



FSK3898 Stochastic Methods

5.0 credits

Stokastiska metoder

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

Course syllabus for FSK3898 valid from Autumn 2018

Grading scale

G

Education cycle

Third cycle

Specific prerequisites

Enrolled as PhD student.

Ph. D students in computational sciences and e-science.

Basic knowledge in statistics and probability theory and basic knowledge using Matlab/Octave.

Recommended knowledge: Basic courses in programming, mathematical statistics and probability theory.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After completing the course, you should be able to:

- List examples of different stochastic methods and judge when the methods are applicable.
- Explain the physical principles and background of Monte Carlo methods and stochastic calculus.
- Illustrate and discuss how Monte Carlo methods are constructed.

Course contents

Random numbers, optimization methods, Markov processes, Monte Carlo methods and stochastic calculus and differential equations, survey of real world examples of stochastic methods.

Disposition

3 weeks format in line with the SeSE course format:

1 week pre-study

1 week lectures and hands-on computer exercises

1 week project assignment

Course literature

C. Gardiner, Stochastic Methods- A handbook for the Natural and Social Sciences , Springer Verlag 2009, ISBN: 978-3-540-70712-7

J. C. Spall, Introduction to Stochastic Search and Optimization, Wiley 2003, ISBN: 978-0-471-33052-3

N. G. van Kampen, Stochastic Processes in Physics and Chemistry, Elsevier, ISBN:978-0-444-52965-7

Equipment

Laptop with Matlab (or Octave) installed.

Examination

- LAB1 - Computer exercises, 1.5 credits, grading scale: G
- PRO1 - Project work, 3.5 credits, grading scale: G

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

DAT1: Computer exercises, 1.5 hp credits, grade scale: P/F

PRO1: Project work, 3.5 hp credits, grade scale: P/F

Other requirements for final grade

Examination (pass/fail):

* Passing computer exercises

* Project work with oral and written presentation

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.