a rigorous way
- Reflect on the presented models and their limitations for e.g. applications

Course content

Markov chains, martingales and their properties, non-Markov processes, Polya's urns, vertex-reinforced and edge-reinforced stochastic processes, methods to analyze such processes.

Teaching

Lectures and project work. Students are encouraged to base the project on a problem relevant to their research.

Assessment

Assessment is based on the written project report.

Grading scale

Possible grades are Pass and Fail. To pass the course, the student must present an approved written project report.

Language of instruction

The course is given in English.

Entry requirements

Basic mathematical knowledge of probability theory, e.g, MASM14 - Mathematical foundations of probability theory.